Volume-III

Question Bank

Diploma in

Agricultural Extension Services for Input Dealers

(DAESI)

National Institute of Agricultural Extension Management (MANAGE)

(An Autonomous Organization of Ministry of Agriculture & Farmers Welfare, Govt. of India)

Rajendranagar, Hyderabad – 500 030, Telangana State, India

Volume - III

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FOREWORD

Indian agriculture is presently at a critical juncture, shaped by increasing climate variability, growing pressure on natural resources, rapid technological advancements, deeper market integration, and heightened expectations from farmers for accurate, timely, and scientifically sound advisory services. In this dynamic and evolving context, agricultural input dealers have emerged as vital frontline extension functionaries and trusted knowledge intermediaries for the farming community.

Recognizing the pivotal role of input dealers in strengthening last-mile extension delivery, the Diploma in Agricultural Extension Services for Input Dealers (DAESI) programme was originally conceptualized and initiated in the year 2003 as an innovative capacity-building initiative. The programme was designed to professionalize agricultural input advisory services by equipping dealers with scientific knowledge, practical skills, and ethical responsibility. In recognition of its relevance and impact, the DAESI programme received structured support from the Ministry of Agriculture and Farmers Welfare, Government of India, from the year 2015–16 onwards, enabling its systematic expansion and strengthening across the country through MANAGE, SAMETIs and ATMAs.

As the existing syllabus of DAESI was last revised in 2016, now it has been revised **into** 16 modules comprising 70 chapters, 80 sessions, and 160 learning hours, represents a significant advancement in aligning extension education with contemporary agricultural challenges. The curriculum has been extensively updated to address emerging priorities such as agro-ecological approaches, soil health management, climate change adaptation, integrated pest and nutrient management, safe and judicious use of agro-chemicals, irrigation and watershed management, agricultural value chains, digital and precision agriculture, organic and natural farming systems, and compliance with agricultural laws and regulations. The study material has been developed through a rigorous and consultative process involving scientists, academicians, extension professionals, and subject-matter specialists from leading national institutions, ensuring effective translation of scientific advancements and policy imperatives into field-level knowledge and strengthening the role of DAESI-trained input dealers as competent para-extension professionals.

Special emphasis has been placed on strengthening advisory competencies related to sustainability, responsible input use, farmer collectives, agri-entrepreneurship, business ethics, and government flagship schemes. The modular and outcome-oriented design of the revised curriculum enables systematic learning while equipping participants with practical skills to provide location-specific, need-based advisories across diverse agro-climatic regions.

I am confident that this revised curriculum will further enhance the technical proficiency, advisory effectiveness, and ethical standards of agricultural input dealers, thereby contributing meaningfully to sustainable agriculture, enhanced farm productivity, and improved farmer incomes. I sincerely appreciate the efforts of the Principal Coordinator (DAESI), Academic Associate (DAESI), authors, reviewers, and all stakeholders involved in revising this curriculum and trust that this publication will serve as a valuable learning resource for the participants across the country.
Happy reading…….

Dr. Sagar Hanuman Singh, IPoS
Director General, MANAGE

Dr. M. Srikanth, Director (ABM) &
PC (DAESI), MANAGE

PREFACE

The Diploma in Agricultural Extension Services for Input Dealers (DAESI) was conceived with the objective of equipping agricultural input dealers with scientific knowledge and practical competencies, thereby enabling them to support farmers with informed, responsible and farmer-centric advisory services. Over the years, the programme has clearly demonstrated its relevance and effectiveness by strengthening last-mile extension delivery mechanisms and enhancing the professional credibility of input dealers across diverse agro-ecological regions and farming systems.

The revised **DAESI course curriculum and study material**, organized into **16 comprehensive modules**, is the outcome of an extensive and systematic review process involving stakeholder consultations, expert deliberations, and critical assessment of emerging trends and challenges in Indian agriculture. The revision seeks to modernize and enrich the content by incorporating recent technological advancements, addressing climate change and sustainability concerns, and reinforcing the integration of theoretical concepts with practical, field-level applications.

The revised curriculum covers a wide range of subject areas, including agro-ecological situations, soil health and nutrient management, crop production technologies, weed and pest management, safe and judicious use of agro-chemicals, irrigation and watershed management, seed systems, farm mechanization, agricultural value chains, precision and digital agriculture, allied agricultural sectors, extension approaches, agri-entrepreneurship development, business ethics, statutory and regulatory frameworks, government support schemes, and organic and natural farming. Collectively, these modules address the technical, managerial, regulatory, and ethical dimensions essential for effective agricultural input advisory services. Designed in a reader-friendly and modular format, the study material facilitates progressive learning while also serving as a practical reference material for field-level problem solving.

We are grateful to Director General, MANAGE, for his kind support and valuable guidance in revising the syllabus of the DAESI programme. I also extend my sincere appreciation to the authors, reviewers, subject-matter experts, and DAESI implementing partners for their valuable contributions. It is hoped that this revised study material will further strengthen the DAESI programme and enable agricultural input dealers to function as effective, ethical, and farmer-centric extension service providers, thereby contributing to sustainable agricultural development and improved rural livelihoods.

Dr. M. Srikanth,
Director (ABM) &
Principal Coordinator (DAESI), MANAGE

Annexure-Module wise content of DAESI course curriculum

Module I: Basics of Agriculture / Agro Ecological Situations
1.1. Overview of Agricultural Production Systems

I. Multiple Choice Questions (MCQs)

1. Farming system where crops are grown for personal consumption rather than for sale
   a. Sustainable agriculture
   b. Integrated Farming System
   c. Subsistence farming
   d. Commercial farming

2. Mono cropping of perennial crops with specialized knowledge on the crop is the characteristics of
   a. Plantation farming
   b. Subsistence farming
   c. Hi-tech farming
   d. IFS

3. A group of interacting components operating together for a common purpose is called
   a. Farm
   b. Production System
   c. Trend
   d. Balance

4. Organic farming promoting scheme in India
   a. Rashtriya Krishi Vikas Yojana
   b. *PMFBY*
   c. *Poshan Abhiyan*
   d. *Paramparagat Krishi Vikas Yojana*

5. Agro-ecosystem covering the North Western and North Eastern Himalayan regions
   a. Hill and Mountainous Agroecosystem
   b. Coastal Agro-ecosystem
   c. Irrigated Agro-ecosystem
   d. Rainfed Agro-ecosystem

6. A system that make use of GPS, GIS technologies for optimizing inputs in cultivation
   a. Precision farming
   b. Aquaponics
   c. Commercial farming
   d. Agroforestry

7. Rice-jute cropping system is mostly practiced in which State
   a. Tamil Nadu
   b. West Bengal
   c. Kerala
   d. Rajasthan

8. Number of agroecosystem in India as per NATP
   a. 5
   b. 15
   c. 21
   d. 11

9. Multi-storey system is the peculiarity of which system
   a. Horticulture based cropping system
   b. Pulse based system
   c. Rice based system
   d. Cotton based system

10. Silvi-pastoral system
   a. Fruit crops + trees+ fodder +animals
   b. Crops + fruit crops + trees
   c. Trees + fodder crops +animals
   d. Crops +trees

II. Fill in the Blanks

1. Subsistence farming is mainly practiced for _____ rather than for sale.
2. Commercial farming is primarily _____ oriented.
3. Plantation farming involves _____ cropping of perennial crops.
4. Mixed farming integrates crop cultivation with _____, poultry, or fisheries.
5. Organic farming avoids the use of _____ fertilizers and pesticides.
6. Integrated Farming Systems (IFS) emphasize _____ of by-products and wastes.
7. Homestead farming is mainly practiced within the _____ area of a farm.
8. Precision farming uses technologies like GPS, GIS, and _____ for better decision-making.
9. Rice-based cropping systems are mainly found in areas with high _____ or irrigation.
10. Rainfed agro-ecosystem depends entirely on _____ without irrigation support.

II. One Mark Questions

1. The integration of crop cultivation with livestock, poultry, or fisheries in the same farm is called----------
2. Give an example of integration of crops and livestock
3. First fully organic state of India
4. An agricultural production system which avoids or largely excludes the use of synthetic fertilizers
5. Farming that depends solely on rainfall for water with little to no irrigation is called

III. Two Marks Descriptive Questions

1. Organic Farming
2. Precision farming
3. Integrated farming system
4. Plantation farming
5. Agricultural production system

IV. Three Marks Descriptive Questions

1. Differentiate subsistence farming and commercial farming
2. Write notes on crop based agricultural production system with example
3. What is Integrated Farming System? Write down the main characteristics of IFS
4. Differentiate organic farming vs. conventional farming
5. Rainfed agro ecosystem

V. Five Marks Descriptive Questions

1. Classification of agricultural production system based on farming
2. Classification of agricultural production system based on dominant crop
3. Classification of agricultural production system based on agro-ecosystem
4. What is organic farming? What are the advantages and disadvantages of organic farming?
5. What is precision agriculture? How can the traditional farming system be integrated with precision farming system?

1.2. A. Agro-ecological situation and Agro-eco system approach

1.2. B. Agro Climatic Zones of India

I. Multiple Choice Questions

1. Agro ecology primarily focuses on:

a. Maximizing chemical input use
b. Ecological balance in farming
c. Export-oriented agriculture
d. Mechanization of farms

2. Which agro ecosystem is most suitable for terrace farming?

a. Coastal
b. Hill
c. Arid
d. Wetland

3. Dryland ecosystems are typically found in:

a. Himalayan region
b. Cauvery delta
c. Deccan Plateau
d. Coastal Odisha

4. Which of the following is a key crop in the Kuttanad wetland ecosystem of Kerala?

a. Paddy
b. Cotton
c. Bajra
d. Soybean

5. Which of the following is a key principle of agro-eco system approach?

a. Ignoring farmer feedback
b. Systems thinking and integration
c. Maximizing chemical use
d. Uniform input use across regions

6. Which practice improves water use efficiency in agro ecosystems?
a. Flood irrigation
b. Mulching
c. Monocropping
d. Deep ploughing

7. Agroforestry helps in:
a. Increasing pesticide use
b. Reducing biodiversity
c. Buffering climate shocks
d. Promoting monoculture

8. The Western Dry Region mainly covers which state?
a. Gujarat
b. Rajasthan
c. Punjab
d. Maharashtra

9. AERs are useful for:
a. District-level crop planning
b. Uniform input distribution
c. Export policy formulation
d. Urban development

10. Zone-specific advisories help in:
a. Uniform input use
b. Reducing input efficiency
c. Matching inputs to local conditions
d. Increasing pesticide use

II. Fill in the Blanks

1. Organic farming avoids the use of _____ fertilizers and pesticides.
2. Organic farming was defined by _____ in 1990.
3. Integrated Farming Systems focus on _____ of resources.
4. Homestead farming is mainly meant for _____ consumption.
5. Precision farming uses technologies like GPS, GIS, and _____.
6. Rice-based cropping system is common in areas with high _____.
7. Wheat is mainly grown as a _____ crop.
8. Pulses are commonly grown as _____ crops with cereals.
9. Irrigated agro-ecosystem contributes over _____ percent of food grain production.
10. Rainfed agriculture depends entirely on _____.

III. Two Marks Descriptive Questions

1. Name one biotic component of an agro-ecosystem.
2. Name one abiotic factor affecting agro-ecosystem.
3. Name one principle of agro-ecosystem approach.
4. Name one example of human intervention in agro-ecosystem.
5. Name one type of agro-ecosystem.

IV. Three Marks Descriptive Questions

1. What is agro-ecology and why is it important for Indian agriculture?
2. List the three main categories of components in an agro ecosystem with one example.
3. Mention any two agro ecosystem types in India and one crop suited for each.
4. Give one example each of an agro ecosystem from Western, Himalayan, and Coastal India with a major crop.
5. What are the three dimensions of agro-ecosystem approach and why are they important?

V. Five Marks Descriptive Questions

1. How does agro-ecosystem management support climate-resilient agriculture?
2. What is the difference between Planning Commission's ACZs and ICAR's AEZs? What are the four criteria used by ICAR to define agro-ecological zones?
3. Name any two agro-climatic zones and mention one dominant crop from each.
4. Name any two soil types in India and one crop suitable for each.
5. What is cropping intensity and why is it important?
6. How can input dealers support farmers using agro-climatic knowledge?

1.3. A. Weather Parameters/ Agro Meteorological Information and their impact on Agricultural Production.
1.3. B. Climate Change, Climatic Variability, Global Warming, Causes of Climate Change and its Impact on Regional and National Agriculture.

I. Multiple Choice Questions

1. Which of the following weather parameters primarily determines the rate of photosynthesis?

a. Wind speed
b. Solar radiation
c. Atmospheric pressure
d. Rainfall

2. The unit of atmospheric pressure generally used in weather observations is:

a. mm of Hg
b. Celsius
c. hPa or millibar
d. Joules

3. Which instrument is used to measure wind speed?

a. Anemometer
b. Hygrometer
c. Pyranometer
d. Rain gauge

4. Relative humidity is expressed in a:

a. Ratio in decimals
b. Percentage (%)
c. Temperature value
d. Pressure in hPa

5. The main component of the hydrological cycle useful for agriculture is:

a. Solar radiation
b. Evaporation
c. Rainfall
d. Cloud cover

6. The standard sea-level atmospheric pressure is:

a. 1000 mb
b. 1013.25 mb
c. 900 mb
d. 1020 mb

7. The combination of evaporation and transpiration from crops is called:

a. Transpiration ratio
b. Condensation
c. Infiltration
d. Evapotranspiration

8. In India, the Gramin Krishi Mausam Sewa (GKMS) is operated by:

a. ICAR only
b. Ministry of Agriculture
c. India Meteorological Department (IMD)
d. Krishi Vigyan Kendra (KVK)

9. Which of the following conditions favours fungal diseases in crops?

a. Low temperature and low humidity
b. High temperature and low humidity
c. High temperature and high humidity
d. Cool and dry weather

10. The best time to apply pesticides according to weather advisory is when:

a. Heavy rainfall is expected
b. Strong winds are blowing
c. No rain and light breeze are expected
d. High temperature and dry winds prevail

II. Fill in the Blanks

1. Weather parameters are _____ elements of the atmosphere that influence agriculture.
2. Temperature indicates the degree of _____ or coldness of the atmosphere.
3. The instrument used to measure temperature is called a _____.
4. Wind is the movement of air from _____ pressure to low pressure.
5. Atmospheric pressure at sea level is about _____ millibars.
6. Humidity refers to the amount of _____ present in the air.
7. The instrument used to measure rainfall is a _____.
8. Solar radiation is the main source of energy for _____ in plants.
9. Evapotranspiration is the combined process of evaporation and _____.
10. Global warming is caused by the increase of _____ gases in the atmosphere.

III. One Mark Questions

1. Name the instrument used to measure rainfall.
2. What is the unit of solar radiation?
3. What parameter indicates the weight of the air column on the earth's surface?
4. Which weather element controls evaporation rate?
5. Name the process of conversion of liquid water into vapour.
6. Which weather parameter directly affects photosynthesis?
7. What is the long form of AAS?
8. Name the combined process of water loss from soil and plant surfaces.
9. What is the standard sea-level pressure value?
10. Which agency provides agro-meteorological advisories in India?

IV. Two Marks Descriptive Questions

1. Define temperature and mention its importance in agriculture.
2. What is wind speed and how is it measured?
3. Explain the term "relative humidity."
4. What is the significance of rainfall in agriculture?
5. Define atmospheric pressure and state its relation with weather.
6. Write two agricultural uses of humidity data.
7. What is the importance of solar radiation for crops?
8. Explain the term "evapotranspiration."
9. List any two modern tools used in agro meteorology.
10. What is the purpose of the GKMS service?

V. Three Marks Descriptive Questions

1. Describe the effects of temperature on crop growth and animal production.
2. Discuss the agricultural impact of strong and light winds.
3. Explain how atmospheric pressure affects rainfall formation.
4. Differentiate between absolute, relative and specific humidity.
5. Discuss the importance of radiation in the crop microclimate.
6. Explain the role of agro-meteorological information in irrigation scheduling.
7. Define wind. Write any three agricultural significances of wind.
8. Name any three instruments used for measuring weather parameters and mention what they measure.
9. Explain how humidity and temperature influence pest and disease occurrence.
10. Describe the relation between evapotranspiration and irrigation requirement.

VI. Five Marks Descriptive Questions

1. Explain in detail the major weather parameters affecting agricultural production.
2. Discuss the role of agro-meteorological information in sustainable agriculture.
3. Describe how weather forecasts and advisories are useful in crop planning and management.

4. Explain the importance of temperature, humidity and rainfall in crop growth and yield.
5. Describe the recent technological developments in agro-meteorology in India.
6. Elaborate on the significance of agromet services such as GKMS and AAS.
7. Explain how weather parameters are used to interpret agro-advisories with examples.
8. Discuss the impact of climate variability on agricultural productivity and risk management.
9. Explain how real-time weather data improve farm-level decision-making.
10. Write an essay on "Role of Weather Parameters in Climate-Smart Agriculture.

1.4. Components of IFS / Agroforestry and Its Advantages - Site Specific Development of IFS Model for different Agro-Climatic Zones in Rainfed, Irrigated and Irrigated Dry Conditions.

I. Multiple Choice Questions

1. The long-term average weather condition of a place is called:

a. Weather
b. Climate
c. Season
d. Atmosphere

2. The process responsible for trapping heat in the atmosphere is known as:

a. Greenhouse effect
b. Condensation
c. Transpiration
d. Photosynthesis

3. The major greenhouse gas emitted from flooded rice fields is:

a. CO2
b. CH4 (Methane)
c. N2O
d. CFC

4. Which gas has the highest global warming potential?

a. Carbon dioxide
b. Methane
c. Nitrous oxide
d. CFCs

5. The IPCC stands for:

a. International Panel on Climate Change
b. International Programme on Climate Change
c. Intergovernmental Panel on Climate Change
d. Integrated Programme for Climate Control

6. The main cause of recent climate change is:

a. Natural variability
b. Solar flares
c. Ocean circulation
d. Human activities

7. The warming of Pacific Ocean surface waters causing monsoon variations is known as:
a. La Nina b. El Nino
c. Cyclone d. Trade wind reversal

8. In India, the project aimed at developing climate-resilient technologies is:
a. NICRA b. NMSA
c. PMFBY d. GKMS

9. Global mean temperature has increased by approximately how much since pre-industrial times?
a. 1.1 C b. 0.5 C
c. 2.0 C d. 3.0 C

10. The main greenhouse gas emitted by livestock is:
a. CO2 b. CH4
c. N2O d. SO2

II. Fill in the Blanks

1. Integrated Farming System involves integration of crops, livestock, fishery and _____.
2. IFS promotes effective _____ of wastes and residues.
3. According to Dr. Jayanthi (2008), IFS ensures additional source of _____ to farmers.
4. One principle of IFS is minimization of _____.
5. Field crops, vegetables, and fruit cultivation are components of _____ farming system.
6. Wetland farming usually depends on water sources like rivers, lakes, and _____.
7. Dryland farming mainly depends on _____.
8. IFS helps in maintaining ecological _____.
9. Bee-keeping and mushroom cultivation are considered _____ of IFS.
10. IFS increases _____ efficiency by utilizing farm resources properly.

III. One Mark Question

1. Name the international body responsible for assessing climate change.
2. What is the full form of NICRA?
3. Which gas is mainly released from fertilizer use in soils?
4. Define the term used for natural fluctuation in climate.
5. Which sector is most vulnerable to climate change in India?
6. What is the main source of methane in agriculture?
7. What is the process by which plants absorb CO_2 and store carbon?
8. Which global phenomenon is associated with warming of Pacific Ocean waters?

9. What type of agriculture is least resilient to climate change?
10. Name one renewable energy source used in climate-smart farming.

IV. Two Marks Descriptive Questions

1. Define climate change.
2. What is global warming?
3. Write any two causes of climate change.
4. Differentiate between weather and climate.
5. List any two greenhouse gases and their sources.
6. Mention two effects of climate change on agriculture.
7. What is climatic variability?
8. Write two adaptation measures to cope with climate change.
9. What is the greenhouse effect?
10. Give two impacts of heat stress on livestock.

V. Three Marks Descriptive Questions

1. Explain the difference between climate change and climatic variability.
2. Discuss the role of agriculture as both a victim and a contributor to climate change.
3. Describe how deforestation contributes to climate change.
4. Explain the effects of global warming on monsoon behaviour in India.
5. Write a short note on greenhouse gases and their importance.
6. What are the major impacts of climate change on soil and water resources?
7. Discuss the significance of the NICRA project in India.
8. Explain how El Niño and La Niña affect Indian agriculture.
9. Describe any three strategies for mitigation of climate change in agriculture.
10. Explain how temperature rise affects crop productivity.

VI. Five Marks Descriptive Questions

1. Explain in detail the causes of climate change—both natural and anthropogenic.
2. Describe the major impacts of climate change on regional and national agriculture.
3. Discuss the role of agriculture in contributing to greenhouse gas emissions.
4. Explain the concept of climate-smart agriculture and its components
5. Write an essay on the effects of global warming on Indian agriculture.
6. Discuss various mitigation and adaptation strategies for climate change in agriculture.
7. Explain the impact of climate change on livestock, crops, and pest dynamics.
8. Describe government initiatives like NICRA, NMSA and GKMS in addressing climate change.
9. Elaborate the relationship between climatic variability and food security.
10. Discuss the importance of reducing emissions from existing agricultural practices.

Module II: SOIL HEALTH MANAGEMENT
2.1. Soil Profile, Types and Characteristics

I. Multiple Choice Questions

1. Black soils have high
   a. Water Holding Capacity
   b. Nutrient Holding Capacity
   c. Both
   d. None

2. Sandy Soils are soils
   a. Well Drained,
   b. Poorly Drained
   c. Compacted,
   d. None

3. The desirable soil structure
   a. Platy
   b. Crumby
   c. Prismatic
   d. None

4. Bulk Density of soil will _____ with depth of soil
   a. Increases
   b. Decreases
   c. Do not change
   d. None

5. Soil air movement is affected by
   a. Texture
   b. Structure
   c. Density
   d. All of these

6. Desirable pH range of soil
   a. Less than 6.5
   b. more than 7.5
   c. 6.5 – 7.5
   d. None

7. Soil structure can be improved by
   a. Ploughing
   b. Irrigating
   c. Adding Organic Matter
   d. None

8. Size of the clay particle is
   a. 2 mm
   b. Less than 0.002 mm
   c. 0.02mm
   d. All of these

9. O Horizon is normally absent in
   a. Red soils,
   b. Black soils
   c. Cultivated soils
   d. None

10. Soils found in Indo Gangetic plains is
    a. Alluvial soil,
    b. Laterite soil
    c. Sandy soil
    d. Saline soil

II. Fill in the Blanks

1. Soil is formed by the _____ of rocks and minerals.
2. Soil profile is a vertical section showing different layers called _____.
3. The major soil horizons are O, A, E, B, and _____.
4. Alluvial soils are highly _____ and productive.
5. Black soil has high _____ holding capacity.
6. Red soils are generally low in _____ and organic matter.
7. Soil texture is determined by the proportion of sand, silt, and _____.
8. Soil structure refers to the arrangement of soil _____ into aggregates.
9. Soil pH indicates the _____ or alkalinity of soil.
10. Soil organic matter decomposes to form _____.

III. One Mark Question

1. What is soil bulk density?
2. What are the types of soil pores?
3. Name any two Soil Health Indicators
4. What is a Soil Profile?
5. Name any two types of organic matter Vermicompost, Oil cakes, Farm Yard Manure (FYM)

IV. Two Marks Descriptive Questions

1. Mention the differences between available water and unavailable water
2. Mention the difference between soil texture and soil structure
3. Mention different layers of soil profile.
4. How plants take up nutrients from soil?
5. How soil aeration can be improved?

V. Three Marks Descriptive Questions

1. How soil water moves through the soil?
2. What are the types of soil water?
3. How soil hard pan is formed?
4. What are the mechanisms of nutrient movement? / How soil nutrients reach plant root zone?

VI. Five Marks Descriptive Question

1. Mention the role of soil temperature/ why soil temperature is important?
2. Describe how soil water is important? / What is the role of soil water? What are the Key functions of soil water?

3. It gives turgidity to plants – Supports plants overall structure and upright growth.What are the advantages of soil organic matter?
4. What are the three important steps in determining soil texture by feel method?
5. What are different types of soil structure?

2.2. A. Importance of Soil Testing

I. Multiple Choice Questions

1. Why soil testing is important in agriculture
   a. To assess soil texture
   b. To estimate probable yield in advance
   c. To manage irrigation requirement
   d. To estimate nutrient availability and soil health

2. How many elements are considered to be essential for plant growth?
   a. 15
   b. 16
   c. 17
   d. 18

3. Which of the following may be the probable reason for not considering micronutrient deficiencies in the absence of soil testing
   a. They are required only in small quantities
   b. Their deficiency symptoms appear rapidly
   c. They are difficult to detect visually
   d. They do not affect crop yield

4. Which of the following is not true about soil testing.
   a. It ensures precise application of chemical fertilizers
   b. Maintaining physical properties of soil
   c. Enhancing microbial activity
   d. Identifying nutrient status of a soil

5. Soil testing avoids excessive fertilizer application by
   a. Improving soil structure
   b. Maintaining physical properties of soil
   c. Enhancing microbial activity
   d. Identifying nutrient status of a soil

6. Availability of nutrients in soil depends on
   a. Bulk density
   b. Aggregate stability
   c. pH
   d. Enzyme activity

7. Soil testing is essential for sustainable agriculture because it
   a. eliminates the need for fertilizers
   b. promotes balanced nutrient management
   c. ensures uniform crop growth in all soils
   d. replaces traditional farming practices

8. Which soil test result indicate that liming is essential.
   a. Acidic soil or low pH
   b. Alkaline soil or high pH
   c. High bulk density
   d. Low available nitrogen

9. Essential nutrient present in agricultural lime
   a. Nitrogen
   b. Phosphorous
   c. Potassium
   d. Calcium

10. Which of the following is incorrect about soil test based fertilizer application?
   a. Reduces input cost
   b. Retards long term soil health sustenance
   c. Regulates over use of fertilizers
   d. Restricts environmental pollution

II. Fill in the Blanks

1. Plants require _____ essential elements to complete their life cycle and sustain crop production.
2. The process of obtaining a representative soil sample by dividing the mixed sample into four equal parts is called _____.
3. The Soil Health Card (SHC) scheme was introduced by the Government of India in the year _____.
4. The SHC assesses soil based on _____ key parameters.
5. Soils of Kerala are generally _____ in nature and show deficiencies of Ca and Mg.

III. . Two Marks Descriptive Questions

1. Major techniques used for assessing soil fertility status
2. Tools used in soil sampling
3. Quartering in soil sampling
4. Soil health card
5. Why periodical soil testing is recommended in sustainable agriculture?
6. Usefulness of soil health card in reducing cost of cultivation

IV. Three Marks Descriptive Questions

1. Major benefits of soil testing

2. Points to be considered while collecting soil sample
3. Benefits of using Soil Health Card
4. Importance of soil testing in sustainable cultivation practices
5. Explain how Soil Health Card helps in misuse of inorganic fertilizers

V. Five Marks Descriptive Questions

1. Procedure for collection of soil samples
2. Concept of Soil Health Card
3. Explain how regular soil testing and soil health card concept contribute to sustainable soil fertility
4. Role of soil testing in sustainable agricultural practice
5. Importance of soil testing in sustaining farmer's income. Briefly explain the soil testing facilities available for farmers.

2.2. B. Problematic Soils and their Management

I. Multiple Choice Questions

1. Soils that adversely affect plant growth due to unfavourable physical or chemical properties are called

a. alluvial soils
b. contaminated soils
c. problematic soils
d. red soils

2. Which of the following is not a problem soil

a. Acidic soil
b. Loamy soil
c. Saline soil
d. Sodic soil

3. Which soil amendment is most commonly used for the reclamation of sodic soils?

a. Lime
b. Gypsum
c. Urea
d. Farmyard manure

4. Calcareous soils are characterized by the presence of excess

a. Calcium carbonate
b. Sodium carbonate
c. Aluminium oxide
d. Soluble salts

5. Integrated management of problematic soils involves

a. use of only chemical amendments
b. use of only biological methods
c. combination of physical, chemical, and biological practices
d. use of salt tolerant crops

6. Soils that are commonly seen in arid and semi -arid regions
   a. Shallow soils
   b. Slowly permeable soils
   c. Highly permeable soils
   d. Surface crusted soils

7. Which one of the following is NOT a soil amendment?
   a. Lime
   b. Dolomite
   c. Gypsum
   d. Azospirillum

8. Ions which are predominant in acidic soils
   a. NO_3^- and NO_2^-
   b. Ca^{2+} and Mg^{2+}
   c. Fe^{3+} and Al^{3+}
   d. PO_4^{3-} and SO_4^{2-}

9. Addition of organic matter helps in the management of problematic soils mainly by
   a. Improving soil structure and microbial activity
   b. Increasing soil salinity
   c. Raising soil ph. excessively
   d. Reducing nutrient availability

10. The amount of soluble salts present in a soil is referred as:
   a. Soil pH
   b. Electrical conductivity
   c. Bulk density
   d. Cation exchange capacity

II. Fill in the Blanks

1. Acid sulphate soils are formed when pyrites oxidise to produce _____, leading to extreme acidity.
2. Laterite soils were first described by Dr. Francis Hamilton Buchanan in the year _____.
3. In salt-affected soils, _____ is commonly deficient because it is tied up with Ca or Mg as insoluble phosphates.
4. Highly permeable soils contain more than _____% sand and less than _____% clay.
5. The recommended size of a representative soil sample obtained after the quartering process is _____ grams.

III. . Two Marks Descriptive Questions

1. What are Problem soils?
2. What is meant by soil surface crusting?
3. Major features of Laterite soils.
4. Contaminated soils
5. Soil electrical conductivity
6. What are binding agents? Name two commonly used binding agents.
7. Major benefits of adding organic matter to soils

IV. Three Marks Descriptive Questions

1. Classification of soils based on physical problems
2. Classification of salt affected soils
3. Management of climatic problem soils
4. Management of submerged soils
5. Reasons for poor drainage of soils
6. Reclamation of acidic soils
7. Adverse impacts of problematic soils on physical properties of soil

V. Five Marks Descriptive Questions

1. Explain how problem soils are classified based on the nature of problems.
2. Explain the characteristics, reasons and management of acidic soils.
3. Explain the role of organic matter in managing the problematic soils.
4. Impact of human activities in the formation of problem soils and how to manage them
5. General ways to manage problem soils for long term sustainability

2.3. Crop nutrition- Essential elements -Importance of major, secondary and micro nutrients. Macro-Micro Nutrient deficiencies + Toxicity and their symptoms

I. Multiple Choice Questions

1. Which nutrient is responsible for chlorophyll formation?

a. Potassium
b. Magnesium
c. Sulphur
d. Calcium

2. Which nutrient is essential for root development?

a. Nitrogen
b. Zinc
c. Potassium
d. Phosphorous

3. Yellowing of older leaves indicates deficiency of:

a. Nitrogen
b. Iron
c. Zinc
d. Boron

4. Leaf edge burning is a symptom of deficiency of:

a. Calcium
b. Magnesium
c. Potassium
d. Sulphur

5. Which nutrient is a secondary macronutrient?

a. Nitrogen
b. Phosphorus
c. Calcium
d. Zinc

6. “Little leaf” symptom occurs due to deficiency of:

a. Iron
b. Zinc
c. Copper
d. Boron

7. Whiptail disease in cauliflower is due to deficiency of:

a. Molybdenum
b. Boron
c. Copper
d. Iron

8. Interveinal chlorosis in older leaves is due to deficiency of:

a. Calcium
b. Magnesium
c. Sulphur
d. Nitrogen

9. Lime is applied to correct:

a. Alkaline soil
b. Acidic soil
c. Saline soil
d. Sandy soil

10. Integrated Nutrient Management includes:

a. Only fertilizers
b. Only organic manure
c. Chemical + organic + biofertilizers
d. Only micronutrients

II. Fill in the Blanks

1. In plants, _____ refers to the lack of essential nutrients, while _____ occurs when a nutrient is present in excess amount.
2. Plants obtain carbon (C) from _____ in the air and hydrogen (H) from _____ for photosynthesis.
3. The primary macronutrients required for plant growth are Nitrogen, _____ and _____.
4. Deficiency of Nitrogen causes _____ of old leaves and poor growth.
5. Deficiency of Phosphorus causes _____ leaves and slow root development.
6. _____ deficiency causes the condition known as "Whiptail" in cauliflower.
7. Deficiency of Boron in plants leads to _____ in fruits.
8. _____ deficiency causes interveinal chlorosis, where yellowing occurs between leaf veins while the veins remain green.

9. INM stands for _____ and is defined as the balanced use of chemical fertilizers, organic and biofertilizers to maintain soil fertility and crop productivity.
10. In pH management as a remedial measure, _____ is used for acidic soils and _____ is used for alkaline soils.

III. One Mark Question

1. What are macro nutrients?
2. Name any two secondary nutrients
3. Which nutrient is responsible for chlorophyll formation?
4. What is interveinal chlorosis?
5. What is Integrated Nutrient Management (INM)?

IV. Two Marks Descriptive Questions

1. Define macro and micro nutrients with two examples each.
2. State any two symptoms of nitrogen deficiency.
3. Write two benefits of using organic manure.
4. Mention any two functions of sulphur in plants.
5. List any two micronutrient deficiency symptoms

V. Three Marks Descriptive Questions

1. Write the role and deficiency symptoms of nitrogen, phosphorus, and potassium.
2. Mention three methods of fertilizer application.
3. List and explain three benefits of biofertilizers.
4. Describe symptoms and corrections for zinc, iron, and boron deficiency.
5. What is the importance of magnesium, calcium, and sulphur in crop nutrition?

VI. Five Marks Descriptive Questions

1. Explain the role, functions, and deficiency symptoms of macro and micro nutrients.
2. Describe in detail the method of soil testing.
3. Explain Integrated Nutrient Management and its components with examples.
4. Describe major deficiency symptoms of five nutrients and their remedial measures.
5. Discuss the role of biofertilizers, organic manures, and foliar sprays in nutrient management.

2.4. Manures and Fertilizers- Classification-Nutrient Content-Nutrient Use Efficiency-Factors Effecting NUE

I. Multiple Choice Questions

1. Which of the following is an organic manure
   a. Urea
   b. Superphosphate
   c. Farm Yard Manure
   d. Muriate of Potash

2. Urea contains how much nitrogen?
   a. 30%
   b. 46%
   c. 60%
   d. 82%

3. Which fertilizer supplies phosphorus?
   a. Urea
   b. Ammonium sulphate
   c. Potassium chloride
   d. Single super phosphate

4. Which of the following is a bulky organic manure?
   a. Vermicompost
   b. Green manure
   c. Oil cake
   d. Farm Yard Manure

5. Nutrient Use Efficiency (NUE) refers
   a. Total fertilizer applied
   b. Crop yield per unit nutrient applied
   c. Soil fertility
   d. Water use

6. Which nutrient is mainly responsible for vegetative growth?
   a. Phosphorus
   b. Potassium
   c. Nitrogen
   d. Sulphur

7. Which factor affects NUE the most?
   a. Soil type
   b. Climate
   c. Method of application
   d. All of the above

8. Which fertilizer is rich in potassium?
   a. Urea
   b. DAP
   c. MOP
   d. SSP

9. Green manuring improves:
   a. Soil salinity
   b. Soil fertility
   c. Soil erosion
   d. Soil acidity

10. Split application of fertilizers helps in:
   a. Decreasing NUE
   b. Increasing losses
   c. Improving NUE
   d. No effect

II. Fill in the Blanks

1. The word "Manure" is originated from the French word "_____" which means "work with soil."
2. The word "Fertilizer" is derived from the Latin word "_____" which means fertile.
3. Among nitrogenous fertilizers, _____ has the highest nitrogen content of 82%, while Urea contains _____% nitrogen.
4. The nutrient use efficiency of Nitrogen is only _____%, with the main causes being immobilization, volatilization, denitrification and leaching.
5. Nano-fertilizers are nutrient carriers with nano dimensions of _____ to _____ nm.
6. Potassium has a nutrient use efficiency of _____% and its low efficiency is mainly due to fixation in _____.
7. NUE (%) is calculated as the yield with applied nutrient minus yield without applied nutrient, divided by _____, multiplied by 100.
8. _____ fertilizers contain two or more major plant nutrients in chemical combination, while _____ fertilizers are simply physical mixtures of solid fertilizer materials.
9. The nutrient use efficiency of Phosphorus is only _____%, and its low efficiency is mainly due to fixation in soils as Al–P, Fe–P and _____.
10. Water soluble fertilizers are applied to crops through irrigation water in a process called _____.

III. One Mark Question

1. Which nutrient is commonly supplied by urea?
2. Define chemical fertilizers.
3. What is farmyard manure (FYM)?
4. Name one factor affecting nutrient losses in soil.
5. What is the full form of NUE?
6. Mention one advantage of using manures.

IV. Two Marks Descriptive Questions

1. Define manure and fertilizer.
2. What is Nutrient Use Efficiency (NUE)?
3. List any two differences between organic and inorganic fertilizers.
4. Mention any four essential plant nutrients.
5. What is green manuring? Give one example.

V. Three Marks Descriptive Questions

1. Classify fertilizers based on nutrient content.
2. Explain the importance of manures in soil health.
3. Describe the concept of Nutrient Use Efficiency (NUE).
4. Explain the role of nitrogen in plant growth.
5. Discuss different methods of fertilizer application.

VI. Five Marks Descriptive Questions

1. Explain the classification of manures and fertilizers with suitable examples.
2. Discuss nutrient content of major fertilizers used in agriculture.
3. Explain Nutrient Use Efficiency (NUE) and its significance in crop production.
4. Describe the factors affecting Nutrient Use Efficiency (NUE) in detail.
5. Discuss integrated nutrient management (INM) and its role in improving NUE

2.5 Compost – preparation of compost from agricultural wastes – urban compost preparation - Vermicomposting – preparation and properties

I. Multiple Choice Questions

1. Composting is the process of converting organic matter into:
   a. Manure
   b. Fertilizer
   c. Soil
   d. Ash

2. Indore process is mainly:
   a. Anaerobic
   b. Aerobic
   c. Chemical
   d. Mechanical

3. Bangalore process combines:
   a. Physical & chemical methods
   b. Aerobic & anaerobic methods
   c. Mechanical & manual methods
   d. None

4. Coimbatore process uses:
   a. Fully aerobic method
   b. Fully anaerobic method
   c. Semi-aerobic method
   d. Chemical method

5. Ideal moisture for vermicomposting is:
   a. 20–30%
   b. 40–50%
   c. 60–70%
   d. 80–90%

6. Compost improves soil:
   a. Color
   b. Texture
   c. Temperature
   d. pH only

7. Mechanical composting is mainly used in:
   a. Villages
   b. Small farms
   c. Cities
   d. Forests

8. Rainwater composting is suitable for:
   a. Wet areas
   b. Hills
   c. Cold regions
   d. Dry areas

9. Urban compost uses:
   a. Crop residues
   b. Only leaves
   c. Only cow dung
   d. Municipal waste

10. Compost increases soil:
   a. Hardness
   b. Water-holding capacity
   c. Salinity
   d. Toxicity

II. Fill in the Blanks

1. The term "compost" is derived from the Latin word "_____", which means "to put together."
2. The ADCO process was developed at _____ Experimental Station by Hutchinson and Richards during the First World War.
3. The Activated Compost Process was developed by Fowler and Ridge in _____ at the Indian Institute of Science, Bangalore.
4. The Indore process was created by Sir Albert Howard and Ward at the Indian Institute of Plant Industry, Indore, and the compost heap is turned _____ times during the composting period.
5. The Bangalore process was designed by Dr. C.N. Acharya in _____ and it combines both _____ and anaerobic decomposition.
6. In Urban composting, refuse and night soil are mixed in a _____ ratio, and _____ is sprinkled between layers to suppress foul odors.
7. In Vermicomposting, the earthworm species commonly used are _____ (red wigglers) and Eudrilus eugeniae.
8. For a 10 × 3 ft. vermicompost bed, about _____ to _____ worms are sufficient.
9. The ideal temperature for maintaining a vermicompost bed is _____ to _____°C, with moisture kept around _____%.
10. Vermicompost should be harvested after _____ days, and should be applied at about _____ tonnes per acre for field crops.

III. Two Marks Descriptive Questions

1. Define compost and composting.
2. What are biofertilizers? Give one example.

3. Mention any two benefits of compost to soil.
4. What is vermicomposting?
5. Name any two plant growth regulators (PGRs).

IV. Three Marks Descriptive Questions

1. Explain the importance of biofertilizers in agriculture.
2. Describe any three types of biofertilizers with examples.
3. Write the steps involved in vermicompost preparation.
4. Explain the Indore method of composting.
5. Discuss the role of plant growth regulators in crop production.

V. Five Marks Descriptive Questions

1. Explain different methods of composting in detail.
2. Describe vermicomposting process and its advantages.
3. Discuss types, functions, and application methods of biofertilizers.
4. Explain factors influencing the efficacy of biofertilizers.
5. Write a detailed note on Plant Growth Regulators (PGRs) and their agricultural applications.

2.6. A. Bio fertilizers – classification with examples – constraints for use in agriculture – bio fertilizers used for different crops/situations
2.6. B. Bio fertilizers – Storage, shelf life and marketing. Factors influencing the efficacy of Bio fertilizers.
2.6. C. Plant Growth Promoting Bio-fertilizers (PGPR) and Plant Growth Regulators

I. Multiple Choice Questions

1. Biofertilizers primarily help in:

a. Enhancing nutrient availability
b. Increasing soil salinity
c. Killing soil microbes
d. Increasing pesticide use

2. Which of the following is a nitrogen-fixing biofertilizer?

a. Rhizobium
b. Bacillus
c. Aspergillus
d. Pseudomonas

3. Phosphorus solubilizing microorganisms convert:

a. Potassium into insoluble form
b. Insoluble phosphates into available form
c. Nitrogen into ammonia
d. Zinc into toxic form

4. Blue Green Algae (BGA) are mainly useful in:

a. Dryland farming
b. Saline soils
c. Desert soils
d. Paddy fields

5. Ideal storage temperature for biofertilizers is:

a. 0–5°C
b. 4–25°C
c. 30–45°C
d. Above 50°C

6. Shelf life of carrier-based biofertilizers is generally:

a. 1–2 months
b. 3–6 months
c. 12–18 months
d. More than 2 years

7. Which method involves dipping seedlings in biofertilizer slurry?

a. Seed treatment
b. Soil application
c. Foliar spray
d. Root dipping

8. Which plant growth regulator promotes rooting and prevents fruit drop?

a. Gibberellins
b. Cytokinins
c. Auxins
d. Ethylene

9. Gibberellins are mainly used to:

a. Delay ripening
b. Increase fruit size and break dormancy
c. Fix nitrogen
d. Reduce plant height

10. Biofertilizers are considered eco-friendly because they:

a. Increase chemical residues
b. Reduce groundwater pollution
c. Destroy soil structure
d. Increase pest attacks

III. Fill in the Blanks

1. Biofertilizers are natural substances containing beneficial microbes that promote plant growth by increasing the availability of _____ and _____ in the soil.
2. Biofertilizers can increase crop yields by _____% to _____%.
3. The nitrogen-fixing biofertilizer _____ fixes nitrogen specifically in paddy fields in aquatic environments, while _____ and Azospirillum fix nitrogen in upland crops.
4. _____ fungi (VAM) act as Phosphate Mobilizers by mobilizing bound phosphate from distant soil zones.

5. Bio fertilizers are best stored between _____°C and _____°C, as extreme temperatures can harm or slow microbial activity.
6. Carrier-based bio fertilizers usually last _____ months, while liquid forms last _____ months and may extend up to 18 months under ideal conditions.
7. Bio fertilizers are typically packed in _____ bags, bottles, or sachets to protect against moisture, contamination, and physical damage.
8. Plant Growth Regulators (PGRs) are organic chemical substances, other than nutrients, that influence _____ and developmental processes in plants.
9. The PGR _____ promotes rooting and prevents fruit drop, while _____ is used for uniform ripening and promoting flowering.
10. The combination of PSB + _____ leads to accelerated plant growth and earlier flowering, while Azotobacter + Cytokinin spray results in higher seedling vigor and _____ in cereals.

III. One Mark Questions

1. Define biofertilizer.
2. Name any one nitrogen-fixing bacteria.
3. Mention one use of Ethylene.
4. What is root dipping?
5. What is the full form of PGR?

IV. Two Marks Descriptive Questions

1. List two advantages of biofertilizers.
2. Mention two methods of applying biofertilizers.
3. Name two types of PGRs and their uses.
4. Write two precautions for PGR storage.
5. Mention two field uses of Cytokinins.

V. Three Marks Descriptive Questions

1. Explain nitrogen fixation mechanism in biofertilizers.
2. Describe three methods of biofertilizer application.
3. Mention uses of Auxins, Gibberellins, and Cytokinins.
4. List three benefits of using PGRs in fruit crops.
5. Write three advantages of biofertilizers over chemical fertilizers.

VI. Five Marks Descriptive Questions

1. Describe different methods of biofertilizer application.
2. Explain types of PGRs and their field uses.
3. List five benefits of biofertilizers.
4. Discuss role of PGRs in fruit crop productivity.
5. Write on integration of biofertilizers with other inputs.

2.7. Integrated Nutrient Management

I. Multiple Choice Questions

1. Reclamation of acidic soil is done by the application of
   a. Gypsum
   b. Iron pyrite
   c. Ammonium sulphate
   d. Lime

2. Natural nitrification inhibitor
   a. Thio Urea
   b. Blitox
   c. Nimin
   d. Hydroquinone

3. Basic slag contains _____ % P_2O_5
   a. 30-38%
   b. 14-18%
   c. 20-30%
   d. 20-22%

4. Nitrogenous fertilizer which is having more explosive nature
   a. Ammonium sulphate
   b. CAN
   c. Urea
   d. Ammonium nitrate

5. Relative proportion of N, P_2O_5, K_2O of a given multi-nutrient fertilizer called as
   a. Fertilizer Grade
   b. Fertilizer Ratio
   c. Fertilizer Value
   d. Fertilizer Texture

6. The phosphorus fertilizer suitable for long duration crops in acid soils
   a. Rock phosphate
   b. DAP
   c. SSP
   d. Nitrophosphate

7. Excess of P causes deficiency of following nutrients
   a. Fe & Mn
   b. Cu & B
   c. Mn & Cl
   d. Fe & Zn

8. Example of Non edible oil cake is
   a. Coconut
   b. Ground nut
   c. Castor
   d. Linseed

9. An example of slow release N- fertilizers is
   a. IBDU
   b. AM
   c. DCD
   d. ST

10. The K_2O content in MOP is
   a. 30
   b. 60
   c. 45
   d. 32

II. Fill in the Blanks

1. Integrated Nutrient Management (INM) integrates the objectives of production with ecology and environment, aiming for optimum crop nutrition, optimum functioning of _____, and minimum nutrient losses.
2. In balanced fertilization, the recommended dose of N, P and K is usually applied to the soil in the ratio of _____ or 3:1:1 (N: P_2O_5: K_2O).
3. Rhizobium belongs to the family _____ and can fix _____ to 100 kg N per hectare in legume root nodules.
4. Azotobacter belongs to the family _____ and grows best in _____ to alkaline soils.
5. By applying Azotobacter to various crops, the recommended doses of nitrogenous fertilizers can be reduced by _____%.
6. The symbiotic association of Azolla pinnata and _____ is termed as Azolla Anabaena complex, which fixes atmospheric nitrogen.
7. Blue Green Algae (BGA) is recommended at _____ kg/ha and is applied _____ days after the transplanting of rice crop.
8. Mycorrhizae form _____ symbiosis, and can substitute up to _____ kg phosphorous fertilizer per hectare for citrus.
9. Biochar is obtained through pyrolysis of agricultural or lignocellulosic biomass at temperatures ranging from _____°C to _____°C.
10. Legumes in crop rotation can fix atmospheric nitrogen to an extent of _____ to _____ kg per hectare.

III. One Mark Questions:

1. Write about the origin of term “manure”
2. Define the term “fertilizer”
3. Define the term mychorhizae
4. Define Integrated Nutrient Management
5. Define the term “biofertilizer”

IV. Two Marks Descriptive Questions

1. Write the classification and nutrient content of phosphorus fertilizers
2. Write the classification and nutrient content of potassium fertilizers
3. Write about the bulky organic manures
4. Write about the advantages of biofertlizers
5. Write about the common constraints in INM

V. Three Marks Descriptive Questions

1. Write about the strategies to enhance nutrient use efficiency
2. Write about the components of INM
3. Write about the advantages of Nano fertilizers over traditional fertilizers
4. Write about the strategies in INM.

5. Write the difference between organic manure and chemical fertilizer

VI. Five Marks Descriptive Questions

1. Give the classification of Bio fertilizers with examples and write about constraints for Bio fertilizers use in agriculture
2. Define manure and write in detail about the classification of organic manures with examples
3. Write in detail about the classification of fertilizers with examples and write about the nitrogen fertilizer classification and nutrient content.
4. Define water soluble fertilizers and write advantages and disadvantages of water soluble fertilizers
5. Define nutrient use efficiency and write about the factors effecting nutrient use efficiency

Module III: Crop Production Technologies of Major Local Crops
3.1. Paddy, Wheat

I. Multiple Choice Questions

1. Which State has the highest wheat productivity?
   a. Uttar Pradesh
   b. Punjab
   c. Haryana
   d. Rajasthan

2. Which group of Wheat species is not classified by Perivale (1921)?
   a. Monoploids
   b. Deploids
   c. T. dicoccum
   d. T. monococcum

3. Which species of wheat has maximum cultivated area in India?
   a. T. aestivum
   b. T. durum
   c. T. dicoccum
   d. T. monococcum

4. The optimum temperature for the growth of wheat crop is
   a. 10-15^0 C
   b. 15-20^0 C
   c. 20-25^0 C
   d. 25-30^0 C

5. Which is the most prominent crop rotation in India?
   a. Rice-wheat
   b. Cotton-wheat
   c. Sugarcane-wheat
   d. Pearl millet-wheat

6. What is the ideal soil pH range for successful rice cultivation?
   a. 4.0 – 5.0
   b. 5.5 – 7.0
   c. 7.5 – 8.5
   d. 8.5 – 9.5

7. Which of these is a popular method of raising a nursery where seedlings are ready for transplanting in just 12–15 days?
   a. Dry bed method
   b. Wet bed method
   c. SRI (System of Rice Intensification)
   d. Dapog method

8. The "Kharda" or "Khaira" disease in paddy is caused by the deficiency of which nutrient?
   a. Nitrogen
   b. Iron
   c. Phosphorus
   d. Zinc

9. In the System of Rice Intensification (SRI), what is the recommended spacing for transplanting single seedlings?
   a. 15 x 10 cm
   b. 20 x 15 cm
   c. 25 x 25 cm
   d. 30 x 30 cm

10. Which stage of the paddy crop is most sensitive to water stress?
   a. Seedling stage
   b. Tillering stage
   c. Panicle initiation and flowering
   d. Ripening stage

II. Fill in the Blanks

1. The hexaploid wheat has _____ of chromosomes. (2N=42).
2. The high yielding responsive to high level of inputs wheat varieties were developed by in incorporating dwarf gene _____**.**
3. _____ is most critical stage of irrigation application in wheat.
4. To compensate the poor tillering under late sowing condition seed rate be increased by ____ **%** in wheat.
5. Rainfed wheat has _____ than irrigated of wheat.

III. Two Marks Descriptive Questions

1. Resource conservation technologies (RCT).
2. Classification of wheat.
3. Different growth phase of wheat plants.
4. Methods of sowing of wheat.
5. Integrated weed management.

IV. Five Marks Descriptive Questions

1. Inspite of many uses and many food preparation of wheat of having around 12% proteins in grain, why it is not recommended by dieticians over course grain?
2. What are the major constraints in wheat production? How the planting in yield can be broken?
3. Rice-wheat crop rotation is most popular among farmers but it is not sustainable. Suggest other alternatives to maintain soil fertility and physical soil conditions.
4. Why different varieties are recommended for different region and condition? Explain the two recently released high yielding wheat varieties for timely sowing, high fertility and irrigated conditions.

3.2. Cereals: Jowar, Bajra, Maize/ Millets

I. Multiple Choice Questions

1. Which of the following millet is rich in calcium?
   a. Foxtail millet
   b. Barnyard millet
   c. Proso millet
   d. Finger millet

2. Recommended spacing for sorghum is:
   a. 15 × 15 cm
   b. 22.5 × 10 cm
   c. 45–60 × 10–15 cm
   d. 30 × 10 cm

3. Optimum seed rate for line-sown pearl millet is:
   a. 2 kg/ha
   b. 12–15 kg/ha
   c. 8–10 kg/ha
   d. 4–5 kg/ha

4. The recommended fertilizer dose for Kharif sorghum is:
   a. 60:30:30 NPK kg/ha
   b. 80:40:40 NPK kg/ha
   c. 100:50:50 NPK kg/ha
   d. 40:20:00 NPK kg/ha

5. The critical irrigation stages in millet crops are:
   a. Vegetative and flowering
   b. Flowering and grain filling
   c. Tillering and maturity
   d. Sowing and harvest

6. Major disease of pearl millet is:
   a. Rust
   b. Downy mildew
   c. Wilt
   d. Smut

7. Which millet has the highest protein content?
   a. Proso millet
   b. Finger millet
   c. Sorghum
   d. Kodo millet

8. Atrazine is recommended at what dose for pre-emergence in sorghum?
   a. 0.25–0.50 kg/ha
   b. 0.75–1.0 kg/ha
   c. 1.5–2.0 kg/ha
   d. 2.5–3.0 kg/ha

9. Which of the following biofertilizers is used in millet seed treatment?
   a. Rhizobium
   b. Azospirillum
   c. Azotobacter
   d. Trichoderma

10. For drought tolerance, millet seeds are primed with:
    a. 1% KNO_3 solution
    b. 1% NaCl solution
    c. 0.5% $CaCl_2$
    d. 1% $ZnSO_4$

II. Fill in the Blanks

1. Millets are popularly known as "_____" due to their superior nutritional profile.
2. Finger millet has the highest calcium content among all millets, with _____ mg per 100g.
3. The scientific name of Pearl Millet is _____.
4. For sorghum under line sowing, the recommended seed rate is _____ kg per hectare.
5. Seeds should be treated with bio-inoculants such as Azospirillum and Phosphobacteria at _____ g per kg of seed.
6. Millets generally require _____ mm of rainfall during their growth period.
7. The pre-emergence herbicide atrazine is applied at _____ kg a.i./ha for weed control in sorghum.
8. Under irrigated and well-managed conditions, sorghum can yield up to _____ tonnes per hectare.
9. Threshed millet grains should be dried to a safe moisture level of around _____ % before storage.
10. The United Nations declared _____ as the International Year of Millets.

II. One Mark Questions

1. Another name for millets due to their nutrient richness
2. The millet known for highest calcium content
3. Major pest attacking sorghum
4. Fungicide used for seed treatment
5. Herbicide recommended for sorghum (PE)
6. Ideal moisture content for millet grain storage
7. Micro-irrigation method suitable for millets
8. Major millet grown in India
9. Millet highly tolerant to drought
10. The millet also known as “Korra”

III. Two Marks Descriptive Questions

1. Mention any two major and two minor millets with their scientific names?
2. Write two advantages of millets in sustainable agriculture?
3. Give the optimum spacing and seed rate for pearl millet?
4. What are the common seed treatment chemicals used in millet cultivation?
5. Mention two important diseases of millet crops?
6. Give any two recommended fertilizer doses for millet crops?
7. List two critical stages of irrigation in millet crops?
8. Name any two biofertilizers used in millet cultivation?

9. Write two important weed management practices in millet crops
10. Mention any two improved varieties of finger millet?

IV. Three Marks Descriptive Questions

1. Explain the classification of millets with examples?
2. Describe the importance of land preparation in millet cultivation?
3. Write short notes on seed treatment practices in millets?
4. Describe the nutrient management practices for sorghum and pearl millet?
5. Discuss integrated weed management practices for millet crops?
6. Explain the water management strategies for millets under rainfed conditions?
7. Write short notes on harvesting and threshing of millets?
8. Describe the yield potential of improved millet varieties?
9. Discuss two major pests of millets and their management?
10. Write a note on the role of biofertilizers in millet productivity?

V. Five Marks Descriptive Questions

1. Explain in detail the crop production technologies of millets from land preparation to harvesting?
2. Discuss the importance and nutritional value of millets in human diet and health?
3. Describe in detail the nutrient and water management practices for major millet crops?
4. Explain integrated weed, pest, and disease management practices in millet cultivation?
5. Describe the improved varieties and hybrids of major and minor millets cultivated in India?
6. Explain the factors affecting yield and productivity of millet crops?
7. Discuss the role of millets in climate-resilient agriculture?
8. Write in detail about post-harvest handling and storage of millet grains?
9. Explain the economic and environmental importance of promoting millets?
10. Discuss how scientific advancements and traditional knowledge can be integrated to enhance millet production?

3.3. Pulses: Red gram, Green gram, Black gram and Bengal gram

I. Multiple Choice Questions

1. Which country produces highest pulses in the world
   a. China
   b. Pakistan
   c. India
   d. Nigeria

2. Chickpea is grown in which season
   a. Rabi
   b. Kharif
   c. Spring
   d. Summer

3. How much spacing should be given for mungbean and urdbean sowing
   a. 60x20cm
   b. 30x10cm
   c. 10x10cm
   d. 1x2m

4. Pod fly in pigeonpea infests
   a. Flowers
   b. Stem
   c. Seeds
   d. Pods

5. Internal discolouration is seed in which disease of pigeonpea
   a. Leaf spot
   b. Wilt
   c. SMD
   d. Stem blight

6. White fly is major pest of
   a. Mungbean
   b. Urdbean
   c. Both
   d. None

7. *Helicoverpa armigera* infests
   a. Mungbean
   b. Urdbean
   c. Pigeonpea
   d. All

8. Wettable sulphur is used for control of which disease in chickpea
   a. Rust
   b. Powdery mildew
   c. Wilt
   d. Collar rot

9. Trichoderma is a used for management of

Wilt
Sterility mosaic disease
Maruca pest
Yellowing in mungbean

10. Seed treatment in pulses is done with following bio-fertilizer
    a. Rhizobium
    b. PSB
    c. Both
    d. Azospirillum

II. Fill in the Blanks

1. Pulses provide _____ % plant-based protein and are especially important for vegetarians.
2. The scientific name of Pigeonpea is _____.
3. For pigeonpea seed treatment, Rhizobium is applied at _____ g/kg of seed to enhance nitrogen fixation.
4. The most destructive pest of pigeonpea is _____, which feeds on flowers, buds, and developing seeds inside pods.
5. Sterility Mosaic Disease in pigeonpea is transmitted by the eriophyid mite _____.

6. Blackgram (*Vigna mungo*) contains about _____ % protein, making it a nutritious crop for vegetarian diets.
7. Greengram and blackgram are harvested when _____% of the pods turn black and dry.

8. Yellow Mosaic Disease in greengram is caused by _____ and spread mainly by whitefly.
9. Bengalgram (chickpea) is sown at a depth of _____ cm using a seed drill.
10. In rainfed conditions, chickpea yields _____ kg/ha.

III. One Mark Questions

1. What percentage of protein is generally present in pulses?
2. Name two major pigeonpea-growing states in India.
3. Which insect pest is known as the most destructive pest of pigeonpea?
4. What is the causal organism of Fusarium wilt in chickpea?
5. Name one biocontrol agent used against pod borer in pulses.

IV. Two Marks Descriptive Questions

1. Write two advantages of growing pulses in crop rotation systems.
2. Mention the seed treatment procedure recommended for controlling wilt and collar rot in pigeonpea.
3. Write short notes on Yellow Mosaic Disease (YMD) in greengram.
4. List any two common diseases of chickpea and their causal organisms.
5. Mention two agronomic practices to manage Dry Root Rot in pulses.

V. Three Marks Descriptive Questions

1. Describe the management practices for *Helicoverpa armigera* in pigeonpea.
2. Explain the fertilizer requirements and soil conditions suitable for pigeonpea cultivation.
3. Discuss the major insect pests of mungbean and their control measures.
4. Explain the symptoms and integrated management of Fusarium wilt in chickpea.

VI. Five Marks Descriptive Questions

1. Describe in detail the major diseases of pigeonpea and their integrated management practices.
2. Explain the economic importance, cultivation practices, and pest and disease management of chickpea in India.

3.4. Oilseeds: Groundnut, Sesamum, Safflower, Sunflower, Soybean and Castor

I. Multiple Choice Questions

1. "Pegging" is a critical growth stage associated with which oilseed crop?
   a. Soybean
   b. Groundnut
   c. Sunflower
   d. Sesamum

2. Which nutrient is essential for groundnut to prevent the "Pops" (empty pods) condition and ensure proper shell development?
   a. Nitrogen
   b. Zinc
   c. Calcium (Gypsum)
   d. Iron

3. What is the characteristic symptom of "Phyllody" disease in Sesamum (Til)?
   a. Transformation of floral parts into green leaf-like structures
   b. Yellowing of the entire plant
   c. Rust-colored spots on the leaves
   d. Root rot and wilting

4. Which oilseed crop is known for its "Heliotropic" movement, where the flower head tracks the sun?
   a. Safflower
   b. Castor
   c. Sunflower
   d. Soybean

5. Soybean seeds must be treated with which specific bio-fertilizer to ensure effective atmospheric nitrogen fixation?
   a. Rhizobium meliloti
   b. Rhizobium japonicum
   c. Rhizobium leguminosarum
   d. Azotobacter

6. The toxic alkaloid "Ricin" is found in which of the following oilseed crops?
   a. Safflower
   b. Soybean
   c. Sesamum
   d. Castor

7. Which pest is considered the most destructive for Castor, characterized by larvae that feed on leaves leaving only the midribs?
   a. Castor Semilooper
   b. Aphids
   c. Pod Borer
   d. Whitefly

8. Safflower is often recommended as a border crop or intercrop because:
   a. It attracts beneficial insects
   b. Its spiny nature acts as a biological fence against stray cattle
   c. It requires heavy irrigation
   d. It provides shade to the main crop

9. What is the recommended seed rate for Soybean to maintain an optimum plant population per hectare?
   a. 20–25 kg
   b. 40–50 kg
   c. 70–80 kg
   d. 100–120 kg

10. "Tikka" leaf spot is a major fungal disease affecting the productivity of:
   a. Groundnut
   b. Sunflower
   c. Safflower
   d. Sesamum

II. Fill in the Blanks

1. Groundnut (*Arachis hypogaea* L.) is valued as a source of edible oil (_____%), protein (25–30%), and carbohydrates (20%).
2. Groundnut improves soil fertility by fixing _____ kg N/ha through symbiosis.
3. In the BBF (Broad-bed and Furrow) method, on an average _____% higher yield of groundnut has been reported from medium black soil over the flat bed.
4. Sesamum is called the "_____" because of its excellent qualities of the seed, oil and meal.
5. The optimum pH range for sesame cultivation is _____.
6. Safflower is commonly known as Kardi in Marathi, Kusube in Kannada, Kusum in Hindi, and _____ in Telugu.
7. Sunflower is a short-duration crop that takes _____ days to complete its crop duration.
8. Soybean is often called the "Wonder Legume" or "_____" and is a major source of edible oil (18–20%) and protein (40–42%).
9. India is the largest producer and exporter of castor seed and oil, contributing more than _____% of global production.
10. Castor seeds have a very high oil content of _____% and the plant produces oils with extremely high levels (80–90%) of ricinoleic acid.

III. One Mark questions:

1. Scientific name of groundnut
2. Common name of sesamum
3. Oilseed rich in protein
4. Crop with underground pods
5. Drought-resistant oilseed
6. Sunflower inflorescence
7. Oil from castor
8. Scientific name of soybean
9. Sesamum scientific name
10. Castor scientific name

IV. Two Marks Descriptive Questions

1. Define oilseed crops.
2. What are the uses of groundnut?
3. Name two varieties of sunflower.
4. What is the importance of soybean?
5. What are the uses of sesamum oil?
6. What is safflower used for?
7. What are the characteristics of castor crop?
8. What is the growing season of groundnut?
9. What are the climatic requirements of sunflower?
10. What is the economic importance of oilseeds?

V. Three Marks Descriptive Questions

1. Explain the importance of oilseed crops in India.
2. Describe the cultivation practices of groundnut
3. Explain the characteristics of soybean crop.
4. Discuss the uses of castor and safflower.
5. Explain the climatic and soil requirements of sesamum.

VI. Five Marks Descriptive Questions

1. Describe the cultivation practices of groundnut in detail.
2. Explain the importance and uses of major oilseed crops.
3. Discuss the agronomic practices of sunflower cultivation.
4. Explain the role of soybean in improving soil fertility and nutrition.
5. Describe the cultivation, uses, and economic importance of castor crop.

3.5. Commercial Crops: Cotton, Chilies, Sugarcane etc. Multiple Choice

I. Multiple Choice Questions

1. Duration of Kamsali crop is

   a. 18 months
   b. 12 months
   c. < 10 months
   d. 24 months

2. Number of 2 budded setts required per acre

   a. 12000
   b. 16000
   c. 24000
   d. 32000

3. Removal of unwanted bottom dry and green leaves at 150 DAP

a. Detrashing
b. Detasseling
c. Propping
d. Halometer

4. Instrument used to assess the maturity of Sugarcane crop

a. Stelometere
b. Refractometer
c. Penetrometer
d. Halometer

5. Planting method suitable for coastal areas which receive high rainfall is

a. Ridge and Furrow
b. Tjeblong
c. Skip Furrow
d. Trench Method

6. Cotton seed rate for hybrids is approximately:

a. 5 kg/acre
b. 3 kg/acre
c. 1.0–1.2 kg/acre
d. 10 kg/acre

7. Cotton is sensitive to:

a. Salinity
b. Frost
c. Drought
d. Heat

8. Earthing-up in sugarcane helps in

a. Weed growth
b. Root development and anchorage
c. Reducing yield
d. Increasing pests

9. Critical stage for weed control in sugarcane is:

a. First 30 days
b. First 60 days
c. First 90–100 days
d. After 120 days

10. Ideal soil pH for cotton cultivation is:

1. 4.5–5.5
2. 5.5–6.0
3. 8.5–9.5
4. 6.5–8.0

II. One Mark questions:

1. Scientific name of cotton
2. Fibre crop
3. Pungent compound in chillies
4. Sugar crop

5. Vegetative propagation in sugarcane
6. Family of chillies
7. Cotton pest
8. Red pigment in chillies
9. Sugarcane family
10. Genetically modified cotton

III. Two Marks Descriptive Questions

1. Define commercial crops.
2. What are the uses of cotton?
3. What is capsaicin?
4. What is Bt cotton?
5. What are setts in sugarcane?
6. Name two products of sugarcane.
7. What are the climatic requirements of cotton?
8. What is the importance of chillies?
9. What are the major pests of cotton?
10. What is ratooning in sugarcane?

IV. Three Marks Descriptive Questions

1. Explain the importance of commercial crops.
2. Describe the cultivation practices of cotton.
3. Explain the characteristics of chilli crop.
4. Discuss the propagation methods of sugarcane.
5. Explain the economic importance of sugarcane.

V. Five Marks Descriptive Questions

1. Describe the cultivation practices of cotton in detail.
2. Explain the importance, uses, and cultivation of chillies.
3. Discuss the agronomic practices of sugarcane cultivation.
4. Explain the role of commercial crops in agricultural economy.
5. Describe the major pests and diseases of cotton and their management.

3.6. Fruit Crops: Mango, Sapota, Custard Apple, Aonla, Grape and Pomegranate

I. Multiple Choice Questions

1. The botanical name of mango is:

a Mangifera indica
b Musa paradisiaca
c Psidium guajava
d Citrus sinensis

2. Mango belongs to which family?

a Rutaceae
b Anacardiaceae
c Rosaceae
d Fabaceae

3. India is the largest producer of mango with production of approximately:

a 10 million tons
b 15 million tons
c 20.9 million tons
d 25 million tons

4. Mango is rich in which vitamin?

a Vitamin B
b Vitamin C
c Vitamin A
d Vitamin D

5. Which method is commonly used for mango propagation?

a Seed propagation
b Softwood grafting
c Layering
d Cutting

6. Fruit bud differentiation in mango occurs during:

a June–July
b August–September
c October–November
d January–February

7. Mango flowering mainly occurs on:

a Roots
b Stem base
c Terminal shoots
d Leaves

8. Sapota belongs to which family?

a Sapotaceae
b Rutaceae
c Myrtaceae
d Anacardiaceae

9. The best rootstock for sapota is:

a Mango seedling
b Rayan/Khirni
c Guava rootstock
d Citrus rootstock

10. Sapota fruits mature in about:

a 3–4 months
b 5–6 months
C 9–10 months
d 12–14 months

II. Fill in the Blanks

1. Cotton requires a frost-free period of a minimum of _____ days for its cultivation.
2. The removal of the terminal bud in cotton to check excessive vegetative growth is called _____.
3. The duration of Adsali sugarcane crop is _____ months.
4. Mango is called the "_____" and is considered the National fruit of India.
5. The botanical name of Sapota is _____, belonging to the family Sapotaceae.
6. Custard apple is also called the "fruit of poor people" and is botanically known as _____.
7. Aonla is very rich in Vitamin C content, ranging from _____ mg per 100g of pulp.
8. The study of grapes is known as _____, and India's average productivity of grape is 16.95 tonne/ha, highest in the world.
9. Iran is the centre of origin for pomegranate and it is also considered the _____ of Iran.
10. Pomegranate fruits become ready for harvesting in _____ months after blossoming.

III. Two Marks Descriptive Questions

1. What is the chromosome number of mango?
2. Define fruit bud differentiation (FBD) in mango.
3. What is biennial bearing in mango?
4. Mention any two uses of mango fruit.
5. What is the optimum pH range for mango cultivation?

IV. Three Marks Descriptive Questions

1. Explain the importance of mango as a fruit crop.
2. Write any three climatic requirements for mango cultivation.
3. List three major pests of mango and their effects.
4. Describe the uses of sapota.
5. Write three characteristics of sapota cultivation.

V. Five Marks Descriptive Questions

1. Explain propagation methods of mango in detail.
2. Describe soil and climatic requirements for mango cultivation.
3. Discuss major physiological disorders in mango and their control.
4. Explain planting and spacing systems in mango cultivation.
5. Describe propagation, planting, and irrigation practices in sapota.

3.7. Production Technology of Vegetable Crops

I. Multiple Choice Questions

1. Blossom-end rot in tomato is caused due to deficiency of:
   a. Calcium
   b. Boron
   c. Potassium
   d. Magnesium

2. The ideal soil pH for brinjal cultivation is:
   a. 4.0–5.0
   b. 5.5–6.8
   c. 7.5–8.0
   d. 8.0–8.5

3. Buttoning in cauliflower occurs due to:
   a. High nitrogen
   b. Very low temperature
   c. Waterlogging
   d. Excess potassium

4. Optimum temperature for cabbage head formation is:
   a. 10–12°C
   b. 15–20°C
   c. 25–30°C
   d. 35–40°C

5. Cucumber is highly sensitive to:
   a. Salinity
   b. Drought
   c. Frost
   d. Heavy manuring

6. Pandal/bower system is commonly used for:
   a. Tomato and cabbage
   b. Bitter gourd and ridge gourd
   c. Cauliflower and brinjal
   d. Cucumber and cabbage

7. Blanching in cauliflower is practiced to:
   a. Protect curd from insects
   b. Maintain curd whiteness
   c. Improve soil fertility
   d. Reduce irrigation requirement

8. Water stress during flowering in brinjal causes:
   a. Blossom drop
   b. Buttoning
   c. Fruit cracking
   d. Fruit rot

9. Cabbage seed rate per hectare nursery is:
   a. 250 g
   b. 500 g
   c. 750 g
   d. 1 kg

10. Yellowing and loose curds in cauliflower are due to:
    a. Early harvest
    b. Delayed harvest
    c. Excess nitrogen
    d. Soil alkalinity

II. Fill in the Blanks

1. The ideal daytime temperature for growing tomatoes is between _____.
2. For determinate tomato types, the recommended spacing between rows is _____.
3. Calcium deficiency in tomatoes typically causes a physiological disorder known as _____.
4. Tomatoes harvested at the _____ stage are full-sized and firm with well-developed seeds, making them ideal for long-distance transport.
5. Brinjal is considered a heavy feeder, especially of the nutrient _____.
6. In cauliflower cultivation, very low temperatures can cause the formation of small curds, a condition called _____.
7. To protect the curd from the sun and keep it white, farmers use a practice called _____.
8. Cucumber is believed to have originated in _____ and is composed of 96% water.
9. In bottle gourd cultivation, farmers use _____ or pandals to improve fruit shape and increase yield.
10. Bitter gourd is widely valued for its medicinal properties, specifically its ability to reduce _____.

II. OneMark Questions

1. Scientific name of tomato.
2. Nutrient deficiency causing blossom-end rot.
3. Critical stage for irrigation in cabbage.
4. Practice of covering cauliflower curds with leaves.

5. Family of bitter gourd.

III. Two Marks Descriptive Questions

1. What is buttoning in cauliflower?
2. Name two cucurbits grown on pandal.

3. Define blanching in cauliflower.
4. State the critical irrigation stage in cucumber.
5. What is the cause of blossom drop in brinjal?
6. Write the seed rate of bottle gourd.
7. What is the average yield of cabbage?

IV. Three Marks Descriptive Questions

1. Explain the role of calcium in tomato fruit quality.
2. Describe transplanting practices in brinjal.
3. What are the problems of delayed harvest in cauliflower?
4. Write the advantages of drip irrigation in vegetable crops.
5. Describe the importance of staking in tomato.
6. Explain about harvesting of cabbage.
7. Explain the sowing method and spacing for cucumber.
8. Write short notes on ridge gourd harvesting.

V. Five Marks Descriptive Questions

1. Explain the production technology of tomato in detail.
2. Describe the nutrient and irrigation management practices in brinjal.
3. Explain the climatic and soil requirements of cabbage and cauliflower.
4. Write in detail about intercultural practices in cauliflower cultivation.
5. Describe the stages of tomato harvesting with importance.
6. Discuss in detail the cultivation practices of cucumber.
7. Write in detail about bottle gourd production technology.
8. Discuss the package of practices for bitter gourd cultivation.

3.8. Medicinal and Aromatic Plants

I. Multiple Choice Questions

1. Which part of Ashwagandha is primarily used for its medicinal properties?
   a. Leaves
   b. Flowers
   c. Roots
   d. Bark

2. The primary medicinal use of Isabgol (Blond Psyllium) husk is as a:
   a. Sedative
   b. Laxative
   c. Anti-hypertensive
   d. Anti-cancer agent

3. Sarpagandha (*Rauwolfia serpentina*) roots are traditionally used to treat:
   a. Constipation
   b. Skin burns
   c. High blood pressure
   d. Chest ailments

4. Which crop is propagated primarily using root suckers?
   a. Coleus
   b. Periwinkle
   c. Aloe
   d. Senna

5. The active compound 'Forskolin' is found in the tuberous roots of:
   a. Kalmegh
   b. Coleus
   c. Long Pepper
   d. Sweet Flag

6. For which crop is it critical to dry the harvested leaves quickly in the shade to prevent them from turning black?
   a. Periwinkle
   b. Senna
   c. Ashwagandha
   d. Kalmegh

7. Which aromatic grass does NOT produce viable seeds and must be propagated by slips?
   a. Lemongrass
   b. Citronella
   c. Palmarosa
   d. Vetiver

8. What is the special requirement for irrigating a Sweet Flag crop?
   a. Drip irrigation
   b. Flooded field (like paddy)
   c. Sprinkler irrigation
   d. No irrigation needed

9. Which part of the Senna plant contains sennosides and is used as a laxative?
   a. Roots and Stems
   b. Leaves and Pods
   c. Flowers and Seeds
   d. Bark and Rhizomes

10. The variety 'CIM-Sheetal' is associated with which medicinal plant?
    a. Sarpagandha
    b. Aloe
    c. Ashwagandha
    d. Periwinkle

II. Fill in the Blanks

1. Ashwagandha, also known as _____ in English, is planted at the end of the rainy season and requires dry weather for root development.
2. Modern medicine uses Periwinkle to produce critical cancer drugs, specifically _____ and vincristine.
3. Sarpagandha roots are traditionally used for snake bites, but modern medicine utilizes them to treat _____.
4. The highly absorbent husk of the _____ plant is primarily used as a laxative to treat constipation and diarrhea.

5. Aloe vera is typically propagated from _____ (offsets) that grow at the base of the plant.
6. The tuberous roots of Coleus contain a compound called _____, which is being developed into drugs for heart conditions and glaucoma.
7. Senna leaves and pods contain active compounds called _____, making it an effective laxative.
8. Known as the "King of Bitters," _____ is used medicinally to stimulate digestion and treat liver problems.
9. Vetiver, commonly known as _____, is a dense grass whose root oil is a prized ingredient in perfumes.
10. The most widely used method for extracting essential oils from aromatic plants is _____.

III. One Mark Questions

1. Name the English name for Ashwagandha.
2. What is the term for the dried root of Long Pepper?
3. Which compound in Periwinkle is used to make anti-cancer drugs?
4. What is the primary form of propagation for Coleus?
5. Which medicinal plant is also known as "King of Bitters"?
6. Which crop's leaves are distilled to produce an oil used as a natural insect repellent?

IV. Two Marks Descriptive Questions

1. Write about harvesting of Ashwagandha.
2. Write about propagation of Ashwagandha?
3. Write about uses of Sarpagandha and lemongrass.
4. Propagating methods of Periwinkle
5. Propagation and planting of Isabgol
6. Mention two primary uses of Aloe vera gel.
7. What is the active compound in Coleus and what is its medicinal significance?
8. explain harvesting of Senna leaves
9. List out different varieties of lemongrass and Palmarosa.
10. What is the major difference in the irrigation requirement for Sweet Flag compared to other medicinal crops?

V. Three Marks Descriptive Questions

1. Write the propagation methods of Ashwagandha and Coleus.
2. Describe the harvesting and post-harvest handling process for Ashwagandha roots.
3. Explain the importance of 'slips' in the propagation of aromatic grasses like Citronella and Vetiver.
4. Discuss the soil and climate requirements for the successful cultivation of Lemongrass.
5. Outline the manuring and fertilization schedule for a crop of Sarpagandha.

6. Describe the process of harvesting and processing Isabgol to obtain the final marketable product.
7. Explain the harvesting technique for Kalmegh
8. Explain oil extraction process of Citronella and Vetiver.

VI. Five Marks Descriptive Questions

1. Write the production technology of Ashwagandha
2. Medicinal importance of Periwinkle and write cultivation practices
3. Discuss the cultivation of Sarpagandha as a long-term crop. Include details on its propagation challenges, nutrient requirements, and the specific precautions needed during its harvest to ensure quality.
4. Explain cultivation and processing of Isabgol
5. Describe the propagation methods, planting techniques, and harvesting of Aloe, Kalmegh
6. Write about cultivation practices of Coleus
7. Explain the complete package of practices for growing Senna
8. Write production technology of Palmarosa

3.9. Floriculture

I. Multiple Choice Questions

1. The commercial flower crops production involves _____
   a. Traditional flowers
   b. Cut flowers
   c. Foliage crops
   d. All the above

2. Bud capping is important special cultural practice in protected cultivation of ___ crop
   a. Chrysanthemum
   b. Orchids
   c. Carnation
   d. Rose

3. Best season for pruning rose
   a. May-June
   b. October-November
   c. Both a & b
   d. January-February

4. Important diseases of Rose
   a. Damping off and Root rot
   b. Fusarium wilt and Anthracnose
   c. Powdery Mildew and Black spot of Rose
   d. All the above

5. Rose is commercially propagated through
   a. Cuttings
   b. Seeds
   c. Tissue culture
   d. T-budding/Shield budding

6. Scent yellow and Scent white are popular varieties of which crop?
   a. Chrysanthemum
   b. Rose
   c. Carnation
   d. Marigold

7. Xanthophyll is a pigment extracted pets of _____ crop
   a. Rose
   b. Orchids
   c. Marigold
   d. China aster

8. Pinching is done to increase _____
   a. Vegetative growth
   b. Auxiliary branches
   c. Roots
   d. None of these

9. Pruning is practiced in different flower crops to regulation _____
   a. Vegetative growth
   b. To improve root quality
   c. To regulate duration
   d. To increase flowering & productivity

10. The total duration of chrysanthemum crop is
   a. 2-3 months
   b. 2-3 years
   c. 4- 5 years
   d. 4-5 months

II. Fill in the blanks

1. The oil produced from _____ leaves is a common ingredient in soaps and perfumes, and it also acts as a natural insect repellent.
2. Vetiver oil, often called the "_____ of the earth," is prized for its deep and persistent fragrance.
3. To improve the aroma of vetiver oil, it should be aged for _____ months after distillation.
4. Lemongrass oil is a vital source for synthesizing _____, making it a versatile herb for both health and industry.
5. The primary aromatic compound that determines the quality of lemongrass is _____.
6. Palmarosa oil is known as "_____ Geranium Oil" due to its sweet, rosy scent and high geraniol content.
7. For the highest oil yield, Palmarosa should be harvested when the plant is in _____.
8. In the steam distillation process, heat and moisture rupture the _____ to release volatile essential oils.
9. Essential oils can be easily separated from water after condensation because they are _____ in water and have a lighter density.
10. To maintain the quality and greenish-yellow color of _____, the harvest must be dried quickly in the shade.

III. One Mark Questions

1. Flower Crops which are grown under protected conditions
2. The growth regulator used to increase stalk length improving size of flower is
3. Removal of suckers or shoots produced from rootstock below bud union in grafted plants is called as?
4. Relative humidity above optimum level causes?
5. The optimum concentration of Co2 for production of rose under protected cultivation
6. During propagation through cuttings which growth regulator is treated to the cut end to increase the percentage of rooting?
7. Mulching is practically practiced using which material?
8. The flower crops which are grown both for cut flower and loose flower purpose
9. Flower crops having industrial applications & importance
10. Non-fragrant species of Jasmine

IV. Two Marks Descriptive Questions

1. Different types of pruning in Rose
2. Commercially important types of Marigold
3. Pruning in Jasmine
4. Netting in Carnation
5. Different types of pinching in Carnation
6. Propagation in Tuberose
7. Propagation in Orchids
8. Propagation of Gladiolus

V. Three Marks Descriptive Questions

1. Discuss about different types of orchids based on nature and place of growing
2. Discuss the special cultural practices followed in Dahlia
3. Write a brief note on pruning in flower crops
4. Write a brief note on application of growth regulators in Flower crops
5. Discuss the soil and climatic requirement for production of Orchids

VI. Five Marks Descriptive Questions

1. Discuss the production techniques of Rose under Polyhouse
2. Discuss the Planting and after care in China aster
3. Discuss the production technology of Gladiolus
4. Write a note on cut flowers and loose flowers scenario in India
5. Discuss in about the Production technology of Chrysanthemum
6. Discuss about the production technology of Crossandra
7. Discuss about the plant protection of Rose crop
8. Discuss about the plant protection of marigold
9. Discuss about the plant protection of Carnation
10. Discuss about the plant protection of Jasmine

3.10. Production Technologies of Plantation Crops

I. Multiple Choice Questions

1. Pit size for coconut in laterite soil

a. 1m × 1m × 1 m
b. 1.5 m× 1.5 m× 1.2 m
c. 0.75 m × 0.75 m× 0.75 m
d. None of the above

2. Number of emitters used for drip irrigation in coconut under sandy soil are-

a. Two
b. Four
c. Six
d. Eight

3. Arecanut spacing recommended is

a. 2.7 × 2.7 m
b. 2.5 × 2.5 m
c. 2.0 × 2.0 m
d. 2.3 × 2.3 m

4. Recommended dose of fertilizer for adult arecanut palms

a. 100:40:40
b. 100:140:40
c. 40:100:100
d. 100:40:140

5. Recommended cocoa spacing under oil palm

a. 2.0 m
b. 3.0 m
c. 2.4 m
d. 3.4 m

6. Recommended water under drip irrigation for cocoa

a. 30 L/day
b. 20 L/day
c. 25 L/day
d. 32 L/day

7. Cocoa pruining season in Karnataka and kerala is

a. May- June
b. Aug-sept
c. Nov-Dec
d. Jan-Feb

8. Oil palm starts flowering after _____planting

a. 14-18 months
b. 24-28 months
c. 12 months
d. None of the above

9. Recommended dose of fertilizer for oil palm under fertigation
   a. 600:300:600
   b. 320:500:1200
   c. 100: 40:140
   d. None of the above

10. CPCRI located at
   a. Tiruvananthapuram
   b. Trichii
   c. Kochi
   d. Kasaragod

II. Fill in the Blanks

1. Known as "Khus," _____ is a perennial grass whose roots provide a fragrance often described as the "perfume of the earth".
2. For maximum oil quality, Vetiver roots should be dried in the _____ for 1-2 days, as sun-drying can reduce the overall yield.
3. Lemongrass oil is highly valued in the industry because it serves as a base for synthesizing _____.
4. The main aromatic compound in Lemongrass that determines its commercial value is _____.
5. _____ oil is frequently referred to as "East Indian Geranium Oil" due to its sweet, rosy scent caused by high geraniol levels.
6. Unlike many other crops, Citronella does not produce _____, meaning it must be propagated by dividing old clumps into "slips".
7. In the extraction process, the grass from Citronella must be distilled within _____ hours of being cut to ensure optimal oil recovery.
8. Palmarosa is highly sensitive to weather and can be killed by _____, requiring a warm tropical climate to thrive.
9. During steam distillation, the mixture of steam and oil is cooled so that it separates into two layers: _____ and essential oil.
10. Essential oils are easily extracted using steam because they are _____ in water and have a lighter density, allowing them to float to the top.

III. Two Marks Descriptive Questions

1. Write seedling selection criteria for coconut
2. Write management of juvenile palms in coconut
3. Name four cover crops
4. What is fertigation
5. What is pruning

IV. Three Marks Descriptive Questions

1. Write about spacing and planting of coconut
2. Write about spacing and planting of arecanut

3. Write about spacing and planting of cocoa
4. Write about spacing and planting of oil palm
5. Write about irrigation management in coconut

V. Five Marks Descriptive Questions

1. Write about nutrient management in coconut
2. Write about nutrient management in arecanut
3. Write about pruning in cocoa
4. Write about nutrient management in oil palm
5. Write about soil water conservation measures in coconut

Module IV: WEED MANAGEMENT

4.1. Importance of Weed Management in Crops and types of Weeds

I. Multiple Choice Questions

1. Weeds compete with crops mainly for:
   a. Rain
   b. Pesticides
   c. Soil nutrients, light and water
   d. Tillage

2. Critical period of crop weed competition refers to
   a. Time when weeds are harmless
   b. Time when weeds must be controlled
   c. Time when crops can tolerate weeds
   d. None

3. Integrated Weed Management (IWM) means
   a. Combination of different weed control methods
   b. Only chemical methods
   c. Ignoring weed growth
   d. Only manual weeding

4. Which weed control practice helps conserve soil moisture?
   a. Mulching
   b. Tillage
   c. Flood irrigation
   d. Broadcasting

5. Presence of weeds in fodder crops may
   a. Increase quality
   b. Cause toxicity to livestock
   c. Improve digestion
   d. Make fodder tastier

6. Parasitic weeds cause damage by
   a. Germinating late
   b. Attaching to host plants and sucking nutrients
   c. Providing shade
   d. Improving soil

7. *Cynodon dactylon* (Doob grass) spread rapidly due to
   a. Wind
   b. Underground stolons and rhizomes
   c. Flowers
   d. Rain

8. Herbicide misuse may lead to
   a. Better soil fertility
   b. Herbicide resistance in weeds
   c. Reduced weed population permanently
   d. None

9. *Phalaris minor* is a major weed of
   a. Wheat
   b. Rice
   c. Sugarcane
   d. Cotton

10. *Striga* is a parasitic weed of
    a. Jowar
    b. Sugarcane
    c. Maize
    d. All the Above

II. Fill in the Blanks

1. Weeds are a major problem in crop production because they compete with primary crops for sunlight, water, space, and _____.
2. In India, weeds cause an estimated annual economic loss of about _____ across ten major crops.
3. The "real" long-term problem in weed management is not just the visible plants, but the _____ stored in the soil.
4. Using a combination of simple, low-cost methods to keep weed populations low is known as _____.
5. _____ control methods involve using tools like hoes, harrows, or even manual hand-weeding to remove weeds.
6. A _____ herbicide, such as Paraquat, only kills the specific plant parts it touches and does not move through the plant's system.
7. Herbicides applied to the soil before any crop or weed growth appears are called _____ herbicides.
8. To control broadleaf weeds like *Chenopodium album* in wheat crops, farmers commonly use the herbicide _____.
9. _____ is a post-emergence herbicide used specifically to control grassy weeds in crops like soybean and groundnut.
10. To prevent weeds from developing _____, farmers should avoid the continual use of the same herbicide and instead rotate or mix different products.

III. One Mark Questions

1. Write parasitic weed of cereal crops?
2. Give one example of a perennial weed.
3. Name three essential resources for which weeds compete with crops.
4. *Fusarium oxysporum* is used for the management of which weed?
5. What is a common weed found in wheat crops?
6. Give one example of contact herbicide.
7. Which type of weed is easier to control with selective herbicides?
8. What is an example of cultural control?

III. Two Marks Descriptive Questions

1. Define weed
2. What is the difference between annual and perenial weed?
3. Define Integrated Weed Management (IWM)

4. What is difference between cultural and mechanical weed control?
5. Why is chemical control important?
6. What is *Zygogramma bicolorata*?

IV. Three Marks Descriptive Questions

1. Enlist different types of weed and their example.
2. Describe the role of crop rotation and sowing time in controlling weeds.
3. What is mechanical control?
4. Write in detail about soil solarization and its effect on weeds.
5. Define herbicide and its role in weed management.

V. Five Marks Descriptive Questions

1. Explain the tools of Integrated Weed Management.
2. Explain the importance of weed management in agriculture.
3. Classify weeds and describe their types.
4. Discuss the limitations of using herbicides alone for weed management.
5. Explain how parasitic weeds like *Striga* and *Orobanche* can be managed using cultural and biological methods.

4.2. A. Classification of herbicides based on chemical nature - time and method of application. Classes of herbicides based on – selectivity – spectrum – translocation – residual nature – soil sterilants and fumigants
4.2. B. Compatibility of herbicides with agro-chemicals and their application
4.2. C. New developments in herbicides – micro-herbicides & nano-herbicide
4.3. Integrated Weed Management (Physical, Chemical, Biological method)

I. Multiple Choice Questions

1. Which herbicide is an example of contact herbicide?
   a. Paraquat
   b. pendimethalin
   c. glyphosate
   d. metribuzin

2. Which herbicide has both systemic and contact properties, making it versatile in weed control
   a. Paraquat
   b. Atrazine
   c. glyphosate
   d. metribuzin

3. Which herbicide is an example of systemic herbicide
   a. Pendimethalin
   b. diquat
   c. propanil
   d. oxyfluorfen

4. Which herbicides are absorbed by the plant and move from the application site to other parts, affecting the entire plant. .
   a. Contact
   b. Systemic
   c. Pre-emergence
   d. Broad Spectrum

5. The herbicides that are designed to target specific groups of weeds without harming the crops
   a. Contact
   b. Systemic
   c. Selective
   d. Broad Spectrum

6. Which of these herbicides kill any plant species they come in contact with, regardless of whether they are crops or weeds.
   a. Contact
   b. Systemic
   c. Selective
   d. Non-selective

7. Mulching kills the weeds due to
   a. Moisture stress
   b. Decreased light
   c. Decreased oxygen
   d. Increased temperature

8. The herbicide needs incorporation immediately after its application for better performance
   a. Paraquat
   b. Fluchloralin
   c. Glyphosate
   d. Metachlor

9. Critical period of crop weed competition for groundnut is
   a. 4-7 DAS
   b. 20 DAS
   c. 45 DAS
   d. 15 DAS

10. Critical period of crop weed competition for maize is
   a. 30 DAS
   b. 20 DAS
   c. 45 DAS
   d. 15 DAS

II. Fill in the Blanks

1. The term herbicide is derived from Latin words ‘herba’ and ‘_____’
2. Herbicides are classified based on chemical nature into _____ and organic types
3. Herbicides applied before sowing the crop are called _____ herbicides
4. _____ herbicides are applied after sowing but before emergence of crop and weeds.
5. Herbicides applied after crop emergence are known as _____ herbicides.
6. Herbicides applied directly to leaves are called _____ applied herbicide

7. Herbicides that kill all types of vegetation are called _____ herbicides.
8. Herbicides that move within the plant from one part to another are known as _____ herbicides
9. Herbicides that remain active in soil for a long period are called _____ herbicides.
10. Soil sterilants are also known as _____ ground herbicides.

III. One Marks Questions

1. A plant that is growing in an area where it is not wanted--
2. Specific time duration during a crop's growth when weeds must be controlled to prevent significant yield loss_____.
3. A range of proactive measures aimed at stopping the introduction, establishment, and spread of unwanted plant species-
4. Complete elimination of all live weeds and their propagules from a specific area _____.
5. These herbicides limited mobility and act by directly killing the plant tissue they come in contact with_____Contact Herbicides
6. These herbicides are absorbed by the plant and move from the application site to other parts, affecting the entire plant _____.
7. The herbicides are designed to target specific groups of weeds without harming the crops
8. The herbicides kill any plant species they come in contact with regardless of whether they are crops or weeds _____.
9. The herbicides control specific groups of weeds by targeting particular weed species without affecting other plants _____.
10. The herbicides effective against a wide range of weed species, in a single application, reducing the need for multiple herbicides _____.
11. The method in which herbicides are applied and incorporated into the soil before crop sowing _____.
12. The method in which herbicides are applied after sowing of crop (within 1–2 days) but before weed emergence _____.
13. Method in which herbicides are applied after both crop and weed emergence, generally 15–30 days after sowing _____.
14. The phenomenon in which some plants release chemicals that inhibit the growth of neighbouring plants-------
15. The physical pulling of weeds out by hand or using tools such as a khurpi -----

IV. Two Marks Descriptive Questions

1. What is stale seed bed method to control weed?
2. What is soil solarization?
3. What is allelopathy?

4. What is P.P.I.?
5. What are the three principles of weed management?
6. What is prevention in weed control?

V. Three Marks Descriptive Questions

1. What are the mechanisms of herbicide selectivity and how is it determined?
2. What is the critical period of weed competition for a given crop, and how is it determined?
3. Classify the herbicides based on the mode of action of herbicides? (3 marks)
4. Write short note on bioherbicides?
5. What are the advantages and disadvantages of herbicide usage in agriculture within an IWM program?
6. What are some examples of beneficial weeds, and what are their harmful effects on crops?
7. Define allelopathy and explain its effects on crop-weed interactions? (3 marks)
8. Briefly explain the biological methods of weed control and give some examples of bio-herbicides?
9. What are the characteristics of common problematic weeds?(4 marks)
10. Classify the herbicides based on the time of application of herbicides? (4 marks)
11. Define weeds? Write any 3 beneficial and three harmful effects of weeds with examples?

VI. Five Marks Descriptive Questions

1. What is selectivity of herbicides? Classify the herbicides based on selectivity?
2. Explain how emerging technology such as drones , sensors can be used for weed monitoring and control?
3. What is mulching? What are the different types of mulching and how it controls weed growth?
4. What is the Role of Remote Sensing and GIS in Monitoring Weed Spread?
5. Explain the principle- prevention of weeds in details?
6. What are different cultural practices for minimization of weed infestation in crop?
7. What are different physical methods of weed control in crop? Explain in details with examples
8. Give the classification of herbicides based on time and method of application with examples?
9. What is integrated weed management (IWM), and what are its key components? Explain in detail.
10. How do weeds interact with crops through competition for resources like water, nutrients, and light?

Module V: Integrated Pest Management (IPM)

5. 1.A. Importance of Pest and Disease Control in Agriculture

5.1. B. Harmful and Beneficial insects.

5.1. C Important species of pollinators, weed killers and scavengers and their importance in agriculture. Predators and Parasitoids

I. Multiple Choice Questions

1. The main aim of Integrated Pest and Disease Management (IPDM) is to:
   a. Eliminate all pests and diseases
   b. Increase pesticide use
   c. Keep pest and disease levels below the economic threshold level
   d. Depend completely on chemicals

2. Yellow Mosaic Disease in mungbean is transmitted by:
   a. Aphids
   b. Leafhoppers
   c. Thrips
   d. Whiteflies *(Bemisia tabaci*)

3. The organism *Fusarium oxysporum* causes:
   a. Leaf curl
   b. Blight
   c. Wilt
   d. Rust

4. Which insect is a predator useful in pest control?
   a. *Coccinella septempunctata*
   b. *Helicoverpa armigera*
   c. *Aphis craccivora*
   d. *Bemisia tabaci*

5. Which of the following is a weed killer insect?
   a. *Trichogramma chilonis*
   b. *Zygogramma bicolorata*
   c. *Coccinella septempunctata*
   d. *Apis mellifera*

6. The fungus *Trichoderma harzianum* acts as:
   a. Plant pathogen
   b. Biofertilizer
   c. Biocontrol agent
   d. Pollinator

7. *Neochetina eichhorniae* controls which weed?
   a. Parthenium
   b. Water hyacinth
   c. Alligator weed
   d. Lantana

8. Which of the following helps in nitrogen fixation in paddy fields?
   a. *Aspergillus*
   b. *Anabaena*
   c. *Trichoderma*
   d. *Penicillium*

9. The main pollinator for crops like sunflower and mustard is:
   a. Butterfly
   b. Beetle
   c. Honey bee
   d. Moth

10. Which of the following is not a principle of pest management?
   a. Mechanical control
   b. Overuse of pesticides
   c. Biological control
   d. Moth

II. Fill in the Blanks

1. The primary goal of Integrated Pest and Disease Management (IPDM) is to keep pest and disease levels below the _____ level.
2. In IPDM, farmers prioritize monitoring and identification, using chemical measures only as a _____ and in the right amount.
3. Cultural control methods include practices such as _____, which helps expose soil-dwelling pests to natural predators and harsh weather.
4. Natural enemies of pests that are used in IPDM to manage populations sustainably are known as _____.
5. The Ladybird beetle is a beneficial predator that eats soft-bodied insects like _____ and jassids.
6. _____ are beneficial insects that lay their eggs inside the eggs of pests, killing the larvae before they can hatch.
7. The egg parasitoid *Trichogramma chilonis* is commonly used to control _____ in cotton and sugarcane.
8. Beyond pest control, insects like _____ play a vital role as pollinators, helping to increase yields in fruits and vegetables.
9. _____ are decomposer insects that help break down organic matter, contributing to soil health.
10. By following IPDM, farmers can reduce costs and improve _____ health while achieving better yields safely.

III. One Mark Questions

1. What is the main goal of Integrated Pest and Disease Management (IPDM)?
2. Name any two cultural methods used in pest and disease management.
3. Which bio-control agent is commonly used against soil-borne fungal diseases
4. What are the three major types of beneficial insects in agriculture?
5. Name one nitrogen-fixing bacterium used as a biofertilizer.

IV. Two Marks Descriptive Questions

1. What are the advantages of using IPDM in crop management
2. Mention two examples of parasitoid insects and their target pests.
3. What are the key steps in diagnosing pest incidence in the field?
4. List two examples of weed killer insects and their target weeds.

5. Write two benefits of beneficial microbes in agriculture.

V. Three Marks Descriptive Questions

1. Explain the principles of disease management in crops.
2. Describe the role of pollinating insects in crop production.
3. Write a short note on scavenger insects and their role in agriculture.
4. What is the importance of accurate pest and disease diagnosis?
5. Explain the role of beneficial microbes in sustainable farming.

VI. Five Marks Descriptive Questions

1. Discuss in detail the components and importance of Integrated Pest and Disease Management (IPDM).
2. Write an essay on harmful and beneficial insects and their role in agriculture.

5.2. A. Insect and Disease Symptoms, Difference among symptoms of Insect, Disease, Nutritional deficiencies and Physiological disorders
5.2. B. Mouth parts
5.2. C. Types of larvae and pupae – differences between nymph and larva

I. Multiple Choice Questions

1. Which of the following is a biotic cause of plant symptoms?
   a. Drought
   b. Nutrient deficiency
   c. Insect infestation
   d. Soil salinity

2. Chlorosis is generally associated with:
   a. Insect damage
   b. Disease infection
   c. Nutritional deficiency
   d. Waterlogging

3. Wilting caused by root rot is an example of:
   a. Nutritional disorder
   b. Physiological disorder
   c. Insect attack
   d. Disease symptom

4. Holes in leaves with uneven margins usually indicate damage from:
   a. Fungal disease
   b. Insects (chewing type)
   c. Nutrient deficiency
   d. Viral infection

5. Which one of the following is an abiotic stress?
   a. Fungal disease
   b. Aphid attack
   c. Frost injury
   d. Bacterial wilt

6. A key symptom of viral infection in plants is:
   a. Webbing on leaves
   b. Mosaic pattern on leaves
   c. Root decay
   d. Powdery growth on surface

7. Interveinal chlorosis is typically a symptom of:
   a. Iron or magnesium deficiency
   b. Fungal disease
   c. Mite infestation
   d. Nematode attack

8. Which of the following symptoms indicates a physiological disorder rather than a pest or disease?
   a. Sunscald on fruit
   b. Leaf curling by thrips
   c. Powdery mildew
   d. Canker on stem

9. Which insect mouthpart causes piercing and sucking type damage?
   a. Mandibulate
   b. Haustellate
   c. Chewing
   d. Stylet-type (piercing-sucking)

10. Necrotic spots surrounded by yellow halos are typical of:
   a. Fungal infection
   b. Nutrient deficiency
   c. Boron toxicity
   d. Insect feeding

11. Sudden leaf drop without visible insect or disease is likely due to:
   a. Root mealybugs
   b. Soil nutrient deficiency
   c. Physiological stress like waterlogging
   d. Nematode infestation

12. Which pest symptom is correctly matched with its cause?
   a. Leaf galls – Mites
   b. Skeletonization – Bacteria
   c. Damping-off – Aphids
   d. Mosaic – Fungi

13. Powdery white coating on leaf surfaces indicates:
   a. Potassium deficiency
   b. Leaf miners
   c. Whiteflies
   d. Powdery mildew (fungus)

14. Leaf margin scorch is often caused by:
   a. Bacterial wilt
   b. Potassium deficiency
   c. Nematode damage
   d. Fungal leaf spot

15. Distorted and curled young leaves are often due to:
    a. Nitrogen deficiency
    b. Aphid or thrip feeding
    c. Fungal rust
    d. Root knot nematode

16. Which one of the following is not a disease symptom?
    a. Wilting
    b. Mosaic
    c. Webbing
    d. Leaf spot

17. Nutrient deficiencies are best confirmed through:
    a. Field observation alone
    b. Insect count
    c. Soil and tissue testing
    d. Microscopy

18. What distinguishes a nutrient disorder from insect damage?
    a. Random appearance on plant
    b. Rapid spread across field
    c. Symmetrical appearance on both sides of leaf
    d. Presence of holes and frass

19. Which of the following disorders is not caused by living organisms?
    a. Root rot
    b. Drought stress
    c. Rust
    d. Blight

20. Yellowing of older leaves with green veins is characteristic of:
    a. Magnesium deficiency
    b. Aphid attack
    c. Viral infection
    d. Bacterial wilt

II. Fill in the Blanks

1. The visible changes in a plant's appearance or function in response to stress are known as _____.
2. Insects that damage plants by removing chunks of tissue, such as caterpillars and beetles, cause _____ damage.
3. _____ damage is characterized by stippling, curling, or yellowing of leaves, often accompanied by sticky honeydew.
4. Internal damage where insects tunnel between the upper and lower leaf surfaces is known as _____.
5. The transition an insect undergoes from an egg to an adult is called _____.
6. Insects that undergo _____ metamorphosis have four distinct life stages: egg, larva, pupa, and adult.
7. An immature insect that resembles a smaller, wingless version of the adult is called a _____.

8. The _____ stage is a non-feeding, quiescent phase where larval tissues reorganize into adult structures.
9. C-shaped, thick-bodied, and sluggish larvae found in white grubs are classified as _____ larvae.
10. Pupae with appendages glued to the body by a hardened cuticle, typical of butterflies and moths, are called _____ pupae.

III. One Mark Questions

1. What is the type of mouthpart in a mosquito?
2. What type of larva does a butterfly produce?
3. What is the larval type of a beetle called?
4. Plant diseases are caused by
5. powdery mildew disease caused by
6. general chlorosis due to
7. Marginal scorch in older leaves, lodging is due to
8. Fruit cracking is due to
9. Hopper burn in rice due to
10. Citrus canker is _____ disease

IV. Two Marks Descriptive Questions

1. Describe one fungal disease in rice crop
2. Write about one insect effecting cotton crop.
3. Write about sooty mould in mango
4. What is a grub? Name one insect that has this larval form.
5. Name one example of sucking pest
6. List two common symptoms caused by insect pests in plants.
7. Mention two visible symptoms of fungal diseases in plants.
8. How do you differentiate between nitrogen and potassium deficiency in plants?
9. What are physiological disorders? Give one example with cause.
10. Name one example biting and chewing insect

V. Three Marks Descriptive Questions

1. Write two important fungal diseases in rice with their symptoms
2. Write two bacterial diseases field crops
3. Write two viral disease in vegetable crops
4. Write about chewing insects
5. Write about sucking insects
6. Mention any three major symptoms caused by insect pests and explain with examples.
7. Describe three common disease symptoms in plants caused by fungi or bacteria.
8. List and explain three nutrient deficiency symptoms with the name of the nutrient.
9. What are physiological disorders in plants? Give three examples with their causes.

10. Write three differences between insect damage, disease infection, and nutrient deficiency in plants.

VI. Five Marks Descriptive Questions

1. Describe different types of insect mouthparts with examples.
2. Write about fungal diseases in field crops
3. Differentiate between complete and incomplete metamorphosis with suitable diagrams.
4. Write a short note on different types of insect larvae with examples.
5. Explain different types of pupae with examples and their characteristics.
6. Discuss common insect symptoms in crops and how they differ from disease symptoms.
7. Write a short note on disease symptoms in plants caused by fungi, bacteria, and viruses.
8. Explain how nutrient deficiency symptoms can be identified in plants with at least three examples.
9. What are physiological disorders in plants? Describe causes and examples related to environmental stress.
10. Differentiate between insect, disease, nutrient, and physiological symptoms with suitable examples

5.3. A. Integrated Pest Management

5.3. B. Concepts and principles of IPM – Economic Threshold Level (ETL) – Economic Injury Level (EIL) and General Equilibrium Position (GEP)

I. Multiple Choice Questions

1. When a natural predator living being applied on the other pathogenic organisms to control them, this process is called
   a. Confusion Technique
   b. Biological Control
   c. Genetic Engineering
   d. Artificial Control

2. IPM stands for
   a. Integrated Pest Management
   b. International Plant Management
   c. International Population Management
   d. Integrated Plant Management

3. The phenomenon of using a predator for controlling a pest is
   a. Artificial control
   b. Confusion technique
   c. Biological control
   d. Genetic engineering

4. The pesticides are the chemicals that kill
   a. Insects
   b. Mites
   c. Weeds
   d. All of these

5. What is the primary goal of Integrated Pest Management (IPM)?
   a. To use chemical pesticides as the first line of defense
   b. To eliminate all pests from an area
   c. To manage pests in a way that is economically sound and has minimal environmental impact
   d. To rely solely on biological control methods

6. Which of the following is a key component of an IPM program?
   a. Regular, scheduled application of broad-spectrum pesticides
   b. Monitoring pest activity and determining action thresholds before taking action
   c. Destroying all natural predators of pests
   d. Ignoring pest problems until they become an overwhelming infestation

7. Which of the following is an example of a biological control method in IPM?
   a. Applying a chemical insecticide to kill an insect pest
   b. Releasing natural predators, like ladybugs, to control aphid populations
   c. Using sticky traps to capture insects
   d. Using genetically modified crops that are resistant to pests

8. Which of the following is a cultural control method used in IPM?
   a. Using a specific insecticide that targets a pest
   b. Introducing a predator that will consume the pest
   c. Modifying the environment, such as changing planting dates or rotating crops
   d. Building a barrier to prevent the pest from entering a specific area

9. What does "action threshold" mean in the context of IPM?
   a. The point at which a pest is invisible to the human eye
   b. The point at which a pest population reaches a level that can cause economic damage
   c. The total cost of all pest control methods used
   d. The time it takes for a pest to complete its life cycle

10. Use of resistant variety in IPM is
   a. Mechanical practice
   b. Cultural practices
   c. Question does not provide sufficient information
   d. None of above

II. Fill in the Blanks

1. Integrated Pest Management is a _____ approach to pest control that combines various strategies to minimize environmental impact and economic costs.
2. The _____ is the pest density at which the cost of damage equals the cost of control.
3. A lower pest level at which one should act to prevent the population from reaching the EIL is known as the _____.
4. The strategy of _____ involves growing a non-host crop after a host crop to reduce pest populations, such as cereals followed by pulses.
5. Sowing maize with a legume like cowpea is an example of _____, which helps improve soil fertility and reduce weeds.
6. _____ involves planting a sacrificial crop, like mustard around cabbage, to lure pests away from the main crop.
7. The larval stage of _____ feeds on all soft-bodied insects like aphids, jassids, and mealy bugs.
8. _____ is a microbial pathogen used specifically for the control of lepidopterous pests.
9. In an IPM strategy, reliance on chemical pesticides should be treated as a _____.
10. One of the main challenges to widespread IPM adoption is the _____ from traditional pest control methods.

III. Three Marks Questions

1 What is the Economic Injury Level?
2 Differentiate between Economic Injury Level and Economic Threshold Level.
3 Write about the importance of IPM.

IV. Five Marks Questions

1 *What is IPM*? Give an example of bio insecticides and bio herbicides and how do they help in pests control.
2 *What is IPM* ? Give an account of the various components of IPM.
3 Elaborate on the biological control of pest management.

5.4. A. Storage pests and their Management

I. Multiple Choice Questions

1. Stored grain pests include which of the following groups?
   a. Insects, mites, rodents, and microorganisms
   b. Birds, reptiles, and insects
   c. Only insects and fungi
   d. Only rodents and mites

2. Which factor increases respiration rate and leads to quality loss in stored grains?
   a. Decrease in light intensity
   b. Increase in storage temperature
   c. Decrease in humidity
   d. Low oxygen concentration

3. The Pulse Beetle (Callosobruchus chinensis) mainly attacks:
   a. Rice and wheat
   b. Pulses such as gram and lentil
   c. Barley and maize
   d. Groundnut and millets

4. The Rust Red Flour Beetle is a:
   a. Primary internal feeder
   b. Primary external feeder
   c. Field pest of maize
   d. Secondary pest of flour and damaged grains

5. Which stored grain pest produces fine powder due to feeding activity?
   a. Rice weevil
   b. Khapra beetle
   c. Lesser grain borer
   d. Rice moth

6. Most storage pests die at which temperature range?
   a. Below 10°C and above 50°C
   b. Below 5°C and above 45°C
   c. Below 15°C and above 35°C
   d. Below 0°C and above 40°C

7. The Khapra beetle and Rust Red Flour Beetle can survive at relative humidity as low as:
   a. 15%
   b. 10%
   c. 10%
   d. 25%

8. Which device is used for systematic sampling and pest monitoring?
   a. Hygrometer
   b. Probe trap or CIPHET instrument
   c. Barometer
   d. Thermometer

9. Neem seed powder and turmeric powder are effective plant products for grain protection when used at:
   a. 0.5–1% of grain volume
   b. 1–2% of grain volume
   c. 5–10% of grain volume
   d. 10–15% of grain weight

10. Fumigation of stored grains should be done using:
   a. Deltamethrin spray
   b. Neem oil solution
   c. Aluminum phosphide under expert supervision
   d. Turmeric and clay mixture

II. Fill in the Blanks

1. Stored grain pests cause both _____ and qualitative losses, including reduction in weight and nutritional value.
2. The _____ is a primary internal feeder that leaves circular holes in grains.
3. Most storage pests die at temperatures below 5 ^{0}C and above _____.

4. To prevent fungal diseases like molds, it is essential to maintain grain moisture content below _____.
5. Treating gunny bags with a 10% _____ solution is an effective non-chemical control method.
6. A _____ is a high-speed machine (3000-4000 rpm) used to mechanically kill insects and mites in grain.
7. _____ is a single-dose acute poison that releases phosphine gas in a rat's stomach.
8. Chronic rodenticides like _____ work by inhibiting blood clotting, leading to death within 3-5 days.
9. The rustling sound of _____ leaves tied to poles is an indigenous technique used to scare away rodents.
10. Installing _____ near rat holes is a biological control method that encourages natural predation.

III. One Mark Questions

1. Which insect is scientifically known as *Sitophilus oryzae*?
2. What is the optimum temperature range (in °C) for most storage pests to develop?
3. Which beetle is known as the most destructive pest of stored wheat?
4. Which gas is released during fumigation with Aluminum Phosphide?
5. Which rodent species commonly infests storage?
6. Name one natural plant product used for non-chemical pest control.
7. What is the minimum moisture content (%) recommended for safe grain storage?
8. Which stored grain pest contaminates grains with webbing and frass?
9. Which chemical is commonly used for surface spraying in storage structures?
10. What is the full form of IPM?

IV. Two Marks Descriptive Questions

1. What are the main objectives of storage of food grains?
2. Mention any two major sources of storage problems.
3. Write two important damage symptoms of Rice Weevil (Sitophilus oryzae).
4. Name any two minor pests of stored grains.
5. At what temperature range do most storage pests die?
6. State the optimum temperature and relative humidity for development of most storage pests.
7. What is the safe moisture content of grains for storage?
8. Mention two examples of non-chemical methods used in stored grain pest management.
9. Name two chemicals used for fumigation and rodent control in storage.
10. what are the key components of Integrated Pest Management (IPM) in storage?

V. Three Marks Descriptive Questions

1. What are the main objectives of storage of food grains?
2. List any three major sources of storage problems and explain how they affect stored produce.
3. Name any three major insect pests of stored grains along with their scientific names.

4. Describe the damage symptoms of Rice Weevil, Khapra Beetle, and Pulse Beetle.
5. Explain the effect of temperature and humidity on the development of storage pests.
6. Write short notes on storage hygiene and its importance.
7. Describe any three methods used for cleaning and disinfecting the storage system.
8. Mention three examples of non-chemical control methods for stored grain pests.
9. Name any three chemicals used in the management of stored grain pests and their uses.
10. What are the key components of Integrated Pest Management (IPM) in stored grain protection?

VI. Five Marks Descriptive Questions

1. Explain the major sources of storage problems in food grains and their effects on grain quality.
2. Describe the major insect pests of stored grains with their scientific names, host range, and damage symptoms.
3. Discuss the effects of temperature and humidity on the development and survival of storage pests.
4. What are the key components of an Integrated Pest Management (IPM) approach for stored grain pest control?
5. Explain the importance of storage hygiene and how it helps in preventing pest infestation.
6. Describe the process of cleaning and disinfecting the storage system before loading new grain.
7. What is the role of aeration and cooling in managing stored grain pests? Explain how these methods work.
8. Explain various non-chemical methods used in stored grain pest management.
9. Write short notes on fumigation and its importance in stored grain pest control.
10. Discuss the integrated approach combining cultural, biological, and chemical methods for safe storage pest management.

5.4.B. Rodents- Important major rodent sps. - Nature of damage- management - Rodenticides – zinc phosphide, aluminium phosphide, bromodilone; Fumigants - aluminium phosphide

I. Multiple Choice Questions

1. Out of more than 100 rodent species in India, only a few are considered:
   a. Endangered species
   b. Aquatic animals
   c. Agricultural and storage pests
   d. Forest dwellers

2. The presence of which of the following indicates rodent infestation?
   a. Honeycombs and wax deposits
   b. Holes in leaves
   c. Webs and cocoons
   d. Droppings and gnawing marks
   e.

3. Which symptom is typical of rodent damage in cereals like rice and wheat?
   a. Leaf curl and discoloration
   b. Stem cutting at the base
   c. Root galling
   d. Fruit boring

4. Which of the following cultural practices helps reduce rodent population?
   a. Late harvesting
   b. Leaving weeds along bunds
   c. Deep ploughing and weed control
   d. Avoiding synchronized planting

5. Which mechanical device is used to control rodent infestation?
   a. Glue boards
   b. Sprinklers
   c. Insect nets
   d. Fertilizer spreaders

6. Which of the following animals acts as a biological control agent for rodents?
   a. Crow
   b. Owl
   c. Sparrow
   d. Hen

7. Which rodenticide is the most commonly used single-dose poison in India?
   a. Aluminium phosphide
   b. Bromadiolone
   c. Zinc phosphide
   d. Warfarin

8. The mode of action of chronic rodenticides is:
   a. Disrupting the nervous system
   b. Inhibiting blood clotting and causing internal bleeding
   c. Causing suffocation in rodents
   d. Blocking digestion

9. Fumigation with aluminium phosphide involves:
   a. Mixing tablets with food bait
   b. Spraying on crops directly
   c. Placing tablets in burrows and sealing them with wet earth
   d. Burning the tablets in open air

10. According to Indigenous Technical Knowledge (ITK), which plant's unpleasant odour repels rats?
   a. Erukku (Calotropis gigantea)
   b. Notchi (Vitex negundo)
   c. Channampoo (Cycas circinalis)
   d. Palmyra (Borassus flabellifer)

II. One Mark Questions

1. What is the scientific name of the Brown or Norway rat?
2. Which rodenticide is most commonly used in India for rodent control?
3. Which gas is released when zinc phosphide reacts in the stomach of a rat?
4. Name one biological predator commonly used to control rats in houses.
5. what is the class to which rats belong?

6. Which chronic rodenticide inhibits blood clotting and causes internal bleeding?
7. Question: Name one field crop most commonly damaged by rodents in India.
8. What is the main purpose of deep ploughing in rodent management?
9. Which second-generation anticoagulant rodenticide is widely used?
10. Name one plant used traditionally (ITK) as a living fence to deter rats.

III. Two Marks Descriptive Questions

1. What is the scientific name of the brown rat and the larger bandicoot rat?
2. Name any two common signs of rodent infestation in agricultural fields or storage areas.
3. Mention two important ways rodents damage crops or stored grains.
4. Why is synchronized planting considered effective in rodent management?
5. Name any two mechanical methods used to control rodents.
6. Mention two examples of biological control agents used against rodents.
7. Write the mode of action of Zinc Phosphide in rodent control.
8. What is the main difference between acute and chronic rodenticides?
9. Give any two examples of Indigenous Technical Knowledge (ITK) practices used for rat control.
10. State two advantages of adopting Integrated Rodent Management (IRM) over chemical control alone.

IV. Three Marks Descriptive Questions

1. What are the major signs of rodent infestation in crop fields and storage areas?
2. Mention three major rodent pest species commonly found in India and their scientific names.
3. Explain how deep ploughing and bund trimming help in rodent management.
4. Write short notes on mechanical methods of rodent control.
5. What is the mode of action of Zinc Phosphide as a rodenticide?
6. Describe the role of biological control agents in managing rodent populations.
7. What are the advantages of synchronized planting in rodent management?
8. How does fumigation with aluminium phosphide help control rodents in storage structures
9. Mention any three Indigenous Technical Knowledge (ITK) practices used for rodent control.
10. Write a short note on the importance of integrated rodent management in agriculture.

V. Five Marks Descriptive Questions

1. Explain the importance of rats in agriculture and storage systems.Discuss their impact on food systems, storage losses, and public health.
2. Describe in detail the major rodent pest species found in India. Include both house and field rat species with their scientific names.
3. Discuss the signs and damage symptoms of rodent infestation in crops and storage areas. Give examples of both visible and indirect signs of infestation.
4. Explain the cultural methods adopted for effective rodent management in agricultural fields. Include weed control, synhronized planting, bund trimming, etc.

5. Describe the mechanical methods used for controlling rodent populations. Mention different types of traps and devices used for monitoring and control.
6. Explain the biological control methods of rodents and their ecological importance. Discuss the role of predators, parasites, and pathogens in population regulation.
7. Write a detailed note on the chemical methods of rodent control. Include types of rodenticides (acute, chronic, fumigation), examples, and mode of action.
8. Differentiate between acute and chronic rodenticides with examples. Explain their mode of action and method of use in rodent management.
9. Discuss some Indigenous Technical Knowledge (ITK) practices used for rodent control. Mention traditional and eco-friendly methods used by farmers.
10. Explain the concept and importance of Integrated Rodent Management (IRM).

5.5. Introduction to conventional pesticides for pest management -Botanical Insecticides- Plant derived insecticides - neem based products - different commercial formulations containing azadirachtin, neem seed kernel extract, neem cake and their uses – nicotine, rotenone, plumbagin and pyrethrum – source – properties and uses

I. Multiple Choice Questions

1. Which of the following problems is commonly associated with excessive use of synthetic chemical pesticides?
   a. Increased soil fertility
   b. Pest resistance and environmental contamination
   c. Reduced biodiversity loss
   d. Enhanced pollinator population

2. Botanical insecticides are primarily derived from which of the following sources?
   a. Minerals
   b. Microorganisms
   c. Plants or plant parts
   d. Synthetic chemicals

3. Which compound in neem is responsible for its insecticidal and antifeedant properties?
   a. Rotenone
   b. Pyrethrin
   c. Azadirachtin
   d. Synthetic chemicals

4. Neem Seed Kernel Extract (NSKE) is generally prepared at which concentration for field use?
   a. 1%
   b. 2.5%
   c. 5%
   d. 10%

5. The main active compound in tobacco responsible for insecticidal activity is:
   a. Rotenone
   b. Nicotine
   c. Plumbagin
   d. Karanjin

6. Pyrethrins are natural insecticidal compounds obtained from:
   a. Chrysanthemum cinerariaefolium
   b. Azadirachta indica
   c. Pongamia pinnata
   d. Derris elliptica

7. Which of the following acts as a synergist in pyrethrum formulations to enhance insecticidal activity?
   a. Piperonyl butoxide (PBO)
   b. Nicotine sulphate
   c. Pong Neem oil
   d. Karanjin

8. Rotenone, obtained from Derris species, primarily acts as a:
   a. Nervous system stimulant
   b. Respiratory inhibitor
   c. Growth hormone promoter
   d. Repellent

9. Which compound extracted from Plumbago zeylanica has insecticidal and antifungal properties?
   a. Plumbagin
   b. Pyrethrin
   c. Rotenone
   d. Nicotine

10. The principal bioactive compound in Pongamia pinnata responsible for insecticidal properties is:
   a. Rotenone
   b. Karanjin
   c. Plumbagin
   d. Limonene

11. Which part of the custard apple (Annona squamosa) plant is mainly used for insecticidal preparations?
   a. Flowers
   b. Fruits
   c. Seeds and leaves
   d. Roots

12. The main class of bioactive compounds in custard apple responsible for insecticidal activity are:
   a. Alkaloids
   b. Acetogenins
   c. Phenolics
   d. Terpenoids

13. Essential oils like citronella and eucalyptus exhibit which type of insecticidal action?
   a. Systemic poisoning
   b. Contact and repellent action
   c. Residual soil activity
   d. Photosynthetic inhibition

14. Which of the following is a major limitation of botanical insecticides?
    a. High persistence in the environment
    b. Slow degradation
    c. Short residual activity and instability
    d. High mammalian toxicity

15. Botanical insecticides generally act as:
    a. Stomach poisons only
    b. Contact poisons only
    c. Repellents, antifeedants, and growth inhibitors
    d. Systemic fungicides

16. Which among the following essential oils is most commonly used as a mosquito repellent?
    a. Eucalyptus oil
    b. Citronella oil
    c. Clove oil
    d. Mentha oil

17. Which factor does *not* significantly affect the efficacy of botanical insecticides?
    a. Sunlight exposure
    b. Temperature
    c. Extraction method
    d. Crop rotation pattern

18. One major advantage of using botanicals in pest management is that they are:
    a. Non-biodegradable
    b. Target-specific and eco-friendly
    c. Highly residual in the soil
    d. More toxic to beneficial insects

19. Nanoemulsion and microencapsulation technologies in botanicals are primarily aimed at:
    a. Increasing pest resistance
    b. Reducing the cost of extraction
    c. Enhancing stability and residual efficacy
    d. Removing toxic compounds

20. In Integrated Pest Management (IPM), botanicals are best utilized as:
    a. Last-resort control agents
    b. First line of defense or preventive measures
    c. Soil amendments
    d. Fertilizer substitutes

II. Fill in the Blanks

1. Botanical insecticides are derived from plants and are generally _____, meaning they break down naturally in the environment.
2. The primary bioactive ingredient in Pongamia oil, which acts as a growth regulator and feeding deterrent, is _____.
3. _____ is a natural neurotoxin found in tobacco leaves that is highly effective against sucking pests like aphids and thrips.
4. To improve the adherence of Neem Seed Kernel Extract (NSKE) on plant surfaces, a _____ like Teepol or soap solution should be added.

5. Natural insecticidal compounds called _____ are concentrated in the flower heads of Chrysanthemums and cause rapid knockdown of pests.
6. Rotenone, derived from the roots of Derris species, acts as a _____ inhibitor, leading to insect paralysis.
7. The seeds, leaves, and bark of the _____ tree contain acetogenins, which interfere with insect metabolism.
8. Plumbagin is a natural compound extracted primarily from the _____ of *Plumbago zeylanica*.
9. One major limitation of botanicals is their _____, as they degrade quickly under sunlight and heat.
10. Essential oils from _____ species have shown strong effects against stored grain pests like the red flour beetle.

III. One Mark Questions

1. Which compound in neem acts as the main insecticidal principle?
2. Name the active insecticidal alkaloid present in tobacco.
3. Which natural compound is obtained from Chrysanthemum flowers and used as an insecticide?
4. What is the main bioactive ingredient in Pongamia pinnata responsible for insecticidal activity?
5. Which compound derived from Plumbago zeylanica shows insecticidal and antifungal properties?

IV. Two Marks Descriptive Questions

1. Describe the advantages of using botanical insecticides over synthetic chemical pesticides?
2. Write short notes on the insecticidal properties of neem and its commonly used formulations?
3. What are pyrethrins, and how do they act on insect pests?
4. Mention any two limitations associated with the use of botanical insecticides?
   Explain the role of essential oils in eco-friendly pest management?

IV. Three Marks Descriptive Questions

1. Describe the preparation and use of Neem Seed Kernel Extract (NSKE 5%) as a botanical insecticide.
2. Write a short note on the mode of action and importance of pyrethrins derived from Chrysanthemum flowers.
3. Discuss the insecticidal role of Pongamia pinnata and its major formulations.
4. Explain any three major limitations in the large-scale adoption of botanical insecticides.
5. Describe how botanicals can be effectively incorporated into Integrated Pest Management (IPM) systems.

V. Five Marks Descriptive Questions

1. Explain the role of neem and its derivatives in sustainable pest management, highlighting its active principles, formulations, and modes of action.
2. Discuss in detail the importance of botanical insecticides in Integrated Pest Management (IPM) and their contribution toward eco-friendly and sustainable agriculture.
3. Describe the various types of essential oils used as botanical insecticides, their sources, modes of action, and advantages in pest management.
4. Enumerate the major challenges associated with the use of botanical insecticides and suggest possible strategies to overcome them for large-scale adoption.
5. Compare and contrast the insecticidal properties and applications of neem, tobacco, and pyrethrum in pest management programs.

Module VI Organic and Natural Farming

6.1. A. Organic Cultivation: Principles, Practices and Ecological Implications

I. Multiple Choice Questions

1. Which of the following best describes the main goal of organic cultivation?
   a. Maximizing yield with chemical fertilizers
   b. Reducing dependence on irrigation
   c. Producing food while conserving environment and biodiversity
   d. Using genetically modified organisms (GMOs)

2. Who has defined the four fundamental principles of organic farming?
   a. FAO
   b. ICAR
   c. IFOAM
   d. NABARD

3. The Principle of Health in organic farming emphasizes:
   a. Increasing pesticide efficiency
   b. Sustaining soil, plant, animal and human health
   c. Reducing water usage only
   d. Maximizing export opportunities

4. Which practice helps in fixing atmospheric nitrogen naturally in organic farming?
   a. Using chemical fertilizers
   b. Growing legumes in crop rotation
   c. Spraying micronutrients
   d. Applying gypsum

5. The Principle of Fairness in organic farming ensures:
   a. Higher input costs for farmers
   b. Ethical treatment of animals and fair prices for farmers
   c. Only consumer benefits
   d. Use of advanced GM crops

6. Which one of the following is not a commonly used organic pest management measure?
   a. Neem based pesticides
   b. Ladybird beetles
   c. Synthetic pyrethroids
   d. Ginder, Garlic and Green chilli extract

7. Stale seedbed technique is used in organic farming mainly for:
   a. Pest control
   b. Enhancing irrigation efficiency
   c. Weed management
   d. Increasing crop yield

8. Which irrigation method is preferred in organic farming to conserve water and reduce weed growth?
   a. Flood irrigation
   b. Drip irrigation
   c. Sprinkler irrigation
   d. Furrow irrigation

9. Which ecological benefit is strongly associated with organic farming?
   a. Loss of biodiversity
   b. Reduced soil fertility
   c. Conservation of pollinators and beneficial insects
   d. Increased pesticide resistance

10. Continuous organic farming can increase soil carbon storage up to:
   a. 20% over a decade
   b. 35% over a decade
   c. 50% over a decade
   d. 63% over a decade

11. Which of the following is not an input in organic farming?
   a. Jeevamrit
   b. Compost
   c. Biofertilizers
   d. Urea

12. Paramparagat Krishi Vikas Yojana (PKVY) is related to
   a. Irrigation management
   b. Promotion of organic farming
   c. Distribution of fertilizers
   d. GM crop introduction

13. Which biological agents are widely used as biopesticides in organic farming?
   a. Bacillus, Trichoderma and Pseudomonas
   b. Rhizobium, Azospirillum and Phosphobacteria
   c. VAM, PPFM
   d. None of the above

14. In India, which region benefits from Mission Organic Value Chain Development?
   a. North-Eastern Region
   b. Central Region
   c. Western Ghats
   d. Indo-Gangetic Plains

15. According to long-term studies, compared to conventional farming, organic fields generally have
   a. Lower populations of natural enemies
   b. No difference in biodiversity
   c. Higher populations of beneficial insects
   d. Greater dependence on chemical inputs

II. Fill in the Blanks

1. Before the 1960s, traditional Indian farming methods were primarily based on _____, crop residues, and natural cycles.
2. The Green Revolution increased India's food production from 50.8 million tonnes in 1950-51 to more than _____ million tonnes in 2024-25.
3. Continuous use of chemical fertilizers has been found to reduce _____, a critical component for soil health.
4. The principle of _____ in organic farming emphasizes that the method should provide everyone involved with a good quality of life and contribute to food sovereignty.
5. Organic cultivation avoids _____ and instead depends on natural processes for soil fertility and pest management.
6. One of the key practices of organic farming is _____, which involves growing different types of crops in the same area across sequential seasons.
7. The principle of _____ suggests that organic agriculture should be managed in a precautionary and responsible manner to protect the well-being of future generations.
8. According to the text, although yields may be lower initially, organic farming reduces _____ and improves long-term resilience.
9. The growing demand for organic food is particularly noticeable in _____ areas, where online platforms are facilitating easier distribution.
10. The _____ scheme provides specific support for organic farming in the North-Eastern Region of India.

III. One Mark Questions

1. Who formulated the four fundamental principles of organic farming?
2. Which soil organism is widely used in vermicomposting?
3. Name one biocontrol agent used in organic disease management.
4. Which certification system provides low-cost certification for smallholders in India?
5. Which organic extract is commonly used as a botanical pesticide against pests?
6. What is the main principle that emphasizes equity and justice in organic farming?
7. Which Indian scheme promotes organic farming practices through training and market linkages?

IV. Two Marks Descriptive Questions

1. Differentiate between organic and conventional farming in terms of fertilizer use.
2. What role do legumes play in organic crop rotation?
3. Define the Principle of Care in organic cultivation.
4. Explain why weed management is a challenge in organic farming.
5. Mention two ecological benefits of organic farming.
6. How does drip irrigation support organic farming systems?

V. Three Marks Descriptive Questions

1. Briefly describe the principle of Health in organic farming with an example.
2. Explain how crop rotation and mixed cropping enhance sustainability in organic systems.

3. Describe two methods of weed management used in organic cultivation.
4. Write short notes on the role of *Bacillus* and *Trichoderma* in organic farming.
5. Discuss the impact of organic farming on biodiversity conservation.
6. What are the key differences between organic and conventional farming?

VI. Five Marks Descriptive Questions

1. Explain the four principles of organic farming as given by IFOAM.
2. Describe the ecological implications of organic farming with respect to soil, water, biodiversity, and climate.
3. Describe in detail the practices of organic farming
4. Discuss the role of organic farming in mitigating climate change.
5. How do government schemes and digital tools support the promotion of organic cultivation in India?

6.2. A. Organic nutrient management-types of organic manures – bio-fertilizers-efficient use of organic sources of nutrients.

I. Multiple Choice Questions

1. The key to maintaining soil health in organic farming is:
   a. Use of chemical fertilizers
   b. Proper irrigation
   c. Organic matter addition
   d. Monocropping

2. The "Law of Return" in organic farming emphasizes:
   a. Exporting nutrients from soil
   b. Returning nutrients taken from soil
   c. Using only chemical fertilizers
   d. Stopping nutrient recycling

3. Which of the following improves soil water-holding capacity and aeration?
   a. Chemical fertilizers
   b. Organic matter
   c. Pesticides
   d. Lime

4. Organic nutrient management mainly aims to:
   a. Increase dependence on synthetic fertilizers
   b. Maintain soil nutrients and recycle them efficiently
   c. Reduce organic matter in soil
   d. Eliminate microorganisms

5. Which of the following is an animal-based organic manure?
   a. Compost
   b. Green manure
   c. Farmyard manure (FYM)
   d. Fly ash

6. Green manure crops like sunnhemp and dhaincha are mainly grown to:
   a. Control weeds
   b. Increase nitrogen and organic matter in soil
   c. Improve drainage
   d. Reduce soil salinity

7. Which industrial byproduct is rich in organic carbon and nutrients?
   a. Pressmud
   b. Fly ash
   c. Bone meal
   d. Sludge

8. Rhizobium biofertilizer is mainly used for:
   a. Cereal crops
   b. Oilseed crops
   c. Legume crops
   d. Cash crops

9. Which biofertilizer is used for nitrogen fixation in non-legume crops like maize and wheat?
   a. Azospirillum
   b. Rhizobium
   c. Azotobacter
   d. Mycorrhiza

10. The main function of phosphate-solubilizing bacteria (PSB) is to:
   a. Fix atmospheric nitrogen
   b. Convert insoluble phosphorus to available forms
   c. Increase soil pH
   d. Absorb potassium from air

11. Mycorrhizal fungi improve plant uptake of:
   a. Phosphorus and water
   b. Nitrogen and sulfur
   c. Zinc and boron
   d. Calcium and magnesium

12. Which of the following is an example of a concentrated organic manure?
   a. Compost
   b. Farmyard manure
   c. Neem cake
   d. Green manure

13. Proper composting of organic waste requires maintaining moisture around:
   a. 20–30%
   b. 40–50%
   c. 50–60%
   d. 70–80%

14. Which recent innovation uses sensors and AI to monitor soil nutrient status?
    a. Integrated Nutrient Management (INM)
    b. Precision Nutrient Monitoring
    c. Waste Recycling Technology
    d. Biochar Formation

15. Continuous use of organic sources of nutrients helps to:
    a. Degrade soil fertility
    b. Maintain long-term soil fertility and productivity
    c. Increase nutrient leaching
    d. Reduce microbial population

II. Fill in the Blanks

1. The "Law of Return" in organic farming dictates that nutrients taken from the soil must be _____ to maintain long-term fertility.
2. Organic matter improves soil structure by increasing _____, which helps plants access oxygen and improves water holding capacity.
3. _____ (FYM) is a common organic source consisting of dung, urine, and litter from farm animals.
4. _____ is the process of decomposing organic wastes using specific species of earthworms to produce high-quality fertilizer.
5. In Integrated Nutrient Management (INM), soil health and yield are improved by combining organic manures, minerals, and _____.
6. Modern organic farming uses _____ tools like sensors and AI to detect nutrient stress in crops early.
7. In the APMC Mysuru case study, approximately _____- _____ tons of market waste are planned to be converted into biogas and manure daily.
8. States like Andhra Pradesh are promoting _____ to assist in the precise application of nutrients like nano-fertilizers.
9. Using _____ as an organic amendment helps maintain soil fertility in specialized crops like mulberry while reducing chemical dependency.
10. Key indicators of soil quality, such as _____, enzyme activity, and organic carbon, are enhanced by organic amendments.

II. One Mark Questions

1. Give two liquid organic formulations used to supply nutrients and support plant growth.
2. Name two crops commonly used as green manure.
3. Which microorganism forms nodules on legume roots?
4. What is the main waste product from the sugar industry used as organic manure?
5. Name one phosphate-solubilizing bacterium used in biofertilizers.
6. Which biofertilizer forms a symbiotic association with plant roots?

III. Two Marks Descriptive Questions

1. Define organic nutrient management and state its main objective.
2. Name slaughterhouse byproducts rich in calcium and phosphorus
3. Why human urine and night soil must b treated before applying to field as organic manure?
4. List two phosphate solubilizing bacteria improving the P availability in soil.
5. Expand VAM
6. What is enriched compost?

IV. Three Marks Descriptive Questions

1. Differentiate between bulky and concentrated organic manures with examples.
2. Explain how organic nutrient management reduces environmental pollution.
3. List three nitrogen-fixing biofertilizers and mention their associated crops.
4. Write short notes on phosphate-solubilizing and potassium-solubilizing biofertilizers.
5. Describe the role of composting in the safe and efficient use of organic manures.
6. Briefly explain the importance of integrating biofertilizers with organic manures.

V. Five Marks Descriptive Questions

1. Discuss the importance and principles of organic nutrient management in sustainable agriculture.
2. Explain in detail the types of organic manures based on their sources and nutrients concentration with suitable examples.
3. Describe the different groups of biofertilizers and their functions in nutrient management.
4. Elaborate on the methods for efficient use of organic sources of nutrients in the field.
5. Discuss recent innovations in organic nutrient management and their benefits.
6. Explain how organic nutrient management supports soil health, nutrient cycling, and environmental sustainability.

6.2. B. Weed management in organic farming – cultural-mechanical-Biological –Bio herbicides.

I. Multiple Choice Questions

1. Weeds mainly compete with crops for:

a. Pesticides
b. Sunlight, water, and nutrients
c. Soil microbes only
d. Fertilizers only

1. Which of the following is a benefit of mulching?

a. Increases weed growth
b. Blocks sunlight to weed seeds
c. Reduces soil fertility
d. Promotes pests

2. Crop rotation helps in weed management by:
   a. Increasing weed seed production
   b. Breaking weed life cycles
   c. Reducing soil fertility
   d. Encouraging perennial weeds

3. Which animals are commonly used for grazing to control weeds?
   a. Cows and pigs
   b. Goats, sheep, and ducks
   c. Horses and camels
   d. Chickens and rabbits

4. Allelopathy is defined as:
   a. Mechanical removal of weeds
   b. Release of chemicals by plants to inhibit neighboring weeds
   c. Use of chemical herbicides
   d. Grazing by animals to reduce weeds

5. Which leaf-eating beetle is used to control *Parthenium hysterophorus*?
   a. *Bactra verutuana*
   b. *Zygogramma bicolorata*
   c. *Rhinocyllus conicus*
   d. *Tripos spp*

6. Bioherbicides primarily contain:
   a. Synthetic chemicals
   b. Living microorganisms like fungi or bacteria
   c. Animal extracts
   d. Chemical fertilizers

7. Which of the following is a natural bioherbicide?
   a. Glyphosate
   b. Vinegar (acetic acid)
   c. Paraquat
   d. 2,4-D

8. Precision weed management uses:
   a. Manual hand weeding only
   b. Smart sensors, UAVs, and site-specific monitoring
   c. Broadcast chemical spraying
   d. Traditional crop rotation alone

9. Robotic weeders like Robovator are designed to:
   a. Spray synthetic herbicides
   b. Distinguish crops from weeds and remove weeds precisely
   c. Harvest crops
   d. Fertilize the soil

10. Multi-species intercropping suppresses weeds by:
    a. Reducing soil nutrients
    b. Increasing competition for light, nutrients, and space
    c. Using chemical herbicides
    d. Allowing weeds to grow between crops

11. Which of these is NOT an eco-friendly weed management practice?
    a. Crop rotation
    b. Mulching
    c. Allelopathic crops
    d. Broad-spectrum chemical herbicides

12. Early removal of weeds is important because:
    a. It improves weed seed germination
    b. It prevents weeds from producing seeds
    c. It reduces soil fertility
    d. It increases crop pests

13. Which factor is important for enhancing crop competitiveness against weeds?
    a. Slow establishment
    b. Large spacing between rows
    c. Rapid early growth and dense canopy
    d. Ignoring nutrient management

14. The main goal of integrated weed management in organic farming is:
    a. Maximize chemical use
    b. Reduce labor costs only
    c. Control weeds sustainably without harming crops, soil, or environment
    d. Increase weed diversity

II. Fill in the Blanks

1. In organic farming, weed management is essential because no _____ are used to control unwanted plants.
2. The _____ method of weed management focuses on preventing the introduction and spread of weed seeds into the field.
3. Using _____ involves covering the soil surface with organic materials like straw or plastic to block sunlight and suppress weed growth.
4. _____ weeding is a mechanical method that uses tools like hoes, cultivators, or hand-pulling to physically remove weeds.
5. In _____ weed control, heat from steam or flame is used to kill weeds without disturbing the soil structure.
6. The use of living organisms, such as insects or fungi, to suppress weed populations is known as _____ control.
7. _____ are natural substances derived from plants or microorganisms that act as eco-friendly alternatives to chemical herbicides.

8. _____ weed management utilizes high-tech tools like sensors, UAVs, and AI to monitor and target specific weed infestations.
9. Robotic systems like _____ have been shown to reduce hand-weeding time by 27-39% in crops like lettuce.
10. A _____ approach to weed management combines cultural, mechanical, and biological practices to ensure long-term sustainability.

III. One Mark Questions

1. Define weed.
2. List the cultural methods of weed management.
3. Give two examples of a bioherbicide.
4. What is allelopathy?
5. Name grazing animal used for weed control.
6. Give two examples of a cover crop.
7. What is mulching?

IV. Two-Mark Questions

8. Define allelopathy and give one example of an allelopathic crop.
9. Mention two advantages of using cover crops in weed management.
10. List two commonly used bioherbicides in organic farming.
11. Give benefits of precision weed management using UAVs.
12. Name two insects used in biological weed control and the weeds they target.
13. State two effects of mulching on soil and weed suppression.

V. Three Marks Descriptive Questions

14. Explain the role of grazing animals in weed management with an example.
15. Describe how crop rotation helps in controlling weeds in organic farming.
16. Write three characteristics of crops that enhance competitiveness against weeds.
17. Describe the role of microbial bioherbicides in weed control.
18. Explain how multi-species intercropping reduces weed growth.
19. Discuss two environmental benefits of using bioherbicides instead of chemical herbicides.

VI. Five Marks Descriptive Questions

20. Discuss the different biological methods of weed management in organic farming.
21. Explain the concept and benefits of precision weed management using modern technologies such as drones and sensors.
22. Describe the role of allelopathy in crop-weed interactions and provide examples of crops and the weeds they target.
23. Discuss how integrated weed management combining cultural, mechanical, and biological methods helps maintain soil health and crop yield.

24. Explain the use of robotic systems in precision weed management and their advantages over manual weeding.

25. Discuss the effectiveness of multi-species intercropping and cover crops as sustainable strategies for weed suppression.

6.3. A. Pest management in organic farming- different components – parasites-predators, microbial pesticides (Bio) -resistant varieties and pheromones
6.3. B. Disease management in organic farming – cultural, mechanical, biological- bio-fungicides.

I. Multiple Choice Questions

1. Which practice helps prevent pest outbreaks in organic farming systems?
   a. Continuous monoculture
   b. Frequent use of chemical pesticides
   c. Crop rotation and intercropping
   d. Heavy irrigation

2. What is the primary focus of pest management in organic agriculture?
   a. Total elimination of pests
   b. Pest resistance breeding using GMOs
   c. Pest population suppression using ecosystem-based strategies
   d. Routine pesticide application

3. When a natural predator living being applied on the other pathogenic organisms to control them, this process is called
   a. Confusion Technique
   b. Biological Control
   c. Genetic Engineering
   d. Artificial Control

4. What is the main problem caused by the use of pesticides?
   a. They deform the gills of some fishes
   b. They kill silkworm
   c. Mosquitoes have become resistant to DDT
   d. Their residues persists in water and other components of the environment

5. Which plant extract is commonly used as a natural pesticide in India?
   a. Eucalyptus oil
   b. Neem (Azadirachta indica)
   c. Tulsi
   d. Mint

6. Which microorganism is used as a biocontrol agent against caterpillars?
   a. Rhizobium
   b. Azospirillum
   c. Bacillus thuringiensis
   d. Pseudomonas fluorescens

7. Trap crops are used in organic farming to:
   a. Increase soil fertility
   b. Attract pests away from the main crop
   c. Provide shade to main crop
   d. Fix nitrogen

8. Which of the following is a predator of aphids?
   a. Ladybird beetle
   b. Termite
   c. Grasshopper
   d. Earthworm

9. Which of the following is a mechanical method of pest control?
   a. Spraying neem oil
   b. Hand picking of insects
   c. Use of fungi against pests
   d. Spraying Bt solution

10. Which of the following is a botanical pesticide used in organic farming?
   a. Malathion
   b. Endosulfan
   c. Pyrethrum
   d. Carbaryl

II. Fill in the Blanks

1. Organic pest management avoids synthetic pesticides and instead focuses on maintaining _____ through organic matter and biological activity.
2. Organisms that live on or in a host and eventually kill it, such as certain wasps or flies, are known as _____.
3. _____ are beneficial insects, like ladybugs or lacewings, that actively hunt and consume pest populations.
4. Microbial pesticides often utilize _____, a soil bacterium that produces proteins toxic to specific insect larvae.
5. In disease management, _____ control involves using physical barriers or heat (like soil solarization) to eliminate pathogens.
6. _____ are specialized traps that use species-specific scents to lure and capture male insects, disrupting their mating cycles.
7. A popular organic foliar spray called _____ is prepared using five cow-derived ingredients, including milk, curd, and ghee.
8. To combat russet mites in organic systems, farmers may use _____ dusts or sprays.
9. _____ is a natural mineral used to control both insect pests and various plant diseases by creating a protective powdery film.
10. The core philosophy of organic protection is to _____ problems before they occur by using resistant varieties and healthy soil.

III. One Mark Questions

1. Name Pest-eating insects → Predators
2. Name Insects that live on host and kill it → Parasitoids
3. Bacterial pesticide → Bt (Bacillus thuringiensis)

4. Define: Pest, diseases, insect-pests and weeds
5. Define: organic pest management

IV. Two Marks Descriptive Questions

1. Define organic pest management.
2. What are predators in pest control?
3. What are parasitoids?
4. Give two examples of microbial pesticides.
5. What is the role of pheromone traps?
6. What are resistant varieties?
7. What is cultural disease management?
8. What is mechanical pest control?
9. What are bio-fungicides?
10. Name two biological control agent

V. Three Marks Descriptive Questions

1. Explain the role of predators and parasitoids in pest control.
2. Describe microbial pesticides with examples.
3. Explain the importance of pheromones in pest management.
4. Discuss cultural methods of disease management in organic farming.
5. Explain biological disease control using bio-fungicides.

III. Five Marks Long Descriptive Questions

1. Explain the different components of pest management in organic farming.
2. Describe in detail the role of biological control agents in pest management.
3. Explain microbial pesticides and their importance in organic agriculture.
4. Discuss various methods of disease management in organic farming.
5. Explain the role of resistant varieties, pheromones, and bio-fungicides in sustainable agriculture

6.4. Organic Certification Process

I. Multiple Choice Questions

1. Which government body acts as the Secretariat for the implementation of the National Programme for Organic Production (NPOP)?

   a. FSSAI b. APEDA
   c. ICAR d. Ministry of Agriculture

2. What is the minimum number of farmers required to form a Local Group (LG) under the PGS-India system?

   a. 2 b. 5
   c. 25 d. 100

3. The conversion period for perennial plants to be certified organic under NPOP is
   a. 12 months
   b. 24 months
   c. 36 months
   d. 48 months

4. What is the name of the web-based traceability system used by NPOP?
   a. Jaivik Kheti
   b. Tracenet
   c. FSSAI Online
   d. PGS-India Portal

5. The "PGS-India Green" logo is specifically used for products that are
   a. Under conversion to organic
   b. Chemically treated
   c. Fully organic
   d. Wild harvested

6. The NPOP certification system is mandatory for which of the following?
   a. Only local village sales
   b. Non-food items only
   c. Export of organic products
   d. Only livestock feed

7. Which logo is the unified identity mark required for all organic food products in India by FSSAI?
   a. Jaivik Bharat
   b. APEDA Logo only
   c. India Organic
   d. PGS-India Organic

8. The web based traceability system for use by the registered operators and accredited Certification Bodies under the NPOP is
   a. Ethernet
   b. Internet
   c. Tracenet
   d. e-NAM

9. A group of farmers working together for participatory organic guarantee programme under PGS-India norms and guidelines is
   a. Local group
   b. Regional group
   c. Zonal group
   d. National group

10. A person assigned by the accredited Certification Body for assessment /evaluation of the operator at the site of activity is
   a. Analyser
   b. Evaluator
   c. Reviewer
   d. Inspector

II. Fill in the Blanks

1. In India, _____ is the essential process that verifies a farm or food product follows the National Standards for Organic Production (NSOP).
2. The _____ (NPOP) is a third-party certification system managed by the Ministry of Commerce and Industry.
3. The _____ (PGS-India) is a decentralized organic quality assurance system that relies on peer-to-peer appraisal and trust.
4. Under NPOP, the _____ (APEDA) serves as the Secretariat for the implementation of the program.
5. The time period between the start of organic management and the certification of crops is known as the _____ period.
6. A _____ certificate is issued by an accredited Certification Body to an operator for every individual sale of an organic product.
7. _____ is the web-based traceability system used by registered operators and certification bodies under the NPOP.
8. The _____ is a written document by a PGS-India group member committing to abide by the organic production norms.
9. In organic livestock production, the number of animals stocked per unit area (e.g., per square meter of a pond) is called the _____.
10. A farm must maintain a _____ between organic and conventional production areas to prevent contamination from synthetic chemicals.

III. Two Marks Descriptive Questions

1. Define Buffer Zone.
2. What is Co-mingling?
3. Define Organic Farming.
4. Explain Traceability in the context of NPOP.
5. Define parallel production

IV. Three Marks Descriptive Questions

1. Discuss the Mandatory Standards for Organic Livestock Production.
2. What are the specific requirements for Organic Food Processing and Handling?
3. Describe the process and standards for Organic Crop Production
4. Describe the role of an Internal Control System (ICS) in grower groups.
5. What are the key requirements for Large Area Certification (LAC)?

V. Five Marks Descriptive Questions

1. Detail the Guiding Principles of the Participatory Guarantee System for India (PGS-India).

2. What are the key differences between Participatory Guarantee System (PGS-India) and National Programme for Organic Production (NPOP)

3. Describe National Programme for Organic Production (NPOP) Certification Process in detail.
4. Describe Participatory Guarantee System (PGS-India) Certification Process in detail.
5. Explain the Operational Structure of the National Programme for Organic Production (NPOP).

6.5 Natural Farming Principles and Methods

I. Multiple Choice Questions

1. The microbial culture used as a bio-stimulant for soil in Indian natural farming is called?

a Beejamrutha
b Jeevamrutha
c Brahmastra
d Neemastra

2. Which component is essential for preparing Beejamrutha?

a Vermicompost and Urea
b Cow Dung and Lime
c Green Manure
d Green Leaf Manure

3. The concept of "Whapasa" refers to the presence of what in the soil?

a Liquid water only
b Solid minerals
c Water vapor and air molecules
d High nitrogen content

4. What is the primary role of "Acchadana" (Mulching) in natural farming?

a Increasing seed germination speed
b Conserving soil moisture and suppressing weeds
c Controlling pests through odor
d Direct nitrogen fixation from the air

5. Natural farming differs from Organic farming primarily because it avoids:

a Use of external purchased organic manures like vermicompost
b Irrigation
c Manual labor
d Type of seeds

6. In Natural Farming, the most preferred source of dung and urine is:

a HF / Jersy
b Poultry litter
c Indigenous (Desi) cow breeds
d Buffalos

7. "Agniastra" is a preparation specifically used for controlling:

a Large pests like leaf rollers and fruit borers
b Soil-borne fungi
c Excess weed growth
d Nutrient deficiencies

8. The process of fermentation in Jeevamrutha takes approximately how many days to be ready for use?

a 1 hour
b 15 days
c 3 to 5 days
d 1 month

9. What is the primary function of jaggery in the preparation of Jeevamrutha?

a To act as a food source for rapid microbial multiplication
b To change the color of the soil
c To increase the sweetness of fruit
d To kill harmful insects

10. Natural farming emphasizes the role of which organism as a "natural plow"?

a Honey bees
b Beetles
c Termites
d Earthworms

II. Fill in the Blanks

1. _____ is the solid/dry form of Jeevamrutha used when liquid application is not feasible.
2. _____ is a preparation primarily using Neem leaves and cow urine to control sucking pests and small larvae.
3. The condition of soil aeration where both air and water vapor exist is known as_____.
4. Dashparni Arka, a fermented extract of ten types of leaves used for _____ control.
5. _____ is added to Jeevamrutha to provide a protein (or nitrogen) source for microbes.
6. _____ is used to treat seeds before sowing to prevent fungal and seed-borne infections.
7. _____ involves adding cover crops, organic debris, or agricultural residue to the top soil.
8. In Natural Farming, seeds are sown directly without deep ploughing in order to allow soil organisms to thrive. (True / False)
9. _____ refers to the dark, organic material formed by the decomposition of plant and animal matter.
10. _____ type of crops in the helps for biological nitrogen fixation.

III. Two Marks Descriptive Questions

1. Define Natural Farming.
2. Define Organic Farming.
3. Name the components of Natural Farming
4. What is Barah Anaaj System in Natural Farming
5. What are the alternative production systems to chemical farming?

IV. Three Marks Descriptive Questions

1. What are the core principles of Natural Farming?
2. Describe the process of preparation of Neemastra
3. Describe the process of preparation of Agniastra
4. Describe the process of preparation of Brahmastra
5. Explain how livestock is integrated in Natural Farming.

V. Five Marks Descriptive Questions

1. What are the key differences between Natural and Organic Farming?
2. What are the advantages of Natural Farming?
3. Describe the preparation and application of Beejamrutha.
4. Describe the preparation and application of Ghana-jeevamrut.
5. Describe the preparation and application of Jeevamrutha

Module VII: Irrigation and Watershed Management

7.1. A. Basic Principles in Irrigation

7.1. B. Water use Efficiency and Methods of Irrigation

7.1. C. Importance of Water Management in Crop Production

I. Multiple Choice Questions

1. Water requirement of Paddy/rice is _____mm
   a. 350
   b. 500
   c. 1250
   d. 600

2. Percent moisture extraction from the top quarter (1/4) root zone is
   a. 10
   b. 20
   c. 30
   d. 40

3. Shallow rooted crop among the following is
   a. Chilli
   b. Cabbage
   c. Tomato
   d. Mango

4. Critical stage of irrigation in chilli is
   a. Stem elongation
   b. Flowering
   c. Fruit Development
   d. Both flowering and fruit development

5. Oldest and simplest method for scheduling of irrigation is
   a. Feel and Appearance
   b. Soil moisture tension
   c. Evapotranspiration
   d. Depletion of Available Soil Moisture (DASM)

6. A soil depth of 35.0 cm would be classified as:
   a. Shallow
   b. Moderately deep
   c. Deep
   d. Very shallow

7. The formula for Water Application Efficiency (Ea) is:
   a. (Water stored in root zone / Water delivered to plot) x 100
   b. (Water delivered to field / Water delivered from source) x 100
   c. (Crop yield / ETc)
   d. (Marketable yield / Water supply)

8. "Mulching" helps in water management primarily by:
   a. Increasing the wind velocity
   b. Reducing evaporation and retaining soil moisture
   c. Increasing the depth of the root zone
   d. Recharging groundwater aquifers

9. Which of the following is a major merit of Sprinkler Irrigation?
   a. High sensitivity to emitter clogging
   b. Eliminates field channels, increasing cultivable area
   c. Requires heavy land leveling
   d. Is only suitable for fine-textured soils

10. What is "Fertigation"?
   a. Applying water through natural rainfall
   b. Using sand to monitor soil moisture
   c. Applying fertilizer along with irrigation (as seen in drip systems)
   d. Rotating crops to prevent nutrient depletion

II. Fill in the Blanks

1. The primary objective of irrigation is to provide sufficient water while minimizing _____ and maximizing crop yield.
2. Soil depth is directly related to root system development, nutrient supply, water storage capacity, and the feasibility of land _____.
3. The soil depth from which a crop extracts nearly 90% of its needed water is known as the _____.
4. Moisture stress has the greatest effect on the quality and quantity of yield during the _____.
5. Scientific irrigation _____ is a technique used to determine the correct time and optimum quantity of water for each application.
6. The method of determining soil moisture through visual observation and touch is known as the _____ of soil.
7. _____ efficiency is the ratio between the quantity of water stored in the root zone and the water delivered to the plot.
8. Uncontrolled surface flooding is also commonly referred to as _____.
9. In _____ irrigation, water is applied directly to the crop's root zone as drops or tiny streams through emitters.
10. The technique of capturing and storing rainwater from surfaces for later use is called _____.

III. One Mark Questions

1. Name indicator plant for scheduling of irrigation
2. Name the pressured irrigation systems used in field and horticultural crops
3. Surface irrigation system used for orchards
4. An irrigation system with high water use efficiency

III. Two Marks Descriptive Questions

1. List out the different surface irrigation systems
2. Name 3 crops where sprinkler irrigation system can be used
3. Name 3 crops where drip irrigation system can be used

IV. Three Marks Descriptive Questions

1. Write about scheduling of irrigation based on visual symptoms
2. Write about soil cum sand mini plot technique for scheduling of irrigation
3. List out the merits and demerits of drip irrigation system

V. Five Marks Descriptive Questions

1. List out the factors influencing water use efficiency
2. Write in brief about the various surface irrigation methods

7.2. A. Installation and Management of Micro irrigation Systems (Sprinkler & Drip Irrigation)
7.2. B. Budget requirement for Installation of Micro Irrigation System

I. Multiple Choice Questions

1. Micro irrigation system mainly includes:
   a. Flood irrigation
   b. Sprinkler and drip irrigation
   c. Furrow irrigation
   d. Basin irrigation

2. Drip irrigation is most suitable for:
   a. Closely spaced crops
   b. Wide spaced crops
   c. Paddy cultivation
   d. Flood irrigation fields

3. Sprinkler irrigation is best suited for:
   a. Uneven and sandy soils
   b. Waterlogged soils
   c. Clay soils only
   d. Deep black soils

4. The main component of drip irrigation system is:
   a. Sprinkler head
   b. Canal

c. Plough
d. Emitters

5. The function of a filter in micro irrigation is to:
   a. Remove impurities from water
   b. Increase pressure
   c. Reduce water flow
   d. Increase fertilizer use

6. Fertigation means:
   a. Application of pesticides
   b. Application of fertilizers through irrigation
   c. Manual fertilizer application
   d. Application of fertilizers through irrigation

7. Which factor mainly affects the cost of micro irrigation system?
   a. Crop type
   b. Application of fertilizers through irrigation
   c. Manual fertilizer application
   d. All of the above

8. Drip irrigation helps in saving water up to:
   a. 10–20%
   b. 30–40%
   c. 50–70%
   d. All of the above

9. The spacing of emitters depends on:
   a. Crop spacing
   b. Soil type
   c. Water requirement
   d. All of the above

10. The major advantage of sprinkler irrigation is:
   a. High labour requirement
   b. Uniform water distribution
   c. High water loss
   d. Soil erosion

I. Fill in the Blanks

1. Roughly _____% of the earth's freshwater resources are used for agriculture.
2. Irrigation is essential for the successful cultivation of _____ crops in India because winter rainfall is rare.
3. The method of irrigation with the highest water use efficiency (80-90%) is _____.
4. Drip irrigation can increase the yield of _____ by as much as 99%.
5. In a sprinkler irrigation system, _____ constitute the largest portion (50%) of the total cost.
6. A _____ system, also known as a rain hose, uses pipes with holes made by a laser to produce a fine spray.

7. Acid treatment is recommended for micro-irrigation systems when the Electrical Conductivity (EC) of the water is above _____.

8. Irrigation water with an EC above _____ is considered unsuitable for drip irrigation as the system will frequently collapse.
9. _____ acid is the only acid that is safe to use for cleaning the system while a crop is still standing in the field.
10. _____ filters are generally the cheaper option for removing physical debris compared to sand filters.

III. Two Marks Descriptive Questions

1. What is Irrigation?
2. Mention the objectives of Irrigation.
3. What is the importance of Irrigation?
4. Describe different methods of irrigation.
5. Give examples for traditional and modern methods of irrigation.
6. Which are the most efficient methods of irrigation systems?
7. Mention different components of Sprinkler method of irrigation system.
8. Mention different components of Drip/trickle method of irrigation system.
9. Mention different types of sprinkler method of irrigation system.
10. Mention primary types of drip irrigation system.

IV. Five Marks Descriptive Questions

1. Mention the response of different crops to Drip Irrigation System in terms of percent water saving.
2. Mention the response of different crops to Drip Irrigation System in terms of percent yield increase.
3. Mention the response of different crops to sprinkler irrigation in terms of percent water saving.
4. Mention the response of different crops to sprinkler irrigation in terms of percent yield increase.
5. Which are the chemical/acids frequently used in cleaning the clogging of drip components like laterals, micro-tubes and drippers/emitters.
6. What are micro irrigation systems and explain briefly.
7. What is the difference between Sprinkler and Laser sprinkler systems of irrigation?

7.3. A. Agricultural Drainage – Surface and Sub-surface drainage systems

I. Multiple Choice Questions

1. The purpose of agricultural drainage is to which part of plant system free from excess water

a. Leaves
b. Stem
c. Root
d. Flower

2. Which among the following is not required for design of agricultural drainage systems

a. Rainfall
b. Topography
c. Soil texture
d. Soil structure

3. Surface drainage systems uses the principle of _____ to drainout the water

a. Operating pumps
b. Gravity
c. Newton second law
d. None of these

4 Which among the following design principle is not used in surface drainage system

a. Hydrologic
b. Hydraulic
c. Structural
d. Civil

5. Which among the following is not a waterlogging sensitive crop

a. Soybean
b. Maize
c. Groundnut
d. Sugarcane

6. Which among the following is not considered under subsurface drainage system

a. Mole drainage
b. Vertical Drainage
c. Furrows
d. Biodrainage

7. Mole drains are in general formed at a depth of

a. 50-60 cm
b. 40-50 cm
c. 60-70 cm
d. 70-80 cm

8. Which among the following crop is not used for Bio-drainage

a. Rice
b. Casurina
c. Eucalyptus
d. Bamboo

9. Subsurface drains are generally installed at_____ depth

a. 1-2 m
b. 0.5-1.0 m
c. 2-3 m
d. 4-5 m

10. The slope of the drain is decided by

a. Soil Structure
b.
c. Crop
d. Soil texture
e.
f. None of these

II. Fill in the Blanks

1. The basic purpose of _____ is to remove water from the surface and sub-surface to keep the root zone free from excess water.
2. In India, the annual soil loss due to erosion is estimated to be between _____ tons per hectare per year.
3. The generally accepted soil tolerance limit (SLTL) in India is _____ tons/ha/year.
4. Improper maintenance of canals and the cultivation of crops like _____ have led to increased water tables in some regions.
5. Increased water tables combined with high evaporation rates often result in the _____ of soils, especially in hot regions.
6. Sub-surface drainage systems are implemented by laying _____ at a specified depth below the ground surface.
7. The depth of sub-surface drains is generally limited to between _____ meters.
8. To prevent soil particles from entering sub-surface drain pipes, _____ materials are wrapped around the pipes.
9. India's annual essential nutrient loss to erosion from water and wind is approximately _____ million tons.
10. Treating land on a _____ basis is considered more significant and effective than a piece-meal approach.

III. One Mark Questions

1. Write the major types of agricultural drainage systems
2. What is the basic purpose of agricultural drainage?
3. Define gravity drainage system
4. Define pump drainage system
5. Equipment used for formation of pipeless drains is _____

III. Two Marks Descriptive Questions

1. Reasons of increase in waterlogged areas after irrigation canals introduction
2. Need for agricultural drainage be explained
3. How the mole drains are formed
4. List out the crops used in Bio drainage
5. Design principle of subsurface drainage system consists of

IV. Three Marks Descriptive Questions

1. List out the data required for design of drainage system
2. List out the types of subsurface drainage systems
3. Define drainage coefficient.
4. List out the design types considered for subsurface drainage system
5. Why the temporary waterlogging conditions occurs.

V. Five Marks Descriptive Questions

1. Explain the design principle of surface drainage systems
2. Explain the design principle of subsurface drainage systems
3. Explain the surface drainage system types
4. Explain the subsurface drainage system types
5. Explain the purpose and need of agricultural drainage system

7.3. B Water harvesting, importance and its techniques- In-situ and Ex-situ water harvesting in arid and semiarid areas.

7.3. C. Principles and concept of Integrated Watershed Management

I. Multiple Choice Questions

1. What is the primary objective of water harvesting?
   a. Store rainwater for future use
   b. Increase soil erosion
   c. Reduce groundwater
   d. Increase evaporation

2. In-situ water harvesting refers to:
   a. Conserving water where it falls
   b. Storing water outside the field
   c. Transporting water from rivers
   d. Using groundwater

3. Which of the following is an in-situ water harvesting technique?
   a. Farm pond
   b. Percolation tank
   c. Contour bunding
   d. Check dam

4. Ex-situ water harvesting involves:
   a. Water conservation in the same field
   b. Collection of water in storage structures
   c. Soil moisture conservation
   d. Reducing rainfall

5. Which structure is used in ex-situ water harvesting?
   a. Mulching
   b. Terracing
   c. Farm pond
   d. Contour ploughing

6. Water harvesting is most important in:
   a. Coastal areas
   b. Flood-prone areas
   c. Arid and semi-arid regions
   d. Forest areas

7. Contour bunding helps in:
   a. Increasing runoff
   b. Reducing soil erosion
   c. Increasing evaporation
   d. Decreasing infiltration

8. Which technique reduces runoff and increases infiltration?
   a. Check dam
   b. Mulching
   c. Contour farming
   d. All of the above

9. Percolation tanks e mainly used for:
   a. Irrigation directly
   b. Groundwater recharge
   c. Drainage
   d. Flood control

10. The main benefit of water harvesting is:
   a. Increased soil erosion
   b. Increased drought
   c. Reduced crop yield
   d. Improved water availability

II. Fill in the Blanks

1. Conservation of rainwater at the place where it falls is called _____
2. Storage of water outside the field is called _____
3. A small water storage structure in farms is called _____
4. Structures built across streams to slow water flow are called _____
5. Soil covering to reduce evaporation is called _____
6. The process of water entering soil is called _____
7. Water harvesting is crucial in _____ regions (dry areas)
8. Recharge of underground water is called _____
9. Farming along contour lines is called _____
10. Step-like land shaping in hilly areas is called _____

III. Two Marks Descriptive Questions

1. Define water harvesting.
2. Explain the importance of water harvesting.
3. What is in-situ water harvesting?
4. Give two examples of in-situ water harvesting techniques..
5. What is ex-situ water harvesting?
6. Mention two ex-situ water harvesting structures.
7. Why is water harvesting important in arid regions?

8. Explain contour bunding.
9. What is the role of check dams?
10. How does mulching help in water conservation?

V. Five Marks Descriptive Questions

1. WATERSHED MANAGEMENT's approach is multi- disciplinary & participatory-explain?
2. Explain the difference between Social resource and natural resource management
3. Give examples for in-situ and ex-situ soil and water conservation measures
4. Mention the treatments suitable for Arable Lands
5. Mention the treatments suitable for Non Arable lands.
6. Outline briefly the history of watershed development in India.
7. Name the current watershed development schemes operating in India.

7.4. A. Rainfed Agriculture: Introduction, types- Dry farming, dryland farming and Rainfed farming

I. Multiple choice questions

1. What is the percentage of land cultivated under rainfed condition in india?
   a. 50% b. 75%
   c. 68% d. 25%

2. What is the total cultivated area of cotton under rainfed condition?
   a. 65% b. 75%
   c. 60% d. 50%

3. Areas receiving anuual rainfall of > 1150 mm is called as
   1. Dryland area 2. Dry farming area
   3. Humid area 4. Rainfed area

4. Areas receiving anuual rainfall between 750 mm to 1150 mm is called as
   a. Dryland area b. Dry farming area
   c. Rainfed area d. Humid area

5. Areas receiving anuual rainfall < 750 mm is called as
   a. Dryland area b. Humid area
   c. Rainfed area d. Dry farming area

6. What is the total geographical area of India?
   a. 328.7 Mha
   b. 400.0 Mha
   c. 350.5 Mha
   d. 375.0 Mha

7. ICRISAT was established in Hyderabad in the year of
   a. 1900
   b. 1972
   c. 1947
   d. 1985

8. Most common crops grown in dryfarming region of India is
   a. Millets
   b. Sugarcane
   c. Paddy
   d. Maize

9. First Dry Farming Research Station established at Manjri in the year of
   a. 1975
   b. 1923
   c. 1950
   d. 2000

10. Crop growing season in dryland farming ranges from
    a. 75-120 days
    b. 50-75 days
    c. > 120 days
    d. < 50 days

II. Fill in the Blanks

1. Growing crops entirely under natural precipitation, without assured irrigation facilities, is referred to as _____ agriculture.
2. Areas receiving extremely low rainfall of less than 750 mm are classified under _____ farming.
3. Approximately _____ percent of India's 142 million hectares of cultivated land is under rainfed agriculture.
4. Rainfed farming accounts for _____ percent of the total area used for growing coarse cereals in India.
5. In _____ farming, the growing season is typically between 75 and 120 days.

III. One Mark Questions

1. Growing of crops entirely under rainfed conditions, without assured irrigation facilities, is called as
2. Percentage of total dryland area in India is
3. Major problem in rainfed farming is
4. Crop failures are more frequent in
5. Total annual average rainfall of India is

IV. Two Marks Descriptive Questions

1. Write major problems of dry farming
2. Write major problems of dryland farming
3. Write major problems of rainfed farming

V. Three Marks Descriptive Questions

1. Write the characteristics of dry farming
2. Write the characteristics of dry land farming
3. Write the characteristics of rainfed farming

VI. Five marks descriptive questions

1. What is rainfed farming? Write different types of farming systems practiced in India
2. Write the differences between dry farming and dryland farming
3. Write the differences between dryland farming and rainfed farming

7.4. B. Management of crops and cropping systems in rainfed areas –Intercropping, sequence cropping and crop rotation- Choice of crops and cropping systems based on length of crop growing season – Potential cropping systems

I. Multiple Choice Questions

1. Intercropping is most suitable in areas receiving rainfall of

   a. 600-850 mm
   b. <500 mm
   c. 950-1050 mm
   d. >1150 mm

2. The number of days for short growing season is?

   a. 50-75 days
   b. 75-100 days
   c. 100-125 days
   d. 125-150 days

3. When the rainfall is >900 mm then type of cropping system possible is

   a. Mono cropping
   b. Multi cropping
   c. Double cropping
   d. Intercropping

4. Rice → Linseed / Chickpea is an example for

   a. Double cropping
   b. Monocropping
   c. Intercropping
   d. None of them

5. Pairing of overlapping crops is called as

   a. Paired row crops
   b. Relay cropping
   c. Rainfed cropping
   d. Intercropping

6. The suitable crop geometry for Sorghum + Cowpea is?
   a. 2:1
   b. 4:1
   c. 8:2
   d. 1:2

7. Growing two or more crops in sequence on the same land within one crop year is called as
   a. Double crop
   b. Sequence crop
   c. Monocrop
   d. Multi-storeyed crop

8. Important double cropping systems followed in Bangalore is
   a. Maize + cowpea
   b. Maize→ Sesame
   c. Monocrop
   d. Cowpea→Finger millet

9. Base crop duration (days) for Maize+ Cowpea is
   a. 100-110
   b. 110-120
   c. 90-100
   d. >120

10. The practice of growing different crops in succession on the same land in a planned sequence is called as
    a. Mixed cropping
    b. Crop rotation
    c. Intercropping
    d. Double cropping

II. Fill in the Blanks

1. The practice of growing two or more crops simultaneously on the same piece of land is called _____.
2. In the state of _____, potential intercropping systems include sorghum + pigeonpea and castor + redgram.
3. _____ cropping involves growing two or more crops in quick succession on the same land in a single year.
4. To minimize the risk of total crop failure due to erratic monsoons, farmers often use _____ as a form of insurance.
5. The farming practice where the same crop is repeated year after year without sufficient fertilizer is known as _____ cropping, which leads to soil depletion.

III. One Mark Questions

1. practice of growing two or more crops in the same field during the same season with a specific spatial arrangement is called as
2. When two crops are taken in a year, it is termed
3. Sequential cropping is possible when annual rainfall is
4. Relay cropping is also called as
5. Example for short growing crop is

6. Example for short growing crop is

IV. Two Marks Descriptive Questions

1. What is intercropping give example for intercropping?
2. What are the conditions that favour the sequential cropping?
3. What is crop rotation and give example for crop rotation?
4. Write examples for crop rotation in rainfed farming?
5. Write important double cropping systems in different locations?

V. Three marks descriptive questions

1. What is relay cropping? Write its importance?
2. Write importance of intercropping systems in Indian condition?
3. Write examples for intercropping in India?

VI. Five marks descriptive questions

1. What is intercropping? Write advantages of intercropping systems with examples
2. What are the guiding factors for selecting crops and cropping systems in rainfed agriculture?
3. Write briefly about potential cropping systems base on rainfall and soil characteristics?
4. What is sequential cropping? Write advantages of sequential cropping system?
5. Describe choice of crops and cropping systems based on length of crop growing season?

Module VIII: Seed & Seed Production

8.1. A. Basics of Seeds

8.1. B. Difference between seeds and grains

8.1. C. Importance of Quality Seeds in crop production

8.1. D. Classes of seeds

8.1. E. Seed treatment- Importance and procedure

I. Multiple Choice Questions

1. Grain is primarily used for:

   a. Planting
   b. Seed treatment
   c. Consumption
   d. Hybridization

2. Quality seeds can contribute approximately how much to yield improvement?

   a. 5–10%
   b. 10–15%
   c. 20–25%
   d. 40–50%

3. High vigor seeds result in:

   a. Slow germination
   b. Uniform and healthy crop stand
   c. Poor root development
   d. Increased disease incidence

4. Breeder seed tag color is:

   a. White
   b. Blue
   c. Golden Yellow
   d. Purple

5. Certified seed tag color is:

   a. White
   b. Azura Blue
   c. Purple
   d. Yellow

6. Damping-off disease is prevented by:

   a. Irrigation
   b. Fertilizers
   c. Weeding
   d. Seed treatment

7. Truthfully Labeled (T.L.) seed requires:

   a. Certification
   b. A government tag
   c. No labelling
   d. Producer's quality declaration

8. Biological seed treatment includes:

   a. Zinc coating
   b. Rhizobium inoculation
   c. Fungicide dusting
   d. Ammonia fumigation

9. In seed treatment, coloring agents are used to:

   a. Increase germination
   b. Improve seed weight
   c. Indicate the seed is poisonous
   d. Improve nutrient content

10. Slurry treatment involves mixing chemicals with:

   a. Sand
   b. Soil
   c. Water
   d. Oil

II. Fill in the Blanks

1. While a grain is produced for consumption, a _____ is specifically produced for the purpose of propagation.
2. The four main classes of seeds in the multiplication chain are Breeder's, Foundation, Registered, and _____.
3. _____ purity refers to the true-to-type nature of the seed, ensuring it matches the characteristics of the variety developed by the breeder.
4. Using certified, high-quality seeds can contribute to a yield increase of _____ percent compared to farm-saved seeds.
5. The final class of seed sold to farmers, which guarantees minimum quality standards, is identified by an _____ blue tag.
6. The application of fungicides, insecticides, or inoculants to the seed surface before sowing is known as _____.
7. Seed treatment provides essential early-season protection against _____ and soil-borne diseases.
8. One of the primary technical roles of an agri-input dealer is to distinguish between seeds and _____ to prevent the accidental consumption of treated products.
9. _____ is a seed quality parameter that refers to the seed's ability to germinate and produce a normal seedling under a wide range of field conditions.
10. Maintaining a clear multiplication chain from Breeder's to Foundation to Certified seed is necessary to ensure the _____ purity of the variety is maintained.

III. Two Marks Descriptive Questions

1. Define a seed.
2. What is the primary difference between a seed and a grain?
3. Mention any two qualities of good seed.
4. What is the tag color of certified seed?

5. Why is seed treatment important?
6. Name two common seed-borne diseases.
7. What is physical purity in seed quality?
8. Define Truthfully Labeled (T.L.) seed.
9. What is the purpose of adding color to treated seeds?
10. What does high seed vigor result in?

IV. Three Marks Descriptive Questions

1. Explain why quality seed is considered the most economical input in crop production.
2. Differentiate between seeds and grains with two points each.
3. Describe the tag colors of breeder, foundation, registered, and certified seeds.
4. List any four advantages of using quality seeds.
5. What is seed treatment? State its importance.
6. Explain the difference between physical purity and genetic purity.
7. Describe dry seed dressing and slurry seed treatment.
8. Why must treated seeds not be used for consumption?
9. Explain the role of biological agents like Rhizobium in seed treatment.
10. What precautions should be taken while mixing chemicals during seed treatment?

V. Long Answer Questions

1. Elaborate on the importance of quality seeds in enhancing crop yield and farm profitability.
2. Explain in detail the differences between seeds and grains with relevant examples.
3. Discuss the different classes of seeds, their characteristics, and tag colors.
4. Describe the complete procedure of chemical seed treatment from preparation to labeling.
5. Write a detailed note on the advantages of seed treatment in preventing diseases and improving stand establishment.
6. Explain seed quality parameters: genetic purity, physical purity, viability, and vigor.
7. Describe the seed multiplication chain starting from nucleus seed to certified seed.
8. Discuss the role of agri-input dealers in advising farmers on seed quality and seed treatment.
9. Explain the importance of certified seeds in achieving a uniform crop stand and better resource efficiency.
10. Provide a detailed comparison of biological, chemical, and physical methods of seed treatment.

8.2. A. Principles and practices of Seed Production

8.2. B. Seed Certification Process

I. Multiple Choice Questions

1. Seed production aims to produce:

   a. Food grains
   b. Pure and high-quality seeds
   c. Fodder
   d. Fertilizers

2. The most important principle of seed production is:

   a. Genetic purity
   b. Irrigation
   c. Fertilizer use
   d. Marketing

3. Isolation distance is maintained to:

   a. Save water
   b. Avoid cross-pollination
   c. Increase yield
   d. Reduce weeds

4. Which class of seed is produced by breeders?

   a. Foundation seed
   b. Certified seed
   c. Breeder seed
   d. Truthful seed

5. Blue tag is used for

   a. Breeder seed
   b. Foundation seed
   c. Certified seed
   d. Truthful seed

6. Seed certification ensures:

   a. High price
   b. Quality assurance
   c. Marketing
   d. Storage

7. Rogueing means:

   a. Irrigation
   b. Storage
   c. Harvesting
   d. Removal of off-type plants

8. Field inspection in certification is done to:

   a. Increase yield
   b. Maintain purity
   c. Improve soil
   d. Store seeds

9. Seed certification agency works under:

   a. Private companies
   b. Banks
   c. NGOs
   d. Government

10. Germination test is conducted to check:

a. Purity	b. Viability
c. Moisture	d. Size

II. Fill in the Blanks

1. Quality seed alone can increase crop yield by _____ percent, even without changing other inputs.
2. High _____ purity ensures that the seed is true-to-type and carries the specific traits developed by the breeder.
3. The seed class that is produced directly from the Nucleus seed under the supervision of a breeder is called _____ seed.
4. _____ seed is the progeny of Foundation seed and is the class that most farmers purchase for commercial cultivation.
5. In India, _____ (TL) seed is a class where the quality is guaranteed by the producer rather than a government agency.
6. The minimum distance required between two different varieties of the same crop to prevent cross-pollination is known as the _____ distance.
7. The process of removing off-types and diseased plants from a seed production field is called _____.
8. A seed certification certificate is initially valid for a period of _____ months from the date of the test.
9. The validity of a seed certificate can be extended for an additional _____ months if the seed lot still meets physical and germination standards.
10. The Certification Agency has the power to _____ a certificate if it was obtained through misrepresentation of essential facts.

III. Two Marks Descriptive Questions

1. Define seed production.
2. What is genetic purity?
3. What is isolation distance?
4. Define seed certification.
5. What is rogueing?
6. Name different classes of seed.
7. What is field inspection?
8. What is germination percentage?
9. What is foundation seed?
10. What is the purpose of seed certification?

IV. Three Marks Descriptive Questions

1. Explain the principles of seed production.
2. Describe the different classes of seeds.

3. Explain the importance of isolation distance.
4. Discuss the role of rogueing in seed production.
5. Explain the steps involved in seed certification process.

V. Five Marks Long Descriptive Questions

1. Explain the principles and practices of seed production in detail.
2. Describe the different classes of seeds and their importance.
3. Explain the complete seed certification process.
4. Discuss the importance of maintaining genetic purity in seed production.
5. Explain the role of seed certification in ensuring quality seed supply

8.3. A. Seed drying – methods of seed drying

8.3. B. Seed storage and maintenance- general principles – Stages and factors affecting – Seed longevity during storage – Measures for pest and disease control during storage

I. Multiple Choice Questions

1. What is the target moisture content for seeds after sun drying?

a. 5-8%
b. 10-12%
c. 15-18%
d. 20-25%

2. At what moisture content should seeds be dried under shade first before sun drying?

a. Above 10%
b. Above 14%
c. Above 17%
d. Above 20%

3. What is the recommended drying temperature for seeds with 18-30% moisture content?

a. 90°F (32.2°C)
b. 100°F (37.7°C)
c. 110°F (43.3°C)
d. 80°F (26.6°C)

4. How many days does sun drying typically take to reduce seed moisture to 10-12%?

a. 1-2 days
b. 2-4 days
c. 5-7 days
d. 7-10 days

5. What is the process of allowing moisture to redistribute evenly within seeds during drying called?

a. Conditioning
b. Stabilization
c. Equilibration
d. Tempering

6. What is the application rate of malathion 50% E.C. for godown sanitation?

a. 2 lit/100 m²
b. 3 lit/100 m²
c. 5 lit/100 m²
d. 10 lit/100 m²

7. Which drying method can handle higher temperatures due to shorter seed exposure time?

a. Sun drying
b. Shade drying
c. Batch dryer
d. Continuous flow dryer

8. What happens to seeds left out overnight during sun drying?

a. They dry faster
b. They absorb moisture from air
c. They lose viability
d. They germinate

9. Forced natural air drying is only effective during which period?

a. Winter months
b. Rainy months
c. Dry months
d. Throughout the year

10. What should be used for arranging seed bags for proper ventilation?

a. Concrete floor
b. Metal pallets
c. Wooden pallets
d. Plastic sheets

II. Fill in the Blanks

1. The process of eliminating moisture from seed is called _____.
2. The rest period between drying stages where moisture redistributes is called _____.
3. _____ shaped seeds provide better protection than flat seeds during handling.
4. The conventional method of drying using solar energy is called _____ drying.
5. Traditional godowns use _____ for natural air circulation.
6. Modern facilities use _____ for forced air movement.
7. Seeds should be arranged on _____ pallets for proper ventilation.
8. The study by _____ (1941) found that high viability seeds resist unfavorable storage conditions.
9. _____ is the chemical used at 5 liters per 100 m² for godown disinfection.
10. Seeds with moisture above _____% should be dried before fumigation.

III. Two Marks Descriptive Questions

1. Define seed drying.
2. What are the two stages of moisture elimination during seed drying?
3. What is tempering in seed drying?
4. Define seed storage.
5. What is the objective of seed storage?
6. Mention the recommended drying temperatures for different moisture contents.

IV. Three Marks Descriptive Questions

1. Explain the relationship between seed moisture content and drying temperature.
2. Describe the process of sun drying of seeds.
3. What are the measures to prevent pests and diseases during seed storage?
4. Describe seed longevity during storage.
5. What are the classifications of seed storage packaging materials?

V. Five Marks Descriptive Questions

1. Compare and contrast natural drying and mechanical drying methods of seeds.
2. Discuss the factors affecting seed quality during storage with suitable examples.
3. Elaborate on the complete seed storage sanitation protocol
4. Explain the process of mechanical drying with special reference to forced air drying methods.

Module IX: Farm Mechanization

9.1. A. Farm Mechanization: Scope and Importance
9.2. B. Name and utility of various farm implements and machinery
9.3. C. Sources and cost estimation of farm implements and machinery

I. Multiple Choice Questions

1. The average farm power availability in India as in 2018-19 is _____ kW/ha

a. 0.48
b. 1.84
c. 4
d. 2.49

2. Farm mechanization level in India is _____ %

a. 30 -35
b. 80 - 90
c. 100
d. 40 - 45

3. Which of the followings is a primary tillage equipment?

a. Cultivator
b. Blade Harrow
c. Disc Harrow
d. Mould board plough

4. Working depth of subsoiler is up to _____ cm

a. 15
b. 30
c.45
d. 90

5. ____ is regarded as primary and secondary tillage equipment

a. Disc plough
b. Cultivator
c. Rotavator
d. Chisel plough

6. _____ imparts rotational motion to the liquid passing through it

a. Nozzle cap
b. Swirl plate
c. Spring
d. Washer

7. _____ is used for direct drilling of seeds without opening the furrow.

a. Transplanter
b. Zero till seed drill
c. Seed drill
d. Planter

8. Spray tank capacity of tractor operated boom sprayer is _____ litre

a. > 500
b. 10 to 16
c. 200 - 400
d. <150

9. Field capacity of power weeder is _____ ha/day

a. 0.05 - 0.12
b. 0.5 - 0.7
c. 0.1 - 0.2
d. 0.6 - 1.0

10. _____ performs multiple operations of harvesting, threshing and grain cleaning or field crops.

a. Vertical conveyor reaper
b. Combine harvester
c. Baler
d. Rotoslasher

II. Fill in the Blanks

1. Farm mechanization level in India is currently estimated to be between _____ percent, which is lower than developed economies like the US or Japan.
2. The average farm power availability in India needs to reach at least _____ kW/ha by 2030 to meet increasing food grain demands.
3. The agricultural workers' share in total power availability is projected to drop to just _____ percent by 2032-33.
4. _____ is the primary source of mobile power in modern Indian agriculture, used for both field work and transport.
5. A _____ is a specialized machine used specifically for breaking up soil clods and leveling the seedbed after initial plowing.
6. The life of a tractor for calculation purposes is generally considered to be _____ years.
7. For a power tiller, the estimated life is _____ years, which is shorter than that of a standard tractor.
8. The tool used for primary tillage to break open the soil is the _____, which has an estimated life of 3,000 hours.
9. A _____ is a machine used to chop fodder into small pieces for livestock feed, with an average life of 8 years.
10. To combat the scarcity of labor and high operational costs, each agro-ecological zone requires _____ mechanization solutions.

II. Two Marks Descriptive Questions

1. Define Farm Mechanization and name different farm operations
2. Write a note on Mouldboard plough and Disc Plough.
3. Write the working principle of rotavator.

4. Explain about Orchard sprayer.
5. Write a note on Long handled manual weeders.
6. Write about root crop digger.

IV. Three Marks Descriptive Questions

1. Explain different secondary tillage equipment.
2. Write a note on Crop residue management equipment
3. Write a brief note Fixed costs involved in cost estimation of agricultural equipment.
4. Differentiate between automatic seed cum fertilizer drill and zero till seed drill.
5. Briefly explain about need for small farm mechanization in India

V. Five Marks Descriptive Questions

1. Explain the status of farm mechanization in India.
2. Write a note on different Primary tillage equipment
3. Write about different secondary tillage equipment
4. Explain different Plant Protection Equipment.
5. Write about different harvesting and threshing equipment
6. Enumerate Fixed costs and Variable costs in cost estimation of agricultural equipment.

9.4. Custom hiring Centers: Concept and Importance in the present

I. Multiple Choice Questions

1. What is the main purpose of a Custom Hiring Center?

a. To sell machines to farmers
b. To rent machines to farmers
c. To train farmers in marketing
d. To sell seeds and fertilizers

2. Which category of farmers benefits the most from CHCs?

a. Rich farmers
b. Large landholders
c. Small and marginal farmers
d. Exporters

3. Machines used for land preparation

a. Tractors
b. Rotavators
c. Ploughs
d. All of these

4. Machines used for sowing and planting

a. Seed drill
b. paddy transplanter
c. Both a and b
d. None of these

5. Machines used for post-harvest purpose

a. Threshers
b. Shellers
c. Graders
d. All of these

6. Machines used for harvesting
   a. Reapers
   b. Combine harvesters
   c. Both a and b
   d. None of these

7. In ---------- state Womens Self Help Groups run CHCs, empowering rural women.
   a. Andhra Pradesh
   b. Karnataka
   c. Madhya Pradesh
   d. Punjab

8. CHCs are managed by
   a. Cooperatives
   b. Government agencies
   c. FPOs
   d. All of these

9. Challenges of Custom Hiring centers
   a. Lack of awareness
   b. Seasonal demand
   c. need for trained operators
   d. All of these

10. Benefits of Custom Hiring centers
   a. Rent machines at low price
   b. Timely access to machines
   c. Operator support available
   d. All of these

I. Fill in the Blanks

1. A _____ is a unit that provides farm machinery and equipment on a rental basis to small and marginal farmers.
2. One of the main objectives of a CHC is to reduce the _____ for farmers who cannot afford to buy expensive machines.
3. CHCs help improve crop yields by ensuring that agricultural operations like sowing and harvesting are done in a _____ manner.
4. The Government of India supports the establishment of CHCs under the _____ on Agricultural Mechanization (SMAM).
5. In addition to individuals and cooperatives, _____ (FPOs) are encouraged to run CHCs for the benefit of rural communities.
6. A _____ is a specialized machine listed in the glossary that is used to level the field with high precision.
7. The _____ is a machine that allows for sowing seeds directly into the soil without the need for prior ploughing.
8. A major challenge for CHCs in hilly or fragmented landholdings is the lack of proper _____ and accessibility for large machines.
9. To ensure the long-term success of a CHC, it is critical to have a regular schedule for the _____ of the equipment.

10. CHCs promote _____ by allowing multiple farmers to share a single set of high-efficiency machines rather than every farmer owning lower-efficiency ones.

V. One Mark Questions

1. Machine that harvests, threshes, and cleans crops.
2. Machine used to level the field using laser technology.
3. The facility that provides farm machinery on rental basis
4. Threshers, Sheller's and graders are used as
5. In which state farmers used CHCs for soybean and wheat cultivation
6. Which state implemented CHCs under farm mechanization programme.

III. Two Marks Descriptive Questions

1. Define Custom Hiring Center in your own words
2. Mention the features of CHCs.
3. List the types of machines available at CHCs.
4. Mention any two benefits of CHCs.
5. Explain the role of CHCs in promoting modern and sustainable farming

IV. Three Marks Descriptive Questions

1. Explain how CHCs reduce cost of cultivation.
2. Give examples of CHC success in two states.
3. Write in detail about Government support for CHcs.
4. Explain why custom hiring centers are essential for small and marginal farmers.
5. Custom Hiring Centers helps in improving productivity and yield. Justify with examples.

V. Five Marks Descriptive Questions

1. Discuss the challenges and opportunities of CHCs in Indian agriculture.
2. Briefly explain the importance of CHCs.
3. Explain in detail about the benefits of Custom Hiring Centers with suitable examples.
4. Explain Government schemes and support for CHC,s in different states.
5. Explain features of CHCs.

Module X: Leveraging Agricultural Value Chains through Collectives

10.1. Role and Impact of Farmer Producer Organizations in Empowering Smallholders

I. Multiple Choice Questions

1. The Producer Company model was introduced in India under which Act?

   a. Companies Act, 1956
   b. Companies Act (Amendment), 2002
   c. Cooperative Societies Act, 1998
   d. Producer Organization Act, 2001

2. Which of the following is *not* a key advantage of farmer collectivization?

   a. Economies of scale
   b. Reduced transaction costs
   c. Increased political representation
   d. Improved market access

3. The principle of "one member, one vote" is associated with:

   a. Private Limited Companies
   b. Producer Companies
   c. Self-Help Groups
   d. Partnerships

4. The Scheme for Formation and Promotion of 10,000 FPOs was launched in:

   a. 2015
   b. 2017
   c. 2020
   d. 2024

5. Which of the following organizations first led the organized promotion of FPOs in India?

   a. SFAC and NABARD
   b. NAFED and NDDB
   c. NABCONS and SIDBI
   d. ICAR and APEDA

6. Women-led FPOs are often engaged in:

   a. Heavy machinery production
   b. Land leasing activities
   c. Import of fertilizers
   d. Seed production and value addition of minor millets

7. FPOs registered as Producer Companies operate under:

   a. Societies Registration Act
   b. Agricultural Produce Marketing Act
   c. Cooperative Development Act
   d. Companies Act, 2013

8. Cluster-Based Business Organizations (CBBOs) were introduced under which initiative?
   a. National Rural Livelihood Mission
   b. 10,000 FPO Scheme
   c. PM-KISAN Scheme
   d. Agri Infrastructure Fund

9. The biggest challenge currently faced by FPOs in India is:
   a. Low awareness among farmers
   b. Sustainability and scaling after formation
   c. Lack of registration laws
   d. Poor irrigation facilities

10. The transformation of farmers from "price-takers" to "price-seekers" reflects:
   a. Economic empowerment through collectivization
   b. Technological intervention
   c. Government subsidy schemes
   d. Contract farming

II. Fill in the Blanks

1. Nearly _____ percent of all cultivators in India are small and marginal farmers operating on less than one hectare.
2. FPOs represent a strategic shift from subsistence farming to _____ agriculture.
3. The primary goal of an FPO is to _____ farmers into member-owned business entities to improve their bargaining power.
4. FPOs address structural handicaps like fragmented holdings and limited access to _____ and modern technology.
5. By engaging in collective _____, FPOs allow small producers to compete effectively in globalized markets.
6. The next phase of FPO development in India must emphasize _____ over quantity to ensure long-term viability.
7. Integrating FPOs into the _____ (MSP) and PDS programs is a key recommendation for leveraging value chains.
8. To ensure scale and efficiency, FPOs are encouraged to form _____ at the district or commodity levels.
9. A major focus of FPO governance should be ensuring the participation of _____ and youth at all levels.
10. FPOs aim to transform isolated producers into _____ who are stakeholders in a more inclusive economy.

III. One Mark Questions

1. The process of organizing smallholders into collective enterprises is called?
2. Which institution introduced the FPO model along with NABARD?

3. When the draft of the most recent National Policy of FPOs was was released?
4. Name the digital marketing platform integrated with FPOs for transparency.
5. The term used for shared benefits and trust among FPO members.

IV. Two Marks Descriptive Questions

1. Define a Farmer Producer Organization (FPO).
2. Mention any two major challenges faced by FPOs in India.
3. What is meant by "economies of scale" in the context of FPOs?
4. Write two functions of the Chief Executive Officer (CEO) in an FPO.
5. Explain briefly the rationale for farmer collectivization.

V. Three Marks Descriptive Questions

1. List three advantages that smallholders gain through collectivization under FPOs.
2. Explain the role of women-led FPOs in strengthening rural livelihoods.
3. Describe how FPOs contribute to market access and value chain integration.
4. What are the key features of good FPO governance?
5. Differentiate between economic empowerment and social empowerment achieved through FPOs.

VI. Five Marks Descriptive Questions

1. Discuss the evolution of FPOs in India and the major policies supporting their growth.
2. Elaborate on the economic and institutional benefits of FPOs for smallholders.
3. Examine the major challenges hindering the sustainability of FPOs and suggest policy measures to overcome them.
4. Explain how FPOs contribute to financial inclusion and risk management for small and marginal farmers.
5. Discuss the role of FPOs in transforming Indian agriculture from subsistence to sustainability.

10.2. Agricultural Cooperatives: Understanding Their Role, Importance, Functioning and Societal Impact

I. Multiple Choice Questions

1. The guiding principle of a cooperative is
   a. One share, one vote
   b. One member, one vote
   c. Profit maximization
   d. Monopoly

2. Which cooperative is known for transforming India's dairy sector?
   a. KRIBHCO
   b. AMUL
   c. IFFCO
   d. NAFED

3. IFFCO was established in:
   a. 1957
   b. 1977
   c. 1967
   d. 1987

4. PACS stands for:
   a. Primary agricultural credit societies
   b. Primary agricultural cooperative credit societies
   c. Primary agro commercial societies
   d. Producer agriculture cooperative societies

5. The marketing cooperative NAFED mainly deals with:
   a. Fertilizers
   b. Milk
   c. Sugarcane
   d. Pulses and grains

6. The Union Ministry of Cooperation, formed in 2021, primarily aims to:
   a. Promote exports of agricultural products
   b. Strengthen and modernize the cooperative movement
   c. Provide subsidies for fertilizers
   d. Regulate private agribusiness companies

7. The highest decision-making body of a cooperative is:
   a. CEO
   b. Registrar
   c. Board of Directors
   d. General Body

8. Which state is famous for sugar cooperatives?
   a. Punjab
   b. Maharashtra
   c. Gujarat
   d. Kerala

9. KRIBHCO is primarily associated with:
   a. Dairy products
   b. Banking
   c. Cotton trade
   d. Fertilizer production

10. Women-led dairy cooperatives are most prominent in:
    a. Maharashtra & Gujarat
    b. Rajasthan & Punjab
    c. Kerala & Tamil Nadu
    d. Bihar & Odisha

III. Fill in the Blanks

1. A cooperative is a group of people who come together for a _____ and share benefits based on their contribution.
2. The core philosophy of an agricultural cooperative is "_____ for mutual benefit."

3. In India, the _____ sector provides a world-renowned example of successful cooperative unity through Amul.
4. Agricultural cooperatives help increase farmer income by reducing the role of _____ in the supply chain.
5. Cooperative organizations often provide farmers with easier access to _____, which are essential for buying seeds and fertilizers.
6. A significant challenge for traditional cooperatives is _____, where a few powerful members make all the decisions.
7. To modernize cooperatives, a key reform is the _____ of Primary Agricultural Credit Societies (PACS).
8. Strengthening governance in cooperatives requires independent _____ and performance-linked incentives.
9. _____ leadership is a priority area for making modern cooperatives more inclusive and future-ready.
10. Cooperatives aim to move beyond being simple "safety nets" to becoming competitive _____ that create rural

III. One Mark Questions

1. Name the largest fertilizer cooperative in India.
2. Which dairy cooperative is based in Gujarat?
3. Expansion of PACS.
4. Name one national-level marketing cooperative.
5. Principle of cooperative governance.
6. Digital platform for agricultural trade.
7. Cooperative promoting organic farming in Sikkim.

IV. Two Marks Descriptive Questions

1. Define an agricultural cooperative.
2. What is the role of PACS in villages?
3. Mention two services provided by IFFCO.
4. Write two societal impacts of agricultural cooperatives.
5. Explain the principle of “one member, one vote.”
6. Give two examples of agricultural cooperatives in India.

V. Three Marks Descriptive Questions

1. Explain the functions of marketing cooperatives with example.
2. How do cooperatives help reduce dependence on moneylenders?
3. Write a short note on Amul as a successful cooperative.
4. Describe the management structure of agricultural cooperatives.
5. Explain the role of women’s dairy cooperatives in empowerment.

VI. Five Marks Descriptive Questions

1. Discuss the role and importance of IFFCO in Indian agriculture.
2. How do agricultural cooperatives support rural development?
3. Explain the societal impact of agricultural cooperatives with examples.
4. What are the latest developments in agricultural cooperatives in India?
5. Describe the role of the Ministry of Cooperation in strengthening cooperatives.
6. Explain the significance of PACS computerisation and Core Banking Solutions (CBS) implementation in strengthening India's cooperative credit structure.

10.3. Optimizing Agricultural Value Chains - A Comprehensive Overview of Agri-Marketing Strategies

I. Multiple Choice Questions

1. An agriculture value chain can involve:
   a. Only farmers and traders
   b. Processing, packaging, storage, transport and distribution
   c. Only exporters
   d. Only government agencies

2. Value chain mapping helps in:
   a. Identifying bottlenecks and market opportunities
   b. Reducing farm production
   c. Eliminating farmers from the chain
   d. Limiting coordination among actors

3. Which actor is responsible for supplying inputs like seeds, fertilizers and farm implements?
   a. Brokers
   b. Producers
   c. Input Suppliers/ Dealers
   d. Collectors

4. Which contract farming structure is directed and popular for high-value crops in developing countries?
   a. Nucleus estate
   b. Centralized
   c. Informal developer
   d. Intermediary (tripartite)

5. Which of the following is NOT a function of FPOs?
   a. Seed and fertilizer supply
   b. Marketing linkages and processing
   c. Managing the entire value chain
   d. Conducting unrelated commercial businesses

6. AVCF is applied to
   a. Only food crops
   b. Agricultural and agribusiness financing
   c. Only non-agricultural commodities
   d. Only export-oriented crops

7. The success of a value chain is measured by
   a. Its ability to ensure smooth flow of inputs, produce, knowledge, information, and innovations
   b. Only the profitability of retailers
   c. Limiting farmer participation
   d. Export volume only

8. KAM promotes farmer capability through
   a. Agricultural labour outsourcing
   b. Soil testing, crop nutrition planning and scientific advisory
   c. Import of foreign machinery
   d. Selling farm machinery only

9. In the 4P model, farmers are considered:
   a. Passive beneficiaries
   b. Only input suppliers
   c. Equal partners
   d. Supervisors of private companies

10. In the CISS-F framework, "C" stands for:
    a. Credit
    b. Competitiveness
    c. Coordination
    d. Consumption

II. Fill in the Blanks

1. A _____ is a set of activities that brings a product from production in the field to final consumption.

2. In modern agribusiness, players are expected to participate as a _____ rather than an individual business entity operating in isolation.
3. The integrated value chain approach helps input dealers by providing _____ demand for inputs from farmers.
4. _____ is a strategic institutional arrangement where a firm provides inputs and technical advice to farmers in exchange for an exclusive right to purchase the harvest.
5. The _____ framework highlights a multi-dimensional approach required for modern value chains, focusing on competitiveness, inclusiveness, sustainability, scalability, and finance.

6. Value chain approaches are particularly important in India to address the challenge of _____ landholdings and poor infrastructure.
7. Technology-driven platforms and digital marketplaces help reduce _____ and minimize post-harvest losses.
8. _____ mechanisms enable stakeholders to access timely credit to invest in processing and marketing.
9. Institutional arrangements like _____ (4P) have proven effective in bridging market gaps and providing technical support.
10. The ultimate goal of an organized value chain is to ensure that the benefits of production reach all stakeholders, particularly _____ farmers.

III. Two Marks Descriptive Questions

1. Define agricultural value chain.
2. What is agri-marketing?
3. What is the role of intermediaries in agri-marketing?
4. Define value addition in agriculture.
5. What is market linkage?

IV. Three Marks Descriptive Questions

1. Explain the components of an agricultural value chain.
2. What are the challenges in agricultural marketing?
3. Describe the importance of value chain optimization.
4. Explain the concept of direct marketing in agriculture.
5. What are modern agri-marketing strategies?

V. Five Marks Descriptive Questions

1. Explain agricultural value chain in detail with its stages.
2. Discuss various agri-marketing strategies used to improve farmers' income.
3. Explain the role of Farmer Producer Organizations (FPOs) in value chain optimization.
4. Discuss the importance of infrastructure in agricultural marketing.
5. Explain the role of digital technology in optimizing agricultural value chains.

Module XI: Latest Technologies in Agriculture

11.1. A. Precision Agriculture: Concepts and techniques; their issues and concerns for Indian Agriculture
11.1. B. Use of nano-technology in Agriculture

I. Multiple Choice Questions

1. The core principle of precision agriculture is often summarized as:
   a. Using the maximum amount of inputs
   b. Treating all parts of the field equally
   c. Reducing technology use in farming
   d. Doing the right thing, in the right way, at the right time, and in the right place

2. Which of the following is NOT one of the "Right Principles" of precision agriculture?
   a. Right Input
   b. Right Place
   c. Right Methodology
   d. Right Time

3. Which technology allows farmers to know their exact position in the field for precise input application?
   a. IoT
   b. Drones
   c. GPS
   d. Blockchain

4. What is the main role of Remote Sensing in precision agriculture?
   a. Predict market prices
   b. Gather crop information without physical contact
   c. Provide weather forecasts
   d. Control farm machinery

5. Variable Rate Technology (VRT) helps farmers by:
   a. Applying the same fertilizer across the field
   b. Automatically changing the amount of inputs applied
   c. Reducing the use of drones
   d. Predicting crop yields before harvest

6. Which of the following is a benefit of precision agriculture?
   a. Increased overuse of chemicals
   b. Reduced crop quality
   c. Cost savings of 10–30%
   d. Higher risk of soil degradation

7. In India, what is the biggest challenge for adopting precision agriculture?
   a. Excessive land size
   b. Over-availability of labor
   c. Lack of crop diversity
   d. Small land holdings

8. What does AI-based yield prediction in agriculture achieve?

   a. Identifies the best pesticides
   b. Forecasts international trade demand
   c. Reduces fertilizer use by 90%
   d. Predicts final yield with 85–95% accuracy

9. Why is customization for local conditions a concern in Indian precision agriculture?

   a. Western technologies may not suit Indian crops and field sizes
   b. Farmers prefer traditional tools
   c. It increases yield unpredictability
   d. Lack of smartphone apps in India

10. Which of the following technologies is used for real-time crop health mapping?

    a. Satellites
    b. Drones
    c. Blockchain
    d. Irrigation pumps

II. Fill in the Blanks

1. The satellite-based system that helps farmers identify exact field locations is called _____.
2. The technique of adjusting input application according to field variability is known as _____.
3. Using drones for capturing field images is part of _____ sensing.
4. AI-based systems that identify crop diseases from leaf images are used for _____ detection.
5. The biggest challenge for adopting precision agriculture in India is small _____ holdings.

III. Two Marks Descriptive Questions

1. Define Precision Agriculture in your own words.
2. State any two benefits of adopting precision agriculture.
3. What is the importance of soil testing and mapping in precision farming?
4. Mention any two issues faced by Indian farmers in adopting precision agriculture.
5. Explain the role of Artificial Intelligence (AI) in improving farming decisions

IV. Three Marks Descriptive Questions

1. Explain the “Five Rights” principle of precision agriculture with examples.
2. Describe how Remote Sensing helps in detecting crop stress at an early stage.

3. What is Variable Rate Technology (VRT) and how does it help farmers reduce input costs?
4. Discuss the role of IoT in agriculture with any two practical applications.
5. List and explain any three major issues that hinder the adoption of precision agriculture in India.

V. Five Marks Descriptive Questions

1. Discuss in detail the benefits of precision agriculture for Indian farmers in terms of cost savings, yield improvement, crop quality, and environmental protection.
2. Explain how Artificial Intelligence (AI) enhances precision agriculture, with reference to disease detection, weather prediction, irrigation management, and yield forecasting.
3. Describe the technological advancements in precision agriculture from the 1990s to the present, highlighting at least four key milestones.
4. Analyze the major challenges in implementing precision agriculture in India and suggest possible solutions for small and marginal farmers.
5. How do soil testing and mapping, GPS, remote sensing, and yield monitoring together contribute to sustainable and efficient farming practices?

11.2. Drone-Based Solutions for Agriculture: Applications in Monitoring, Spraying, and Analysis, SOPs for Use of Drones

I. Multiple Choice Questions

1. How many number of crops that the standard operating procedures for pesticides spraying using drones by Govt. of India released during 2023.

a. 7	b. 10
c. 12	d. 8

2. What is optimim drone speed recommended for pesticides spaying using drones?
   a. 4-5 m/sec
   b. 7-8 m/sec
   c. 6-7 m/ sec
   d. 2 m/sec

3. What is recommended dosage of pesticides for drone spraying?
   a. 75% of recommended dose
   b. 100% of recommended dose
   c. 125% recommended dose
   d. None of the above

4. What is the optimum spray width of drone spraying of pesticides?
   a. 3-3.5 m
   b. 4-5 m
   c. 5-6 m
   d. 2-3 m

5. What is best suitable nozzle type for drone spraying of insecticides?
   a. Conejet
   b. Floodjet type
   c. Hallow Cone
   d. Flat fan

6. The optimum wind speed recommended while spraying of pesticides using drones
   a. <10 m/sec
   b. >3 m/sec
   c. <3 m/sec
   d. <5 m/sec

7. As per the SOPs released by Govt. of India, the recommended drone spraying height for sugarcane crop in
   a. 2.0 – 3.0 m above the crop canopy
   b. 3.0 – 4.0 m above the crop canopy
   c. 1.5 – 2.0 m above the crop canopy
   d. 1.0 – 1.5 m above the crop canopy

8. What is the buffer zone to be maintained away from water bodies while spraying the pesticides using the drones.
   a. 50 m away from water bodies
   b. 250 m away from water bodies
   c. 100 m away from water bodies
   d. 500 m away from water bodies

9. The present rules that govern the Drone environment in India are named as:
   a. National Drone Policy (2018)
   b. The Drone Rules (2021)
   c. UAS Rules (2021)
   d. Drone Training Circulars (DTCs)

10. What is the field capacity of the drones
   a. 1.38 ha/hour
   b. 2.0 ha/hour
   c. 0.19 ha/hour
   d. 5.0 ha/hour

III. Fill in the Blanks

1. The acronym DRONE stands for _____ Remotely Operated Navigation Equipment.
2. In India, agriculture contributes nearly _____ percent to the national GDP.
3. Drones can help address the challenge of _____ shortages caused by rural-to-city migration.
4. Agricultural drones are used to apply _____, fertilizers, and other inputs with high precision and speed.
5. The use of drones for spraying can reduce water consumption by up to _____ percent compared to traditional methods.
6. _____ (SOPs) have been developed for various crops to ensure the safe and effective application of pesticides using drones.
7. The _____ Academy at PJTAU provides specialized training for drone pilots and researchers.
8. Drones are capable of performing _____ to assess crop health and detect nutrient deficiencies or pest infestations early.
9. A patented technology mentioned in the text for sowing seeds using drones is the _____.

10. Input dealers can act as _____ by facilitating drone-based services for farmers in their local areas.

IV. Two Marks Descriptive Questions

1. Why drones / UAVs in agriculture? Substantiate the role of drones in agriculture
2. What are opportunities for input dealers in promoting the drone technology to farmer doorsteps?
3. Write of areas of drone usage in agriculture?
4. Write brief note on Govt. of India deployed policies on promoting the drone usages in agriculture

V. Three Marks Descriptive Questions

1. Write the advantages of drone spraying in agricultural crops?
2. Write comparison between traditional spraying and aerial spraying equipments?
3. Write short note on sensor used for agricultural UAV monitoring?

VI. Five Marks Descriptive Questions

1. Write the detailed standard operating protocols for drone based pesticide spraying in major field crops?
2. Write the ooperational and safety measures being recommended for pesticides spraying using drones
3. Write detailed information on challenges associated in deploying drone technology in agriculture and its redress

11.3. A. Transforming Agriculture: Practical Applications of Artificial Intelligence and Machine Learning
11.3. B. Block chain Technology for Traceability and Transparency in Food Systems

I. Multiple Choice Questions

1. What is a key feature of blockchain records?
   a. They are immutable (unchangeable)
   b. They are stored only on one computer
   c. They can be edited anytime
   d. They require no validation

2. What is the purpose of drones in crop monitoring?
   a. Capturing images for soil and crop analysis
   b. Measuring livestock weight
   c. Planting seeds only
   d. Selling farm produce

3. Predictive analytics in farming helps with
   a. Guessing crop growth randomly
   b. Making data-driven decisions
   c. Replacing all farmers
   d. Increasing pesticide use

4. What system in India uses AI/ML for early pest detection?
   a. National Drone Network
   b. Soil Health Card System
   c. National Pest Surveillance System
   d. Green India Mission

5. The initiative of Government of India that uses AI to assist farmers with scheme-related queries?
   a. Digital Kisan Mandal
   b. Agri-Sat Program
   c. Smart Farmer Card
   d. Kisan e-Mitra

6. A mango-sorting machine categorizes fruits by colour and defects. Which technology drives this?
   a. Blockchain
   b. Natural language processing
   c. GPS mapping
   d. AI-based computer vision

7. A farmer using AI to plan which crops to grow next season mainly benefits from
   a. Predictive analytics
   b. Smart contracts
   c. Blockchain traceability
   d. Drone spraying

8. A farmer receives irrigation recommendations based on weather forecasts and soil moisture. Which technology combination is at work?
   a. Robotics + manual labour
   b. IoT sensors + AI models
   c. Blockchain + pesticides
   d. QR codes + blockchain

9. A food company needs to prove to consumers that its products are organic. Which technology offers immutable proof?
   a. Blockchain ledger
   b. Excel records
   c. Verbal assurance
   d. Paper logs

10. Which technology helps robots identify weeds in real time?
   a. Radio signals
   b. Manual tagging
   c. Computer vision
   d. Human supervision

II. Fill in the Blanks

1. Blockchain Technology creates a shared digital record called a ____.
2. Consumers can access product history stored on blockchain by scanning a ____ code.
3. _____ contracts automatically execute agreements when set conditions are met.
4. Wearable devices used to monitor animal health are called ____.
5. ____ is a subset of AI where computer systems learn from data.
6. ____ are the devices that detect and respond to events or changes in their environment.
7. Every action in the supply chain becomes a ____ on the blockchain.
8. Sensors placed in soil measure ____ levels to improve irrigation.

9. One major drawback of blockchain adoption is the high ____ of devices and infrastructure.
10. Blockchain allows all participants to see the same ____ of the product.

III. Two Marks Descriptive Questions

1. Define Artificial Intelligence.
2. Define Machine Learning.
3. Define Blockchain Technology.
4. Define sensor.
5. Define Precision Agriculture.

IV. Three Marks Descriptive Questions

1. What are the uses of drones in agriculture?
2. What are the challenges in adoption of AI/ML in agriculture?
3. What is the National Pest Surveillance System and how does it use AI/ML?
4. Explain how predictive analytics supports farm-wide decision-making.
5. Discuss the major challenges of blockchain adoption in agriculture.

V. Five Marks Descriptive Questions

1. Explain how Blockchain Technology transforms traceability and transparency in the agri-food supply chain.
2. Differentiate between Traditional and Blockchain Traceability
3. What are the advantages of Blockchain Technology?
4. Explain the practical applications of AI/ML in agriculture.
5. Explain the practical applications of Blockchain Technology in agri-food systems.

11. 4. A. Application of ICTs in Agriculture

11.4. B. Social Media, Portals and Mobile application including NPSS (National Pest Surveillance System)

I. Multiple Choice Questions

1. ICT in agriculture stands for:
   a. Information Communication Technology
   b. Integrated Crop Technology
   c. Indian Communication Technology
   d. Information and Communication Technology

2. Which ICT tool provides real-time weather information to farmers?
   a. Radio
   b. Posters
   c. Newspapers
   d. Mobile apps

3. NPSS stands for:
   a. National Pest Survey System
   b. National Pest Surveillance System
   c. National Plant Safety System
   d. National Pest Service Scheme

4. Which platform is widely used for farmer awareness and communication?
   a. Social media
   b. Books
   c. Letters
   d. Notice boards

5. Kisan Suvidha app is an example of:
   a. Portal
   b. Mobile application
   c. Newspaper
   d. TV channel

6. Agricultural portals mainly provide:
   a. Entertainment
   b. Farming information
   c. Political news
   d. Sports updates

7. ICT helps farmers in:
   a. Reducing knowledge
   b. Increasing crop losses
   c. Decision making
   d. Avoiding technology

8. Which of the following is a social media platform?
   a. Facebook
   b. MS Word
   c. Excel
   d. PowerPoint

9. NPSS is mainly used for:
   a. Irrigation
   b. Pest monitoring
   c. Soil testing
   d. Harvesting

10. Digital India initiative promotes:
    a. ICT usage
    b. Manual farming
    c. Traditional methods only
    d. No technology

II. Fill in the Blanks

1. ICT stands for _____ and Communication Technology.
2. _____ media helps farmers share information quickly.
3. NPSS is used for _____ surveillance.
4. Mobile applications provide _____ information to farmers.
5. _____ portals provide agricultural advisory services.

6. WhatsApp is an example of _____ media.
7. ICT reduces the _____ gap between farmers and experts.
8. Kisan Call Centre is an ICT-based _____ service.
9. NPSS helps in early detection of _____.
10. Digital platforms improve _____ efficiency.

III. Two Marks Descriptive Questions

1. Define ICT in agriculture.
2. What is the role of social media in agriculture?
3. What is NPSS?
4. Name any two agricultural mobile applications.
5. What are agricultural portals?

IV. Three Marks Descriptive Questions

1. Explain the importance of ICT in agriculture.
2. Describe the role of mobile applications in farming.
3. Write a short note on agricultural portals.
4. Explain how social media benefits farmers.
5. Discuss the objectives of NPSS.

V. Five Marks Descriptive Questions

1. Explain the application of ICT tools in agriculture with examples.
2. Discuss the role of social media and mobile applications in agricultural development.
3. Describe the functions and importance of NPSS in pest management.
4. Explain how ICT helps in improving agricultural productivity and farmer income.
5. Discuss different ICT platforms used in agriculture and their advantages

11.5. A. Latest PHTs and Secondary Agriculture

11.5. B. Use of Plastics in Agriculture

I. Multiple Choice Questions

1. Which of the following is considered as biodegradable are certified by independent third parties in accordance with international standard specifications and test methods?

   a. Biodegradable polymers
   b. Synthetic polymers
   c. Agricultural plastics
   d. Conventional polymers

2. Damage caused by physical forces such as spillages, abrasion, bruising, crushing, puncturing is known as

   a. Physical factors
   b. Mechanical factors

c. Physiological factors
d. Biochemical factors

3. Respiration is the process by which all living cells break down organic matter into simpler substances, releasing energy and
   a. O_2
   b. CO_2
   c. N_2
   d. H_2

4. The percentage of post-harvest losses for fruits and vegetables reaches up to
   a. 5-10%
   b. 10-20%
   c. 20-30%
   d. 30-40%

5. The spoilage caused by insects, pests, animals, and microorganisms such as fungi and bacteria is known as
   a. Physical factors
   b. Mechanical factors
   c. Biological and microbiological factors
   d. Biochemical factors

6. Polyethylene (PE), polypropylene (PP), and polyvinyl chloride (PVC) come under
   a. Biodegradable polymers
   b. Synthetic polymers
   c. Agricultural plastics
   d. Conventional polymers

7. Biological and microbiological factors comes under
   a. Primary causes of losses
   b. Secondary causes of losses
   c. Tertiary causes of losses
   d. None of the above

8. Which of the following is used as cladding materials to create controlled environments for year-round cultivation in a greenhouse.
   a. Glass
   b. UV-stabilized polyethylene
   c. Plastic
   d. FRP

9. The application of plastics in agriculture, often referred to as
   a. Vermiculture
   b. Plasticulture
   c. Sericulture
   d. Horticulture

10. Which of the following is not a principal of PHT?
   a. Increase in productivity
   b. Generation of employment
   c. Decreasing shelf life
   d. Ensuring value addition in food

II. Fill in the Blanks

1. Postharvest Technology (PHT) begins at the time of _____ and continues until the product reaches the consumer's table.

2. The evaluation of fruit and vegetable quality is divided into external attributes like appearance and _____ factors such as nutritional composition and safety.
3. Fresh fruits and vegetables are essential in the human diet because they are rich sources of vitamins, minerals, and _____.
4. Modern food safety measures focus heavily on bolstering _____ throughout the entire supply chain, from the field to the fork.
5. While plastics have enhanced agricultural productivity, their use poses long-term risks such as _____ pollution from fragmentation in the soil.
6. The leaching of chemical additives like _____ from plastic materials can be toxic to both plants and soil microbes.
7. Overdependence on plastics in farming may discourage traditional _____ practices, leading to a loss of soil biodiversity.
8. One of the major limitations of agricultural plastic is that _____ limits the ability to effectively recycle the material.
9. To balance productivity with ecological responsibility, the material suggests transitioning toward _____ plastics as a sustainable alternative.
10. Excessive reliance on plasticulture can promote _____ and high-input farming systems, which may be unsustainable in the long term.

IV. Two Marks Descriptive Questions

1. What is meant by post-harvest technologies?
2. Define secondary agriculture?
3. What do you understand by the term “Agricultural plastics”?
4. Write the benefits of greenhouse films?
5. Define biodegradable plastic?
6. Write the impact on soil biodiversity and function
7. Difference between physiological factors and psychological factors
8. Difference between biodegradable polymers and conventional polymers

V. Three Marks Descriptive Questions

1. Write the various concerns of plastic use and their impact in Agriculture?
2. List out the key components of post-harvest technologies
3. Write various benefits of plastic use and their impact in Agriculture
4. Briefly explain the factors affecting post-harvest losses?
5. Write down the objectives of PHT
6. Draw the flow chart of typical post harvest operations
7. List out the Principals of PHT

VI. Five Marks Descriptive Questions

1. Explain the role of post-harvest technologies in promoting secondary agriculture?
2. Draw the flow chart of Losses in food chain

3. Explain various applications of plastics in agriculture along with benefits
4. Write different examples of post-harvest technologies supporting secondary agriculture
5. Describe the importance of post-harvest technology
6. Enlighten in detail about different causes of postharvest losses
7.

11.6. A. Hi-tech Agriculture
11.6. B. Protected cultivation – Importance and scope
11.6. C. Vertical Farming and Urban Agriculture: Novel Production Systems Hydroponics

I. Multiple Choice Questions

1. Fertigation is the technique of applying _____ & _____ together to the root zone of plants
   a. Nutrients & water
   b. Water & Pesticides
   c. Water & chemicals
   d. Nutrients & insecticides

2. Which among the following are considered as hi-tech agriculture practices/techniques
   a. Hi-density planting
   b. Use of Drones
   c. Micro irrigation
   d. All of these

3. Solapur Lal is a biofortified variety of _____ crop and rich in _____
   a. Apple & Vitamins
   b. Pomegranate & Vitamins
   c. Pomegranate & Minerals
   d. Apple and Minerals

4. Off season cultivation of crops is achieved through
   a. Protected cultivation
   b. Open cultivation
   c. Traditional cultivation
   d. All of these

5. Hi-tech agriculture technologies suitable for urban agriculture
   a. Hydroponics
   b. Vertical farming
   c. Aeroponics
   d. All of these

6. Use of VRT (Variable rate technology) in farming increases efficiency of
   a. Water
   b. Nutrients
   c. Pesticides
   d. All of these

7. Hi-tech agriculture practices are _____ and _____ to the environment
   a. More environment dependent and More harmful to the environment
   b. Less environment dependent and more harmful to the environment
   c. Less environment dependent and less harmful to the environment
   d. All the above

8. Drip irrigation increases efficiency of water use by _____ %
   a. 10 %
   b. 20 %
   c. 40-50 %
   d. 90%

9. Rapid multiplication of disease free, healthy planting material is done through which method
   a. Grafting
   b. Tissue culture
   c. Budding
   d. None of these

10. Which of the following situations of present Indian agriculture demands Hi-tech agriculture practices?
    a. Climate change
    b. Scarcity of labour
    c. Depleting natural resources
    d. All of these

II. Fill in the Blanks

1. _____ agriculture uses advanced technologies like AI and IoT to manage crops at a micro level and optimize input application.
2. The technique of growing plants in a nutrient-rich water solution without soil is called _____.
3. In a _____ (NFT) system, nutrients flow in a shallow stream of water over the plant roots, making it ideal for small plants.
4. The _____ (DFT) system involves submerging roots in a nutrient solution while the plants float on top, which is perfect for leafy greens.
5. In the _____ technique, pots are fixed to a Styrofoam board and artificial aeration is provided to prevent root suffocation.
6. The _____ action technique uses highly porous media in pots with holes at the bottom to absorb nutrients from the solution below.
7. _____ is a specialized hydroponic method where nutrients are supplied to the roots through a misting solution in the air.
8. The collective network of connected devices that communicate with each other and the cloud is known as the _____ (IoT).
9. High-tech agriculture helps address the challenges of _____ by allowing farmers to move away from purely traditional practices.

10. One of the main goals of precision farming is to achieve _____ while using fewer resources like water and fertilizers.

III. One Mark Questions

1. Protected cultivation works on the principle of which effect?
2. The technique of using plastic in agriculture to improve efficiency of farming is termed as _____
3. Example for a crop variety developed through genetic engineering technique
4. An approach to manage pests and diseases integrating all possible methods and combinations is termed as?
5. The apps which uses artificial information to give information to farmers for taking real time decisions during farming

IV. Two Marks Descriptive Questions

1. Define Hi-tech agriculture and list any 4 important components of hi-tech agriculture practices
2. Define Protected cultivation and crops suitable for protected cultivation
3. Limitations of Hi-tech agriculture practices
4. Define INM with example
5. Define IPM and IDM
6. Discuss the principle of Green house effect

V. Three Marks Descriptive Questions

1. Scope and Importance of Protected cultivation
2. Advantages of Hi-tech agriculture practices
3. Write a brief note on Roof top gardening/Terrace gardening with its advantages and disadvantages
4. Write a brief note on application of automation techniques in Agriculture
5. Application of Drones in Agriculture

VI. Five Marks Descriptive Questions

1. Discuss on the key components of Hi-tech agriculture practices
2. Discuss about Urban agriculture practices
3. Discuss about the need for Hi-tech agriculture practices in Indian
4. Discuss about the technique of Hydroponics and its components with its advantages and limitations
5. Discuss in detail about the areas of Plastic application in Agriculture

Module XII: Overview of Allied Sectors

12.1. Livestock Feed and Supplements: Opportunities for Agri-Input Dealers

I. Multiple Choice Questions

1. What percentage of livestock rearing cost is attributed to feed?

a. 30–40%
b. 40–50%
c. 60–70%
d. 80–90%

2. Which of the following is a feed additive?

a. Probiotic
b. Vitamin premix
c. Protein supplement
d. Mineral mixture

3. What is the main purpose of roughages in livestock feed?

a. Provide protein
b. Aid digestion
c. Boost immunity
d. Enhance fertility

4. Which supplement supports eggshell formation in poultry?

a. Calcium carbonate
b. Vitamin A
c. Molasses
d. Fishmeal

5. What is the role of phytase enzyme in feed?

a. Boost milk yield
b. Break down phytates
c. Improve palatability
d. Prevent rancidity

6. Which of the following is a benefit of using feed supplements?

a. Reduce water intake
b. Enhance coat color
c. Improve growth rate
d. Reduce feed cost

7. What is the function of Urea-Molasses Blocks?

a. Improve gut health
b. Provide cheap protein-energy
c. Enhance flavor
d. Prevent disease

8. Which feed type is used for long-term nutrient storage?

a. Crop residues
b. Roughages
c. Concentrates
d. Silage

9. Which of the following is a feed additive rather than a supplement?
   a. Mineral mixture
   b. Vitamin premix
   c. Prebiotic
   d. Protein supplement

10. Which of the following feed enhances feed efficiency and health
   a. Mineral mixtures
   b. Probiotics
   c. Concentrates
   d. UreaMolasses Mineral Blocks (UMMB)

II. Fill in the Blanks

1. Livestock feed nutrition is critical for animal health, and the cost of feed typically accounts for _____ percent of the total expense of raising animals.
2. Regular food given to farm animals like grass, grains, and crop residues is simply referred to as _____.
3. _____ are extra nutrients like vitamins, minerals, and proteins added to the base diet to address specific nutritional deficiencies.
4. Non-nutritional substances like probiotics and enzymes that are added to feed to enhance health or production efficiency are called _____.
5. Feed supplements are especially critical for achieving proper animal growth and _____ when primary forages do not provide all necessary nutrients.
6. The primary role of _____ is to improve the digestion of nutrients or protect the animal from diseases.
7. According to the document, the company _____ is a well-known provider of dairy feed and silage bags in India.
8. _____ mixtures, such as RIGMIN-FORTE, are used to ensure animals receive essential trace elements often missing from local fodder.
9. Liquid multivitamin supplements are offered by companies like _____ to support animal vitality.
10. Understanding the distinct roles of roughages, concentrates, supplements, and additives is the key to _____ livestock farming

III. One Mark Questions

1. Define feed additives.
2. Name one example of a protein supplement.
3. What is the purpose of feed supplements?
4. Mention one brand that offers layer feed.
5. What is the function of prebiotics?

III. Two Marks Descriptive Questions

1. Briefly explain the importance of feed supplements and feed additives.
2. List two benefits of using probiotics in livestock feed.

3. What are the key components of a Total Mixed Ration?
4. Name two brands that offer mineral mixtures.
5. Why are Urea-Molasses Blocks considered cost-effective?

IV. Three Mark Descriptive Questions

1. Explain how calcium carbonate supports poultry health.
2. Describe the role of enzymes in improving feed digestibility.
3. List and explain types of feed additives with their benefits.
4. How do feed supplements support animals during lactation and pregnancy?
5. Describe three types of livestock feed and their purposes.

V. Five Marks Descriptive Questions

1. Elaborate the types of livestock feed with examples and their nutritional roles.
2. Discuss the scientific rationale and benefits of using feed supplements in livestock diets.
3. Explain the functions and examples of five major feed additives used in livestock nutrition.
4. Analyze the business potential for agri-input dealers in the livestock feed sector.
5. Differentiate between feed supplements and feed additives with examples.

12.2. Exploring the World of Livestock Enterprises: Key Concepts and Practices; Dairy, Poultry, Fisheries, etc.

I. Multiple Choice Questions

1. Which set best represents the three broad livestock production systems?
   a. Organic, synthetic, hybrid
   b. Extensive, semi-intensive, intensive
   c. Rural, peri-urban, urban
   d. Pastoral, arable, agro-forestry

2. A key performance indicators (KPI) that directly indicates feed efficiency in poultry is:
   a. ADG
   b. FCR
   c. ROI
   d. Mortality interval

3. A core sustainability approach where manure becomes fertilizer or biogas feedstock exemplifies:
   a. Circular economy
   b. Linear economy
   c. Cash-flow recycling
   d. Genetic looping

4. A layer flock KPI often tracked for performance is:
   a. Carcass marbling score
   b. Wool yield per head
   c. Egg number per hen per year
   d. Litter size

5. A common dairy methane-mitigation strategy mentioned is:
   a. Replacing feed with only forage
   b. Eliminating concentrates entirely
   c. Zero-grazing regardless of ration
   d. 3-NOP/seaweed-based additives

6. Which pair best matches enterprise → dominant risk/theme?
   a. Dairy → shell quality; Poultry → ketosis
   b. Dairy → Newcastle disease; Poultry → mastitis
   c. Dairy → metabolic/reproductive disorders; Poultry → HPAI/biosecurity
   d. Dairy → egg drop; Poultry → milk fever

7. "Feed conversion ratio below ~1.8" in the chapter most directly refers to:
   a. Beef feedlots
   b. Dairy heifers
   c. Broilers
   d. Small ruminants

8. Contract farming in poultry typically means integrators supply:
   a. Land and labour
   b. Chicks, feed, veterinary services
   c. Retail outlets
   d. Hatcheries owned by growers

9. Early detection in PLF can use wearable sensors to monitor:
   a. Only liveweight
   b. Wool fibre diameter
   c. Only hoof angles
   d. Rumination and body temperature

10. In layers, a high annual performance target can be around:
   a. 220 eggs/hen/year
   b. 120 eggs/hen/year
   c. 320 eggs/hen/year
   d. 420 eggs/hen/year

III. Fill in the Blanks

1. Dairy farming has evolved from smallholder, pasture-based systems into highly _____, precision-driven enterprises.
2. The world of livestock enterprises exists in a delicate balance between _____ and sustainability.
3. Challenges such as climate change and _____ resource scarcity continue to reshape the trajectory of livestock production.

4. Poultry farming has transitioned from a backyard practice to one of the fastest-growing _____ in the world.
5. Livestock are described as both _____ of and contributors to environmental challenges like climate change.
6. The path forward for the livestock sector involves balancing _____ with technology and science.
7. One of the "existential questions" facing the sector is how to produce more with less while ensuring animal _____.
8. Transitioning to a smarter, more _____ future involves valorizing waste and adopting renewable energy.
9. Empowering smallholders with technology and _____ access is critical for equitable distribution of innovation benefits.
10. Poultry enterprises are noted for their ability to meet global protein demands with remarkable _____.

III. Three Marks Descriptive Questions

1. The ratio that indicates how efficiently animals convert feed into output.
2. A livestock management approach emphasizing real-time sensing and automation.
3. Economy model where waste like manure is reused productively.
4. Primary GHG from enteric fermentation in cattle.
5. Temperature-related stress reducing dairy yield in hot climates.
6. Number of eggs/hen/year—key KPI in layers.
7. Short, rapid growth meat enterprise with high FCR efficiency.
8. Proactive disease-detection signals in dairy sensors (name any one: e.g., ____ or ____).
9. Strict farm-gate protection practice to prevent disease entry.
10. Poultry enterprise for fertile egg production supplying hatcheries.
11. Dairy technology allowing cows to choose milking times.
12. Feed additive class cited for methane mitigation.
13. KPI linking milk composition to economics (two words; ____ ____).
14. Key environmental emissions from poultry houses to be mitigated (name one: ____ or ____).
15. Digital standardization goal for interoperable livestock data (abbrev./term).

IV. Two Marks Descriptive Questions

1. Define a livestock enterprise and list two typical outputs.
2. Differentiate extensive and intensive systems with one example each.
3. Mention any two KPIs used in dairy and why they matter.
4. Explain the role of PLF in early disease detection (two points).
5. What is the circular economy in the context of manure management?
6. List two sustainability pressures on livestock systems today.
7. State two core elements of modern dairy nutrition management.

8. Why is biosecurity “non-negotiable” in poultry? Give two reasons.
9. Define FCR and state why it is critical in broiler economics.
10. Name two ways heat stress affects dairy productivity.
11. State two benefits of controlled-environment housing in poultry.
12. What does consolidation mean for farm numbers and herd size.

V. Three Marks Descriptive Questions

1. Outline three foundational concepts that underpin livestock enterprises.
2. Compare semi-intensive vs. intensive systems on inputs and resilience.
3. Explain how KPIs guide decision-making and benchmarking on farms.
4. Describe three practical components of PLF/PPF and their on-farm value.
5. Discuss how methane inhibitors and manure-to-biogas address GHGs.
6. Summarize the economic logic of contract farming in poultry.
7. Describe how heat mitigation + cow comfort improve dairy yields.
8. Explain how traceability and data interoperability support biosecurity.
9. Give three examples of circular practices in dairy or poultry.
10. Discuss trade-offs between scale economies and rural employment.
11. Explain how early-warning sensors change herd/flock health strategy.
12. Contrast core risk profiles in dairy vs. poultry.

VI. Five Marks Descriptive Questions

1. Critically evaluate extensive, semi-intensive, and intensive systems for efficiency, environmental footprint, and resilience.
2. Develop a key performance indicators (KPI) dashboard for a 200-cow dairy herd and justify each metric’s decision value.
3. Propose a circular-economy plan for a dairy farm integrating biogas, fertilizer, and water recycling.
4. Draft a comprehensive biosecurity SOP for a 30,000-bird layer farm.
5. Compare robotic milking vs. conventional parlour systems on welfare, labour, and economics.
6. Construct a heat-stress mitigation blueprint for a tropical dairy using housing and management tools.
7. Assess consolidation’s impact on market power, risk distribution, and employment in dairy.
8. Build a risk register for avian influenza with monitoring, response, and recovery steps.
9. Evaluate the role of AI/computer vision in PPF for early respiratory disease detection.
10. Synthesize a sustainability roadmap that balances productivity, welfare, and climate targets across dairy and poultry.

12.3. A. Apiculture
12.3. B. Lac Culture
12.3. C. Sericulture

I. Multiple Choice Questions

1. The scientific name of Indian honey bee is:
   a. Apis mellifera
   b. Apis dorsata
   c. Apis cerana indica
   d. Apis florea

2. The rearing of honey bees is called:
   a. Sericulture
   b. Pisciculture
   c. Apiculture
   d. Horticulture

3. Lac is produced by which insect?
   a. Silkworm
   b. Butterfly
   c. Lac insect
   d. Honey bee

4. The scientific name of lac insect is:
   a. Bombyx mori
   b. Drosophila
   c. Apis indica
   d. Kerria lacca

5. Silk is obtained from:
   a. Worm
   b. Bee
   c. Larva of silkworm
   d. Adult moth

6. Which of the following is a bivoltine silkworm?
   a. Desi race
   b. Multivoltine race
   c. Hybrid race
   d. Foreign race

7. The queen bee is responsible for:
   a. Laying eggs
   b. Collecting nectar
   c. Guarding hive
   d. Making honey

8. Lac cultivation is mainly practiced in:
   a. Desert areas
   b. Coastal areas
   c. Forest areas
   d. Mountain areas

9. The main host plant of lac insect is:
   a. Mango
   b. Wheat
   c. Palas
   d. Rice

10. Cocoon is formed during which stage of silkworm?
   a. Egg
   b. Larva
   c. Pupa
   d. Adult

II. Fill in the Blanks

1. The first truly movable frame hive was developed in 1851 by _____, based on the discovery of the "bee space" principle.
2. The Indian bee species commonly used for beekeeping in South India, for which the "Newton hive" was designed, is _____.
3. A honey bee colony consists of three distinct castes: a single fertile queen, a few hundred drones, and several thousand _____.
4. _____ are the only male members of the bee colony, and their sole function is to mate with the queen.
5. In sericulture, the specialized glands in silkworm larvae that secrete liquid silk are known as _____ glands.
6. The specific type of silkworm that produces the vast majority of the world's commercial silk is _____.
7. _____ is a viral disease in silkworms characterized by the larvae becoming fragile, yellow, and leaking milky fluid.
8. The _____ fly is a severe endo-larval parasitoid that causes significant damage to silkworm crops by laying eggs on the larvae.
9. To prevent the entry of pests like the uzi fly, rearing houses should be fitted with _____ on doors and windows.
10. A chemical trap used to attract and kill uzi flies in the rearing house involves dissolving a specialized _____ in water.

II. One Mark Questions

15. Rearing of bees →
2. Rearing of silkworm →
3. Rearing of lac insect →
4. Scientific name of silkworm →
5. Product obtained from bees →
6. Product obtained from lac insect →
7. Stage producing silk →
8. Female bee →
9. Lac insect host plant →

10. Silk thread extraction process →

III- Two Marks Descriptive Questions

1. Define apiculture.
2. What is lac culture?
3. Define sericulture.
4. Name two species of honey bees.
5. What are the products obtained from bees?
6. Mention two host plants of lac insect.
7. What is cocoon?
8. What is brood in apiculture?
9. What is meant by voltinism in sericulture?
10. What is the importance of lac?

IV. Three Marks Descriptive Questions

1. Explain the different types of honey bees used in apiculture.
2. Describe the life cycle of lac insect.
3. Explain the process of silk production in brief.
4. Discuss the economic importance of apiculture.
5. Explain the role of host plants in lac culture.

V. Five Marks Descriptive Questions

1. Describe the structure and organization of a bee colony.
2. Explain the life cycle of silkworm with diagram.
3. Discuss in detail the methods of lac cultivation and processing.
4. Explain the steps involved in scientific beekeeping.
5. Describe the importance, production process, and uses of silk in detail.

Module XIII: Extension Approaches and Agri-Entrepreneurship Development
13.1. Soft Skills for Agri-Input Dealers
(1. Communication Skills, 2. Negotiation, 3. Motivation, 4. Counselling, 5. Stress Management)

I. Multiple Choice Questions

1. Which of the following is **not** an element of the communication process?
   a. Encoding
   b. Channel
   c. Transaction cost
   d. Feedback

2. The most common first point of contact for farmers when seeking input advice is:
   a. Scientists
   b. Input dealers
   c. Media
   d. Extension officers

3. The process of reaching a mutually acceptable agreement between two parties is called:
   a. Counselling
   b. Negotiation
   c. Motivation
   d. Communication

4. Which type of motivation arises from within the individual and provides satisfaction?
   a. Extrinsic motivation
   b. Intrinsic motivation
   c. Financial motivation
   d. Induced motivation

5. When a farmer buys seeds on credit and the dealer sets repayment conditions, this is an example of:
   a. Counselling
   b. Stress management
   c. Negotiation
   d. Persuasion

6. Distress refers to:
   a. Positive stress that motivates action
   b. Negative stress causing anxiety and health issues
   c. Normal stress in work
   d. Stress-free condition

7. The 4 A's of stress management include all except:
   a. Avoid
   b. Alter
   c. Adapt
   d. Accelerate

8. Active listening, empathy and confidentiality are essential skills for:
   a. Communication
   b. Counselling
   c. Negotiation
   d. Motivation

9. Persistence in motivation refers to:
   a. Taking the first step
   b. Maintaining effort despite obstacles
   c. Getting rewards
   d. Stopping after failure

10. Input dealers can act as para-extension professionals primarily by:
   a. Supplying cheaper inputs
   b. Giving expert advice and building trust
   c. Advertising new products
   d. Avoiding competition

III. Fill in the Blanks

1. Agriculture supports the livelihoods of nearly _____ percent of the Indian population.
2. The recommended standard ratio for extension agents to farmers is _____.
3. Communication is defined as a _____ information-sharing process where both parties gain a common understanding.
4. In the communication process, the sender must _____ their idea by translating it into a message using words or symbols.
5. _____ is a negotiation category where participants view each other as enemies and the goal is to win or lose.
6. The three mechanisms that maintain motivation are activation, persistence, and _____.
7. _____ motivation refers to internal satisfaction, such as the creative instinct, rather than external rewards like money.
8. Positive, helpful, and motivating stress that improves performance is known as _____.
9. The "4 As" of stress management are Avoid, Alter, _____, and Accept.
10. The first stage of the counseling process is _____, which focuses on building a relationship with the farmer.

II. One Mark Questions

1. The process of converting ideas into messages is called?
2. Motivation that comes from external rewards is called?
3. Which stress type is considered positive?
4. Name the first step in the counselling process?
5. What is the feedback in communication?

III. Two Marks Descriptive Questions

1. Define communication in the context of agri-input dealers.
2. Differentiate between intrinsic and extrinsic motivation with examples.
3. What is the importance of feedback in communication?
4. Write two reasons why stress management is important for input dealers.

5. Mention two essential negotiation skills required for input dealers.

IV. Three Marks Descriptive Questions

1. List and explain three elements of the communication process.
2. Why are negotiation skills important for agri-input dealers?
3. Explain the three components of motivation with examples.
4. Differentiate between eustress and distress with one example each.
5. Write three counselling skills necessary for input dealers.

V. Five Marks Descriptive Questions

1. Discuss the role of input dealers as para-extension professionals in Indian agriculture.
2. Explain the process of communication with suitable examples relevant to farmers and dealers.
3. Describe the stages of counselling process in dealing with farmers.
4. Discuss the 4 A's of stress management with practical examples
5. Write in detail about the importance of motivation skills for input dealers to encourage adoption of new technologies.

13.2. Market-led Extension: Meaning, Role of Input dealers in promoting forward and backward linkages of farmers

I. Multiple Choice Questions

1. Forward linkages in agriculture refer to:
   a. Connecting farmers to input suppliers
   b. Connecting farmers with processors, retailers, exporters etc.
   c. Improving seed quality
   d. Reducing production cost

2. Which initiative helps farmers with real-time market price discovery in India?
   a. e-NAM
   b. RABI
   c. Pradhan Mantri Kisan Samman Nidhi
   d. Crop Insurance

3. Which scheme under the Government of India supports setting up of collection / processing centres for both perishable and non-perishable produce?
   a. MNREGA
   b. Scheme for Creation of Backward & Forward Linkages (MoFPI)
   c. National Food Security Mission
   d. Soil Health Card

4. Market intelligence in market-led extension includes:
   a. Knowledge of local pest control methods only
   b. Information on buyer preferences, quality standards, market price trends
   c. Input supplier locations only
   d. Only government policy

5. A role of input dealers in market-led extension would be:
   a. Only selling inputs without advice
   b. Advising farmers on what varieties buyers want, helping with grading / packaging etc.
   c. Restricting information to prices in local mandis only
   d. Ignoring forward markets

6. "Self Help Groups (SHGs)" or farmer groups are useful in market-led extension because:
   a. They reduce need for extension agents
   b. They help with collective marketing, aggregation, bargaining power
   c. They focus only on credit, not markets
   d. They replace input dealers

7. E-extension tools such as SMS, mobile apps etc. support market-led extension by:
   a. Eliminating face-to-face contact entirely
   b. Providing updated market / quality information & reminders to farmers
   c. They focus only on credit, not markets
   d. Only for input orders

8. Which of the following is an example of forward linkage?
   a. Fertilizer supplier to farmer
   b. Farmer selling produce to processing unit
   c. Seed certification agency
   d. Input company producing biofertilizer

9. Which agency helps in establishing backward & forward linkages for farmers in India?
   a. Small Farmers Agribusiness Consortium (SFAC)
   b. Post Office
   c. Ministry of Culture
   d. Department of Transport

10. Which of the following is a disadvantage of market-led extension for small farmers?
   a. Requires higher standards (quality, packaging) which can increase cost
   b. Always yields more profit
   c. No risk involved
   d. Less need for advisory

III. Fill in the Blanks

1. Market-Led Extension aligns production and advisory services with _____, emphasizing profitability and sustainability.
2. Unlike traditional models, MLE integrates _____, agribusiness principles, and value chain perspectives into extension delivery.
3. In production-led extension, the farmer's role is often that of a _____ of technology.
4. Information flow in Market-Led Extension is _____, meaning market signals and consumer demands feed back into production decisions.
5. _____ linkages involve the dealer supplying timely and suitable inputs, such as specific varieties that match buyer requirements.
6. Connecting farmers with traders, processors, or retailers and assisting with aggregation and packaging is known as promoting _____ linkages.
7. Input dealers can help small farmers meet buyer volume requirements by facilitating _____ and collective marketing.
8. To mitigate the challenge of poor infrastructure, dealers can partner with government schemes such as _____ to set up cold chains or pack houses.
9. Market-Led Extension shifts the focus from "produce more" to "_____".
10. One of the first steps in the suggested framework for input dealers is to assess _____ by talking to local processors and retailers.

II. Two Marks Descriptive Questions

1. Define forward linkage in agricultural value chains.
2. What is market intelligence ?
3. Name two challenges small farmers face under market-led extension.
4. What is the meaning of grading and packaging in produce marketing?
5. Mention any two government schemes in India that support backward & forward linkages in agriculture

III. Three Marks Descriptive Questions

1. Explain how input dealers can use market intelligence to guide farmers' crop decisions.
2. Describe the role of aggregation (through FPOs or groups) in improving farmers' bargaining power.
3. What are the differences between production-led extension vs market-led extension?
4. List and briefly explain three traits quality that buyers typically look for in produce.
5. How can digital tools (SMS / WhatsApp / Apps) aid in market-led extension?

IV. Five Marks Descriptive Questions

1. Discuss in detail how input dealers can facilitate post-harvest handling practices to reduce losses and improve marketability.

2. Critically analyze the pros and cons of contract farming for both farmers and input dealers.
3. Outline a plan for an input dealer to build forward linkages in a region where cold storage infrastructure is weak.
4. Explain how input dealers can adapt extension messages & methods to align with buyer preferences (variety, quality, timing) in perishable crops.
5. Describe the steps involved in establishing an effective market intelligence system at the input dealer level.

13.3. Extension Methods such as Training, Demonstration, Exhibition, Kisan melas (purpose and procedure for organising each methods)

I. Multiple Choice Questions

1. The three main categories of extension methods are:
   a. Visual, Oral, and Written
   b. Technical, Social, and Cultural
   c. Individual, Group, and Mass
   d. Practical, Theoretical, and Experimental

2. Which method involves personal contact between the extension worker and the farmer?
   a. Individual method
   b. Group method
   c. Mass method
   d. Demonstration method

3. A "Method Demonstration" aims to:
   a. Show results of new practices
   b. Promote government schemes
   c. Collect feedback from farmers
   d. Teach the steps of a particular practice

4. "Result Demonstration" helps in:
   a. Showing comparative results of new and traditional practices
   b. Building personal rapport
   c. Promoting input sales
   d. Conducting surveys

5. "Field Days" and "Study Tours" belong to:
   a. Individual methods
   b. Mass methods
   c. Group methods
   d. ICT methods

6. Example of a mass extension method is:
   a. Farm visit
   b. Training workshop
   c. Exhibition or campaign
   d. Farmer's call

7. A key advantage of group methods is:
   a. Helps in collective learning and cooperation
   b. Requires less facilitation
   c. Suitable for one-to-one advice
   d. Used only by scientists

8. The limitation of mass media methods is:
   a. Lack of personal interaction
   b. Too costly
   c. Requires physical meetings
   d. Covers only few farmers

9. "Adaptive Trials" are used when:
   a. Practices are well established
   b. Local adaptation is required
   c. No participation is needed
   d. Extension workers work alone

10. Effective extension for agri-input dealers primarily requires:
   a. Selling more products
   b. Using only digital tools
   c. Avoiding follow-up
   d. Building credibility and farmer trust

II. Fill in the Blanks

1. Extension methods are the organized and systematic _____ used by extension workers to communicate new ideas and technologies to farmers.
2. According to Kelsey and Hearne (1949), extension teaching methods help people learn by seeing, hearing, and _____.
3. Extension methods aim to bring desirable changes in the knowledge, attitudes, and _____ of farmers.
4. Wilson and Gallup (1955) classified extension teaching methods according to their _____ and form.
5. Farm and Home Visit is an example of _____ contact method of extension.
6. Result demonstration involves comparison between improved practices and _____ practices.
7. Group methods promote participation, discussion, and _____ learning among farmers.
8. Mass methods are mainly used to create _____ among a large and geographically dispersed audience.

9. Radio and television are examples of _____ methods of extension communication.
10. The combined use of individual, group, and mass methods is known as the _____ approach

III. Two Marks Descriptive Questions

1. Define "Extension Methods."
2. List any three objectives of using extension methods.
3. Give two examples each of individual, group, and mass methods.
4. What is the purpose of method demonstration?
5. Mention any two limitations of mass methods.
6. Write two advantages of farm and home visits.
7. State any two principles of effective communication in extension.

IV. Three Marks Descriptive Questions

1. Differentiate between method demonstration and result demonstration.
2. Explain the role of agri-input dealers as extension agents.
3. Describe the key advantages and limitations of group methods.
4. Write a short note on "Extension Methods Mix."
5. How do exhibitions and campaigns help in farmer education?
6. Compare individual, group, and mass methods on the basis of coverage, cost, and feedback.
7. What is the importance of participatory approaches in extension?

V. Five Marks Descriptive Questions

1. Discuss the classification of extension methods with suitable examples.
2. Describe in detail the individual methods and their advantages and limitations.
3. Explain the group methods with examples like demonstrations, field days, and study tours.
4. Evaluate the role of mass media in agricultural extension and awareness generation.
5. "An integrated approach ensures maximum adoption." — Discuss with examples.
6. Outline the major challenges faced by agri-input dealers in extension work and suggest solutions.
7. Elaborate on the key principles of good extension practices for technology dissemination.
8. Explain how communication skills enhance the effectiveness of extension methods.
9. Discuss the role of ICT tools in strengthening modern agricultural extension.
10. Write a detailed note on the importance of result demonstrations and how they influence farmer decision-making.

13.4. Agricultural Entrepreneurship: Opportunities and Challenges

I. Multiple Choice Questions

1. Agricultural entrepreneurship refers to:
   a. Starting innovative agri-based business
   b. Farming only
   c. Government jobs
   d. Teaching agriculture

2. Which of the following is an agri-entrepreneurial activity?
   a. Crop cultivation only
   b. Banking
   c. Teaching
   d. Dairy farming

3. The main aim of agricultural entrepreneurship is:
   a. Profit only
   b. Employment generation
   c. Innovation and value addition
   d. All of the above

4. Value addition in agriculture means:
   a. Increasing cost
   b. Processing and improving product value
   c. Reducing production
   d. None

5. Which of the following is a challenge in agri-entrepreneurship?
   a. Easy market access
   b. Lack of finance
   c. High profits
   d. Skilled labor availability

6. Startup India scheme supports:
   a. Large industries
   b. Small businesses
   c. Entrepreneurs
   d. Government employees

7. Which sector provides maximum rural employment
   a. IT sector
   b. Agriculture
   c. Banking
   d. Transport

8. Agri-processing industries help in:
   a. Reducing value
   b. Increasing wastage
   c. Increasing shelf life
   d. None

9. Which is an example of agri-startup?
   a. Organic farming business
   b. Food delivery app
   c. Taxi service
   d. Coaching center

10. Risk in agriculture is mainly due to:

a. Weather
b. Stable market
c. Government support
d. Technology

III. Fill in the Blanks

1. As of 2025, India has the _____ largest start-up ecosystem in the world.
2. Between 2019-20 and 2024-25, 1,943 agri start-ups received support under the _____ (RKVY) scheme.
3. Agripreneurship is projected to create _____ million jobs in India by 2030.
4. The goal for women-led agri-ventures is to reach _____ percent by the year 2030.
5. _____ are organizations that can be strengthened using the Cluster-Based Business Organisation (CBBO) model.
6. One of the major challenges for agri-startups is the lack of _____, which includes poor roads and inadequate cold storage.
7. The process of adding value to raw agricultural products to increase their shelf life and market value is known as _____.
8. To address climate change, agripreneurs are encouraged to use "green practices" such as _____ and water-saving irrigation.
9. A significant opportunity for agri-entrepreneurs lies in _____, which involves the use of drones, IoT, and AI in farming.
10. DAESI participants play a pivotal role by acting as _____ for farmers to help them adopt entrepreneurial practices.

II. One Mark Questions

1. Starting a new business →
2. Agri-based business person →
3. Increasing product value →
4. Government startup support →
5. Uncertainty in farming →
6. Selling products directly →
7. New idea or method →
8. Financial assistance →
9. Skill development program →
10. Processing agricultural products →

VI. Two Marks Descriptive Questions

1. In India _____ (46 / 75) percent of population in India is dependent on agriculture, start-ups emerging in the domain of agriculture is on minimum side
2. Indian Start-up ecosystem is _____ (Third / Fourth) largest in the world
3. What is agripreneurship?
4. How is an agripreneur different from a traditional farmer?
5. Why is agripreneurship important for India’s rural economy?

6. How does agripreneurship help in generating employment?
7. What role can DAESI participants play in promoting agripreneurship?
8. Name two examples of off-farm agripreneurial activities.
9. How does food processing benefit farmers and agripreneurs?
10. What is the meaning of the digital divide in agriculture? How it is important in agriculture?

IV. Three Marks Descriptive Questions

1. What are the major financial challenges faced by agripreneurs?
2. How does lack of infrastructure affect agribusiness?
3. What is the role of FPOs (Farmer Producer Organizations) in agripreneurship?
4. How can agripreneurship reduce rural to urban migration?
5. Why is skill development important in agriculture today?
6. What kind of support is offered under the PMFME scheme by MoFPI?
7. Mention one successful agripreneurship model or start-up from the chapter.

V. Five Marks Descriptive Questions

1. Explain agricultural entrepreneurship and its importance in rural development.
2. Discuss various opportunities available in agri-entrepreneurship.
3. Explain the major challenges faced by agri-entrepreneurs and suggest solutions.
4. Describe the role of agri-processing and value addition in increasing farmer income.
5. Discuss government schemes and policies supporting agricultural entrepreneurship in India.

13.5. A. Financial Management: Budgeting, Cost Analysis, and Record Keeping
13.5. B. Tapping into Credit: Understanding Agricultural Financing Options
13.5. C. The Importance of Record Keeping for Agri- Input Dealers: Best Practices and Benefits

I. Multiple Choice Questions

1. What is the main purpose of budgeting in a farm business?
   a. Maximizing land use
   b. Applying new technology
   c. Predicting weather patterns
   d. Estimating costs, returns, and profits

2. Which type of budgeting estimates the profitability of a few modified operations?
   a. Enterprise budgeting
   b. Complete budgeting
   c. Partial budgeting
   d. Break-even budgeting

3. When marginal cost is less than average cost, average cost is:
   a. Rising
   b. Constant
   c. Falling
   d. Zero

4. Break-even point occurs when:
   a. Marginal cost = Marginal revenue
   b. Total cost = Total revenue
   c. Average variable cost = Price
   d. Fixed cost = Variable cost

5. Which of the following records provides details of day-to-day farm operations?
   a. Inventory record
   b. Daily labor record
   c. Input-output record
   d. Production record

6. The record which helps to evaluate financial status of farm business is:
   a. Balance sheet
   b. Labor chart
   c. Weather record
   d. Input schedule

7. What type of loan is given to help farmers avoid distress sale of produce?
   a. Consumption loan
   b. Marketing loan
   c. Investment loan
   d. Production loan

8. What is the maximum interest rate for Differential Interest Rate (DIR) loans?
   a. 7%
   b. 6%
   c. 4%
   d. 11%

9. Which document helps track how much stock remains in the shop?
   a. Daily cash book
   b. Purchase register
   c. License file
   d. Stock register

10. What does a credit and payment register help in tracking?
    a. Seed variety
    b. Dues from customers
    c. Insect control
    d. Rainfall

II. Fill in the Blanks

1. Farm budgeting is defined as the expression of a farm plan in _____ terms by estimating receipts, expenses, and net income.
2. A _____ budget is used to estimate the costs and returns for a specific single activity, such as one acre of paddy or a single dairy unit.
3. The process of evaluating the profitability of a specific change in the farm plan, rather than the whole farm, is called _____ budgeting.
4. Total cost is the sum of _____ costs (which do not change with output) and variable costs (which change with the level of production).

5. The _____ is the point where the total revenue equals the total cost, meaning the farm is neither making a profit nor a loss.
6. _____ costs are "hidden" costs, such as the value of the farmer's own labor or the rental value of their own land.
7. A _____ is a physical record that tracks the quantity of items like seeds, fertilizers, and chemicals currently in storage.
8. Maintaining a _____ allows a farmer to track every rupee coming in and going out, ensuring they know their daily cash position.
9. _____ is the loss in value of farm assets (like tractors or sprayers) over time due to wear and tear.
10. One of the major benefits of record keeping for farmers is that it serves as valid documentation when applying for _____ and crop insurance.

III. One Mark Questions

1. Name the budgeting technique used to assess small changes in farming.
2. Name the budgeting type used for the whole farm.
3. What type of cost includes both fixed and variable components?
4. Which bank regulates rural credit and refinancing in India?
5. Which type of credit is used for buying seeds and fertilizers?
6. What is the maximum interest rate under DIR loans?
7. What is the document that tracks all items sold by a dealer?
8. Name the register that records purchases made by the dealer.
9. Which device is often used to back up digital records?
10. What is the term for unsold products that may expire soon?

IV. Two Marks Descriptive Questions

1. Distinguish between Average Cost and Marginal Cost.
2. Write a short note on enterprise budgeting.
3. Write two functions of Regional Rural Banks (RRBs).
4. What is the importance of maintaining a stock register?
5. What is the role of inventory records in minimizing losses?
6. Distinguish between direct and indirect loans.
7. How do co-operative banks support small farmers?
8. How does record keeping help during inspections by regulatory authorities?

V. Three Marks Descriptive Questions

1. Explain the components of a complete farm budget.
2. Differentiate between fixed cost, variable cost, and total cost
3. Explain the importance of cost analysis in farm planning.
4. Draw and explain the relationship between AC and MC.
5. What is meant by cash flow budgeting? How is it useful?

6. State the limitations of budgeting in agriculture.

VI. Five Marks Descriptive Questions

1. Discuss the classification of agricultural credit based on approach and contact.
2. Discuss the significance of credit in improving agricultural productivity and farmer livelihoods.
3. Explain how record keeping supports compliance with FCO and other regulations.
4. How does record keeping enhance the professionalism and reputation of an agri-input dealer?
5. Prepare a simple partial budget for a farm decision.

Module XIV: Business Ethics and Regulation

14.1. Seed Act, 1966; Seed Rules, 1968, Seed Control Order, 1983

I. Multiple Choice Questions

1. In Seed Act 1966 number of sections
   a. 35 b. 15
   c. 25 d. 39

2. How many sections are in E.P Act 1986
   a. 25 b. 26
   c. 35 d. 30

3. How many clauses are in the Seed control order 1983
   a. 15 b. 17
   c. 39 d. 25

4. How many rules are in seed rules 1968
   a. 38 b. 25
   c. 39 d. 18

5. Reanalysis charges of seed sample
   a. 1500 b. 100
   c. 50 d. 200

6. if offence is proved for the first time the penalty of fine
   a. Rs. 1,500 b. Rs. 50
   c. Rs. 500 d. Rs. 5,000

7. If offence proved for second time the penalty of imprisonment
   a. 3 years b. 2 years
   c. 6 months d. None

8. The validity of seed license is
   a. 2 years b. 3 calendar years
   c. 5 years d. None

9. The grace period after validity of license
   a. 1 month
   b. 2 months
   c. 1 year
   d. None

10. Types of offences
   a. One
   b. Two
   c. Three
   d. None

II. Fill in the Blanks

1. The Seeds Act of 1966 consists of _____ sections that regulate the quality and sale of notified varieties.
2. Under the Act, "Seed Quality" is measured by several characteristics, including genetic purity, physical purity, germination, and _____.
3. Crop varieties are notified by the State and Central Government after consultation with a specific _____.
4. According to Section 7 of the Act, no person can sell a notified variety unless it is identifiable as to its _____.
5. Every container of a notified variety must carry a label that specifies the _____ limits of germination and purity.
6. A _____ is an official appointed to check if the seed quality matches the standards mentioned on the label.
7. If an Inspector takes a seed sample for analysis, one sample is sent to the laboratory, one is kept as a referee/guard sample, and one is delivered to the _____.
8. A _____ notice (Form III) is issued by an Inspector when rectifiable defects are found in the seed stock.
9. For a first-time offense under the Seed Act, the penalty is a fine of up to _____ rupees.
10. Under Section 24, a _____ is exempted from the Seed Act when delivering their own grown seed to another for sowing purposes.

14.2. Insecticide Act, 1968; Insecticide Rules, 1971

I. Multiple Choice Questions

1. The main primary objective of the Insecticides Act, 1968, is—
   a. Increase pesticide exports
   b. Promote chemical industries
   c. Prevent risks to humans, animals, and the environment
   d. Import banned insecticides

2. Which ministry administers the Insecticides Act, 1968?
   a. Ministry of Chemicals and Fertilizers
   b. Ministry of Environment
   c. Ministry of Agriculture and Farmers Welfare
   d. Ministry of Health

3. The Insecticides Act was enacted in and enforced from:
   a. 1969; 1973
   b. 1968; 1971
   c. 1971; 1972
   d. 1970; 1974

4. What must a dealer have to legally sell insecticides?
   a. A business registration certificate
   b. A valid license with conditions
   c. A letter from a pesticide manufacturer
   d. No documents are required.

5. What type of records must dealers maintain under Rule 15?
   a. Only purchase bills
   b. Sales, purchases, and stock of insecticides
   c. Employee attendance records
   d. Transport documents only

6. How must insecticides be stored according to the Act and Rules?
   a. In any available space
   b. Together with food products
   c. Safely to prevent risks to humans and the environment
   d. Where they are least visible

7. What should dealers do with empty insecticide containers?
   a. Throw them in the trash.
   b. Sell them to recyclers without cleaning
   c. Dispose of them safely and as per Rule 44.
   d. Keep them indefinitely in the shop

8. What emergency items must dealers keep in stock under Rule 39?

a. Fire extinguishers only
b. Antidotes and first-aid materials
c. Extra insecticide stock
d. Food and water supplies

9. Who is authorized to inspect insecticide dealers' premises and records?

a. Government Inspectors under Sections 21 & 22
b. Local police only
c. Any customer
d. Shop employees only

10. What is the penalty for violating the Insecticides Act?

a. Only a warning letter
b. No penalty if first offense
c. Community service only
d. Imprisonment, fines, or both, depending on offense severity

11. What training is mandatory for personnel handling insecticides?

a. No training needed
b. Marketing training only
c. Basic safety and emergency procedures training
d. Computer skills training

12. What does Section 13 of the Act deal with?

a. Central Lab setup
b. Label design
c. Licensing of dealers
d. Packaging standards

13. Under Rule 40, what is required of personnel involved in insecticide handling and sale?

a. No special training required
b. Only supervisors need training
c. Must have a university degree in agriculture
d. Must be trained in safety, product knowledge, and emergency procedures

14. What action can inspectors take under Sections 21 & 22 regarding dealers?

a. Only request voluntary cooperation
b. Inspect only during business hours on weekends
c. Inspect only after 24 hours' notice
d. Enter premises, inspect records, take samples, and seize insecticides if necessary

15. Section 29 of the Act relates to:

a. Storage and transport
b. Cancellation of licenses
c. Penalties for offenses
d. Registration of products

II. Fill in the Blanks

1. Although titled the "Insecticides Act," the legislation actually covers all categories of _____, including fungicides, herbicides, and rodenticides.
2. The Act was largely prompted by a 1965 incident where insecticides accidentally contaminated the _____, causing a major public health hazard.
3. Every person or firm intending to sell or distribute pesticides must obtain a valid _____ from the Licensing Officer.
4. Pesticide stock must be stored in a separate room that is well-ventilated, dry, and away from _____ or animal feed.
5. Under the Act, dealers are required to maintain a _____ (Form XIII) to track the daily receipt and sale of pesticides.
6. A _____ is an official authorized to enter premises, inspect stocks, and take samples for quality testing.
7. To prevent accidental poisoning, every pesticide container must have a _____ and a leaflet containing instructions for safe use.
8. Expired or banned pesticides are considered "misbranded" and must be disposed of in a manner that prevents _____ contamination.
9. The _____ program, conducted by MANAGE, is a recognized training initiative that equips dealers with the knowledge needed for licensing.
10. Strict compliance with these rules helps pesticide dealers act as a critical link in safeguarding _____, environmental protection, and agricultural sustainability.

II. One Mark Questions

1. How many sections are there in the Insecticides Act, 1968?
2. In which year were the Insecticides Rules notified
3. What type of insecticides are prohibited under Section 17?
4. What two types of materials must be available in dealer shops as per Rule 39?
5. What must dealers maintain according to Rule 15?
6. What must be safely disposed of under Rule 44?
7. Where must insecticides be stored according to Rule 29?
8. What can inspectors take under Sections 21 & 22 for testing?

III. Two Marks Questions

1. What is the purpose of provisional registration introduced by the Insecticides (Amendment) Act, 1977?
2. Mention any three key responsibilities of insecticide inspectors under the Act.
3. Explain the role of Rule 40 in ensuring safety in pesticide handling.
4. Why is proper labeling and packaging (Rules 16–20) of insecticides important?
5. What are the legal penalties under Section 29 of the Act for violations?

6. What does Section 17 of the Act prohibit?
7. Under which rule is the disposal of used containers regulated?
8. What is the function of the Central Insecticides Board?
9. Who has the authority to issue dealer licenses?
10. What does Rule 15 require dealers to maintain?
11. What type of training is mandated under Rule 40?
12. What is the purpose of the Central Insecticides Laboratory (Section 16)?
13. Mention the penalties of seed Act 1966.
14. Mention about the classes of seed with colour of the tags.
15. Mention the important sections of the seed Act 1966.
16. What is the seed quality.
17. What are the seeds used for sowing or planting in respect of notified kind or variety.

III. Three Marks Descriptive Questions

1. Wright about seed varieties notification.
2. Wright about the important sections of Seed Act 1966.
3. Write about the seed certification.
4. Write about the classes of seeds.
5. Write about the suspension / cancellation of seed license and appeal.

IV. Five Marks Descriptive Questions

1. Write about the documents required for grant of seed license.
2. Write about the maintenance of the out let, records to be maintained after grant of seed license.
3. Write about the powers of seed inspector.
4. What are the types of offences in seed Act, administrative action and judiciary provisions?

14.3. A. Fertilizer Control Order, 1985; Fertilizer Movement and Control Order (FMCO), 1973; Fertilizer Amendment Order, 2002/2023.

I. Multiple Choice Questions

1. FCO was issued for the first time in the year

   a. 1973 b. 1985
   c. 1957 d. 1955

2. FMCO was issued in the year

   a. 1985 b. 1973
   c. 1957 d. 2002

3. How many clauses are existing in FCO 1985
   a. 04 b. 39
   c. 35 d. 23

4. The fees required for retail C.R.
   a. Rs. 2,500 b. Rs. 1,500/-
   c. Rs. 5,000/- d. Rs. 4,500/-

5. Contravention provision of a sample declared nonstandard.
   a. cl.8 b. cl.28
   c. cl.7 d. cl.19

6. Penal provision in FCO 1985 r/w EC Act. 1955.
   a. Sec 7 b. Sec 3
   c. Sec 29 d. Sec 19

7. The powers of fertilizer inspector given in clause.
   a. cl.14 b. cl.28
   c. cl.21 d. cl.31

8. The certificate of registration can be suspended for maximum period of.
   a. 30 days b. 21 days
   c. 15 days d. 10 days

9. The stop sale notice can be given for a period of.
   a. 20 days b. 15 days
   c. 21 days d. None

10. The duration of certificate of registration is.
    a. 3 years b. 2 years
    c. 5 years d. 4 years

II. Fill in the Blanks

1. The Fertilizer Control Order (FCO) was evolved from Section 3 of the _____ Act of 1955 to regulate the movement and quality of chemical fertilizers.
2. Fertilizer was first notified as an _____ commodity in 1957.
3. The primary objective of the _____ Movement and Control Order (1973) is to ensure that fertilizers are distributed fairly across different states and regions.
4. Under the Fertilizer Amendment Order of 2002/2023, the government introduced regulations for _____ fertilizers, which are customized to specific soil health needs.

5. In the _____ system, the fertilizer subsidy is released to the manufacturer only after the actual sale is made to the farmer through an e-POS device.

III. Two Marks Descriptive Questions

1. How many types of offences are in F.CO 1985 and what are they? With examples.
2. Write about the back ground of F.C.O 1985.
3. What are the important clauses in F.C.O 1985?
4. Who are the persons competent to stop and seize the fertilizers according to the provisions of F.M.C.O 1973.
5. What is the penalty under section 7 of E.C Act 1955?

IV. Three Marks Descriptive Questions

1. What is the main aim of F.C.O 1985?
2. Types of fertilizers notified by G.O.I.
3. The samples are tested for?
4. The relevant provisions for grant of CR, validity and grace period in brief.
5. Write about the sale of fertilizers in smaller quantities and under which provision?

V. Five Marks Descriptive Questions

1. Write about the documents required for grant of C.R.
2. Write about the records to be maintain by a dealer.
3. Write about the powers of fertilizer inspector and the relevant provision?
4. Write about the procedure of filing a case under section 6 A and subsequent proceedings.
5. Write about the re analysis procedure in case if the sample is declared as nonstandard in the State Laboratory.

14.3. B. DBT in Fertilizers, Sale of Fertilizers through e-POS Machine, Grant of License through Online

I. Multiple Choice Questions

1. DBT in fertilizers stands for:
   a. Direct Benefit Transfer
   b. Direct Bank Transfer
   c. Digital Banking Transaction
   d. Direct Budget Transfer

2. Under DBT, subsidy is given to:
   a. Farmers directly
   b. Fertilizer companies
   c. Dealers
   d. Banks

3. e-POS stands for:
   a. Electronic Point of Sale
   b. Easy Point of Service
   c. Electronic Payment System
   d. Economic Point of Sale

4. e-POS machines are used for:
   a. Economic Point of Sale
   b. Fertilizer sale tracking
   c. Crop harvesting
   d. Irrigation

5. Aadhaar is used in e-POS for:
   a. Loan approval
   b. Weather forecasting
   c. Farmer authentication
   d. Crop insurance

6. Online fertilizer license is issued by:
   a. Banks
   b. Government authority
   c. NGOs
   d. Private firms

7. DBT helps in reducing:
   a. Leakages
   b. Production
   c. Crop yield
   d. Irrigation

8. Sale of fertilizers through e-POS ensures:
   a. Manual entry
   b. Corruption
   c. Delay
   d. Transparency

9. Which scheme uses Aadhaar authentication?
   a. PMFBY
   b. DBT
   c. MGNREGA
   d. KCC

10. Online licensing system helps in:
    a. Increasing paperwork
    b. Faster approval
    c. Delays
    d. Reducing access

II. Fill in the Blanks

1. To purchase subsidized fertilizer, a farmer must provide their _____ number or a valid ID for biometric authentication at the retail shop.
2. The _____ machine is the digital tool used by dealers to record sales, track inventory, and verify farmer identities in real-time.
3. The _____ portal is the online system used in states like Telangana for the grant and renewal of fertilizer licenses.
4. A retail fertilizer license is typically issued by the _____ (ADA) at the divisional or district level.
5. The _____ is a mandatory document (Form O) that dealers must obtain from manufacturers to certify that they are authorized to sell a specific brand of fertilizer.

III. Two Marks Descriptive Questions

1. What is DBT in fertilizers?
2. What is the purpose of e-POS machines?
3. What is Aadhaar authentication?
4. What is online licensing?
5. How does DBT reduce leakages?
6. What are the benefits of e-POS system?
7. What is the role of government in fertilizer subsidy?
8. What is transparency in fertilizer distribution?
9. What is digitization in agriculture?
10. Why is online licensing important?

IV. Three Marks Descriptive Questions

1. Explain the concept of DBT in fertilizers.
2. Describe the working of e-POS machines in fertilizer sales.
3. Explain the importance of Aadhaar authentication in DBT.
4. Discuss the benefits of online licensing system.
5. Explain how DBT improves transparency in subsidy distribution.

V. Five Marks Descriptive Questions

1. Explain the Direct Benefit Transfer (DBT) system in fertilizers and its advantages.
2. Describe the role of e-POS machines in ensuring transparency in fertilizer sales.
3. Discuss the process and importance of online licensing for fertilizer dealers.
4. Explain the impact of digital technologies on fertilizer distribution system.
5. Discuss the challenges and benefits of DBT and e-POS implementation in Indi

14.4. A. Essential Commodity Act, 1955
14.4. B. Consumer Protection Act, 1986; Food Adulteration Act, 1954/1976/2006
14.4. C. APMC Act
14.4. D. Sales Tax / GST

I. Multiple Choice Questions

1. Under the Essential Commodities Act, 1955, what restriction applies to seed dealers?
   a. They can sell seeds loose or packaged
   b. They must sell seeds only in packaged form
   c. They must sell seeds directly to farmers
   d. There are no restrictions on seed sale

2. The 2020 amendment to the ECA allows stock limits only when:
   a. The government feels it's necessary
   b. Traders stockpile excessively
   c. Price rises exceed certain thresholds
   d. Demand increases during harvest

3. Which authority was introduced under the Consumer Protection Act, 2019 to investigate unfair practices?
   a. State Consumer Forum
   b. Consumer Grievance Cell
   c. Central Consumer Protection Authority
   d. National Disputes Commission

4. What type of liability can input dealers face under CPA, 2019 if their product causes crop failure?
   a. Product liability
   b. Moral liability only
   c. No liability
   d. Tax liability

5. Which food law consolidated India's food regulations into a single framework?
   a. Prevention of Food Adulteration Act, 1976
   b. Consumer Protection Act, 1986
   c. Food Safety and Standards Act, 2006
   d. Model APMC Act, 2003

6. According to the FSSA, what is the punishment for selling adulterated food that causes death?
   a. Up to 3 years imprisonment
   b. Life imprisonment + compensation
   c. ₹10 lakh fine
   d. 6 years imprisonmen

7. The Model APMC Act, 2003 encourages which of the following?
   a. Direct marketing between farmers and buyers
   b. Multi-level taxation
   c. Centralized markets only
   d. Farmer subsidies

8. Which act allows farmers to sell their produce anywhere in India without APMC restrictions?
   a. Sales Tax Act
   b. Consumer Protection Act
   c. Farmers' Produce Trade and Commerce Act, 2020
   d. Food Safety Act

9. What is the GST rate on pesticides sold by agricultural input dealers?
   a. 0%
   b. 5%
   c. 12%
   d. 18%

10. Under GST, what is a key benefit for input dealers regarding tax efficiency?
   a. Exemption from filing returns
   b. Uniform rates across states
   c. Input Tax Credit
   d. No need to register

II. Fill in the Blanks

1. The _____ Act (ECA) of 1955 ensures that essential goods like seeds and fertilizers are available at fair prices and helps prevent hoarding.
2. Under the Consumer Protection Act, a penalty of up to _____ lakh rupees can be imposed for "Misleading Advertisements."
3. The _____ Act of 2003 was introduced to reform agricultural marketing by allowing direct marketing between farmers and buyers.
4. In the GST regime, seeds intended for _____ are generally taxed at a rate of 0%.
5. Most chemical fertilizers, such as Urea and DAP, attract a GST rate of _____ percent.
6. The highest GST bracket for agricultural inputs, which includes _____ and herbicides, is 18 percent.
7. Business ethics in the agri-input sector is defined as applying _____ principles and values to guide business decisions.
8. One of the key principles of business ethics is _____, which involves providing factual product information and avoiding false advertising.
9. To maintain fair trade practices, dealers should avoid _____ or black marketing, especially during times of high demand.
10. The _____ (FSSA) of 2006 is the consolidated law that regulates food safety and sets penalties for food adulteration in India.

III. One Mark Questions

1. Which act ensures the availability of fertilizers at fair prices?
2. Who investigates unfair trade practices under CPA, 2019?
3. Which act consolidated India’s food laws in 2006?
4. What replaced sales tax with a unified national system in 2017?
5. Which 2003 act promoted direct farmer-to-buyer sales?

IV. Two Marks Descriptive Questions

1. Explain how the Essential Commodities Act, 1955 regulates agricultural input dealers.
2. What are the key consumer rights introduced under the Consumer Protection Act, 2019?
3. State two major reforms introduced in the Model APMC Act, 2003.
4. Mention any two benefits of GST for agriculture input dealers.
5. How does the Food Safety and Standards Act, 2006 differ from the PFA Acts of 1954 and 1976?

V. Three Marks Descriptive Questions

1. How did the 2020 Amendment to the Essential Commodities Act affect agricultural input dealers?
2. What protections does the Consumer Protection Act, 2019 offer to farmers buying agricultural inputs?
3. What are the major reforms brought by the Food Safety and Standards Act, 2006 compared to previous PFA Acts?
4. Compare the Model APMC Act, 2003 and Farmers' Produce Trade and Commerce Act, 2020 regarding market access and farmer protection.
5. Describe three key GST benefits for agriculture input dealers.

IV. Five Marks Descriptive Questions

1. What is the Essential Commodities Act and what changes were made in 2020?
2. How does the Consumer Protection Act help farmers buying inputs?
3. How have food adulteration laws evolved from 1954 to 2006?
4. What are the goals and benefits of the Model APMC Act?
5. What are the GST benefits for agriculture input dealers?

14.5. Business Ethics

I. Multiple Choice Questions

1. Business ethics refers to:
   a. Profit maximization only
   b. Following moral principles in trade
   c. Aggressive marketing
   d. Legal tricks to avoid taxes

2. A responsible input dealer must:
   a. Hide product side effects
   b. Sell expired products
   c. Inform customers honestly
   d. Avoid giving receipts

3. Ethical conduct in business builds:
   a. Profit loss
   b. Market monopoly
   c. Customer trust
   d. Dependency on others

4. Selling duplicate products is:
   a. Legal
   b. Ethical
   c. Beneficial to farmers
   d. Unethical and illegal

5. Which of the following is an unethical practice?
   a. Providing usage instructions
   b. Hoarding stock
   c. Selling certified seeds
   d. Issuing bills

II. Fill in the Blanks

1. Business ethics involves applying _____ principles and values to guide decisions and behavior in business.
2. In the agri-input sector, ethical conduct ensures that farmers receive _____ inputs, fair advice, and trustworthy service.
3. One of the primary benefits of ethical business is that it builds _____, which creates long-term customer loyalty.
4. To maintain honesty and transparency, a dealer should always give _____ product information and avoid false advertising.
5. In terms of quality and safety, a dealer must ensure they only sell _____ products and avoid expired or fake inputs.
6. A core fair trade practice is to avoid _____ or black marketing, especially during times of high product demand.
7. Under the principle of "Customer Respect & Service," dealers are encouraged to provide guidance in the _____ language of the farmer.
8. To ensure legal compliance, a dealer must follow all _____ norms and prominently display them at their shop.
9. Ethical marketing means promoting products that are _____ backed rather than using pressure-selling tactics.
10. The study material concludes that ethics are the _____ of a sustainable and successful business.

III. One Mark Questions

1. Define business ethics.
2. What is meant by fair trade practice?
3. State one ethical responsibility of an agri-input dealer.
4. What is meant by transparency in business?
5. Name one unethical practice in agri-input trade.

IV. Two Marks Descriptive Questions

1. State two benefits of ethical business practices.
2. Mention any two unethical business practices to be avoided.

3. Write any two principles of business ethics.
4. State two ways to ensure customer satisfaction.
5. Mention two qualities of a responsible agri-entrepreneur.

V. Three Marks Descriptive Questions

1. Explain three important principles of business ethics in agri-input trade.
2. Describe three consequences of unethical behaviour in agri-trade.
3. Mention three practices that build trust with farmers.
4. State three ways to ensure product quality and safety.
5. Differentiate between ethical and unethical marketing (3 points).

VI. Five Marks Descriptive Questions

1. Explain in detail the principles of business ethics in agri-input trade.
2. Describe the responsibilities of agri-input dealers in promoting ethical behaviour.
3. Discuss the impact of ethical practices on long-term business sustainability.
4. Explain with examples the role of transparency and honesty in trade.
5. Describe common unethical practices and their consequences in agri-business.

Module XV: Government schemes related to Agriculture Sector

15.1. Major flagship Schemes of Central/State Governments related to agriculture and allied Sectors- ATMA, e-NAM, RKVY, AIF, PMKSY, PM KISAN, MIDH, NLM, NBHM, PMMSY, etc

I. Multiple Choice Questions

1. The Pradhan Mantri Matsya Sampada Yojana (PMMSY) was launched by which Ministry/Department?
   a. Ministry of Agriculture and Farmers Welfare
   b. Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying
   c. Ministry of Rural Development
   d. Ministry of Finance

2. The Animal Husbandry Infrastructure Development Fund (AHIDF) was launched under which government initiative?
   a. Make in India
   b. Digital India
   c. Atmanirbhar Bharat Abhiyan
   d. Skill India Mission

3. The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) is primarily focused on enhancing which aspect at the farm level?
   a. Soil testing frequency
   b. Crop insurance coverage
   c. Water use efficiency through Micro Irrigation
   d. Seed multiplication rate

4. What is the annual financial assistance provided to eligible landholding farmer families under the PM-KISAN SAMMAN scheme?
   a. ₹2,000
   b. ₹6,000₹6,000
   c. ₹4,000
   d. ₹10,000

5. What is the total corpus of the Agriculture Infrastructure Fund (AIF)?
   a. ₹50,000 crore ₹1 lakh crore
   b. ₹1 lakh crore
   c. ₹2 lakh crore
   d. ₹5 lakh crore

6. The PM-KUSUM scheme supports farmers in installing which type of pump to reduce reliance on diesel?
   a. Electric submersible pumps
   b. Manual hand pumps
   c. Solar irrigation pumps
   d. Wind-powered pumps

7. The PM-FME scheme promotes regional specialization through which concept?
   a. One Village One Product
   b. One District One Product (ODOP)
   c. One Block One Cluster
   d. One State One Brand

8. Under the PMMSY, what was the percentage of financial assistance received by Mr. Kapil Talwar for his Biofloc fish farming unit?
   a. 25%
   b. 40%
   c. 50%
   d. 60%

9. Which component of PMKSY specifically focuses on efficient program management, precision irrigation, and micro/secondary storage structures?
   a. PDMC (Per Drop More Crop)
   b. Har Khet Ko Pani
   c. AIBP
   d. Watershed Development

10. The National Livestock Mission (NLM) was launched by which Department?
   a. Department of Dairy Development
   b. Department of Animal Husbandry & Dairying
   c. Department of Rural Development
   d. Department of Food Processing Industries

II. Fill in the Blanks

1. The Pradhan Mantri Matsya Sampada Yojana (PMMSY), launched in 2020, has been extended up to the year _____.
2. Under the AHIDF scheme, micro and small units can avail a loan for up to _____% of the total project cost.
3. The _____ portal is used for submitting applications for the National Livestock Mission (NLM).
4. The PM-KISAN scheme provides an annual financial assistance of _____ per eligible farmer family, delivered in three equal installments.
5. Component B of the PM-KUSUM scheme focuses on the installation of 14 lakh _____ agriculture pumps in off-grid areas.
6. The PM-FME scheme promotes regional specialization in food processing through the _____ (ODOP) approach.
7. The Agriculture Infrastructure Fund (AIF) provides an interest subvention of _____% per annum on loans up to ₹2 crore.
8. The _____ platform digitally integrates APMC mandis to create a unified national market for agricultural commodities.
9. Under the PMKSY - Per Drop More Crop component, the subsidy rate for Small and Marginal Farmers (SMFs) is _____%.

10. The _____ (MIDH) was launched in 2014-15 to promote the holistic development of the horticulture sector.

III. One Mark Questions

1. What is the total annual financial assistance provided under the PM-KISAN SAMMAN scheme? (Ans in Rupees)
2. Which institution implements the e-NAM scheme?
3. In which year was the Pradhan Mantri Matsya Sampada Yojana (PMMSY) launched?
4. The Animal Husbandry Infrastructure Development Fund (AHIDF) provides what percentage of interest subvention to eligible borrowers?
5. The PMKSY aims to promote the use of Micro Irrigation such as Drip and which other system?
6. The National Livestock Mission (NLM) focuses on entrepreneurship in poultry, sheep, goat, and piggery, including the development of which other two key areas?

IV. Two Marks Descriptive Questions

1. State the primary goal of the PM-KUSUM scheme regarding energy use in the agricultural sector.
2. Briefly mention two key objectives of the Animal Husbandry Infrastructure Development Fund (AHIDF).
3. Name any two key components supported under the Mission on Integrated Development of Horticulture (MIDH).
4. What are the two main benefits for farmers using the e-NAM platform?
5. What is the primary focus of the Per Drop More Crop (PDMC) component under PMKSY?
6. List two categories of beneficiaries eligible for the Pradhan Mantri Matsya Sampada Yojana (PMMSY).

V. Three Marks Descriptive Questions

1. Explain how the PM-KISAN SAMMAN scheme provides income support to farmer families'
2. and what system is used for fund transfer.
3. Describe the three main sub-missions covered under the National Livestock Mission (NLM).
4. As an input dealer, how can you guide farmers to avail the benefits of the PM-KUSUM scheme, mentioning the typical funding pattern?
5. Outline the main difference in funding patterns between the Central Sector Scheme and the Central Sponsored Scheme (Other States) under PMMSY.
6. What is the concept of One District One Product (ODOP) under the PM-FME scheme, and why is it promoted?
7. List three key activities that are eligible for support and development under the Agriculture Infrastructure Fund (AIF).

IV. Five Marks Descriptive Questions

1. Explain the main challenges in the fisheries sector that the Pradhan Mantri Matsya Sampada Yojana (PMMSY) was launched to address and state its four key objectives.
2. Describe the implementation mechanism of the Animal Husbandry Infrastructure Development Fund (AHIDF) specifically mentioning the role of banks and the interest subvention provided.
3. What are the four main components of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and what is the primary purpose of this overall scheme?
4. Discuss the role of the Mission on Integrated Development of Horticulture (MIDH) in promoting horticulture. Mention any four sub-schemes it includes to address regional needs.
5. How does the PM-FME scheme work to strengthen the unorganized food processing sector, mentioning the support provided for Credit-Linked Subsidy and Seed Capital?

15.2. PMFBY

I. Multiple Choice Questions

1. What is a major challenge for crop insurance in developing countries besides asymmetric information and moral hazard?
   a. High interest rates
   b. Adverse selection
   c. Lack of political stability
   d. Excess supply of insurance companies

2. What was the unit of insurance proposed by Dandekar (1976) for the 'area' approach which encompasses several villages?
   a. Tehsil
   b. District
   c. Mandal (Block)
   d. State

3. What is the farmers' share in premium for Kharif crops (cereals, pulses and oilseeds) under PMFBY?
   a. 1.5 per cent
   b. 5 per cent
   c. 10 per cent
   d. 2 per cent

4. The PMFBY scheme was made optional for all farmers starting from which crop season?
   a. Rabi season of 2016
   b. Kharif season of 2020
   c. Rabi season of 2022
   d. Kharif season of 2018

5. Post-harvest losses are covered under PMFBY for a maximum period of how many days from the date of harvesting?
   a. 7 days
   b. 21 days
   c. 14 days
   d. 30 days

6. Under PMFBY the Sum Insured (SI) is generally equivalent to the cost of cultivation, also known as what?
   a. Crop Diversification Value
   b. Farmer's Income
   c. Scale of Finance
   d. Actual Yield

7. How is the Threshold Yield (TY) for a crop calculated under PMFBY?
   a. Average yield of the best five of the past seven years (excluding two calamity years) multiplied by the Indemnity Level
   b. Average yield of the past 10 years multiplied by Indemnity Level
   c. The highest yield recorded in the past five years
   d. The average yield of all crops in the notified area

8. What approach does PMFBY primarily adopt for risk transfer from farmers to implementing insurance companies?
   a. Partial risk transfer approach
   b. Cup & cap approach
   c. Complete risk transfer approach
   d. Shared liability approach

9. What is the maximum insurance premium contribution for horticultural and annual commercial crops under PMFBY?
   a. 1.5 per cent
   b. 2 per cent
   c. 5 per cent
   d. 10 per cent

10. What is the name of the initiative under PMFBY to distribute crop insurance policies directly to farmers to create awareness?
    a. SARTHI Platform
    b. Jana Dhan Yojana
    c. Fasal Bima Yojana App
    d. Meri Policy Mere Haath

II. Fill in the Blanks

1. The Pradhan Mantri Matsya Sampada Yojana (PMMSY) aims to double the income of fishers and fish farmers while creating more jobs in the sector.
2. For Central Sponsored Schemes under PMMSY, the funding pattern for North Eastern and Himalayan States is _____% Central and _____% State.

3. The Animal Husbandry Infrastructure Development Fund (AHIDF) provides a _____% interest subvention to eligible borrowers for up to eight years.
4. Under the AHIDF, the repayment period for loans is eight years, which includes a _____-year moratorium on the principal repayment.
5. The National Livestock Mission (NLM) was launched in 2014-15 and later revised in the year _____.
6. The subsidy cap for a Poultry Project under the National Livestock Mission is _____.
7. The PMKSY - Per Drop More Crop scheme focuses on enhancing water use efficiency at the farm level through _____ and sprinkler irrigation systems.
8. The _____ component of PMKSY emphasizes the development of new and traditional water sources and the renovation of water bodies.
9. The e-NAM platform was launched on _____ (Date) to create a unified national market for agricultural commodities.
10. As of August 2025, the e-NAM platform has connected a total of _____ mandis across India.

II. Two Marks Descriptive Questions

1. List two ways in which farmers typically respond when their crops fail due to natural calamities.
2. What are the main objectives of the Pradhan Mantri Fasal Bima Yojana (PMFBY)?
3. Explain the 'cup and cap approach' in the context of PMFBY and insurance company's profits and losses.
4. State two major benefits of the PMFBY scheme for Banks and two major benefits for Farmers.
5. What are the two major challenges observed in the implementation of crop insurance schemes in India that lead to dissatisfaction among farmers?

III. Three Marks Descriptive Questions

1. What are the key differences between the Kharif season and the Rabi season regarding the cultivation of crops in India?
2. Explain why crop insurance is crucial for sustainable agriculture practices and financial stability of farmers?
3. Explain the concept of Threshold Yield under PMFBY. How is it linked to the insurance contract period?
4. Why did the initial individual farm-based crop insurance scheme (launched in 1972) fail to gain wider coverage, leading policy makers to suggest the area approach?
5. What technological solutions and frameworks are suggested as the way forward to minimize human intervention and expedite claim settlement in crop insurance?

IV. Five Marks Descriptive Questions

1. Discuss the need for crop insurance in India, referencing the high incidence of extreme weather events and how crop insurance acts as a protective shield for both vulnerable farmers and State Governments.
2. Describe the implementation cycle of PMFBY starting from the meeting of the State Level Coordination Committee up to the final payment of insurance claims.
3. Explain the Samrakshane Portal in Karnataka. How do these digital systems help in ensuring transparent and timely settlement of crop insurance claims?
4. Detail the mechanism of premium sharing under PMFBY for different crop types (Kharif, Rabi and Horticultural).
5. Discuss the major issues of PMFBY that keep farmers away from the scheme and suggest two long-term strategies for improving its uptake.

15.3. KCC (Kisan Credit Card and Kisan Call Centre)

I. Multiple Choice Questions:

1. The Kisan Credit Card (KCC) Scheme was launched in which year?

a. 1995 b. 1998

c. 2001 d. 2005

2. The KCC Scheme was introduced on the recommendation of which committee?

a. Narasimham Committee b. R.V. Gupta Committee

c. Rangarajan Committee d. Kelkar Committee

3. The KCC Scheme was expanded in 2019 to include which additional sector?

a. Farm mechanization b. Animal husbandry and fisheries

c. Agricultural exports d. Rural warehousing

4. The Kisan Call Centre (KCC) was launched on:

a. 15th August 2002 b. 26th January 2003

c. 21st January 2004 d. 1st July 2005

5. The Kisan Call Centre operates through how many levels of service?

a. One b. Two

c. Three d. Four

6. During 2020–21, which Indian state recorded the highest number of farmer calls to Kisan Call Centres?
   a. Maharashtra
   b. Uttar Pradesh
   c. Tamil Nadu
   d. Bihar

7. Which of the following is not an objective of the Kisan Credit Card Scheme?
   a. To provide short-term credit for crop cultivation
   b. To finance post-harvest expenses
   c. To promote agricultural exports
   d. To meet consumption needs of farmers' households

8. Under the KCC Scheme, the credit limit is generally fixed for how many years?
   a. To provide short-term credit for crop cultivation
   b. To finance post-harvest expenses
   c. To promote agricultural exports
   d. To meet consumption needs of farmers' households

9. Which type of financial institutions are authorized to issue Kisan Credit Cards?
   a. Commercial Banks, RRBs, and Cooperative Banks
   b. Only RRBs
   c. Only Commercial Banks
   d. Only NABARD

10. Which of the following documents is mandatory for issuing a Kisan Credit Card?
    a. Aadhaar and land ownership documents
    b. Ration card
    c. Voter ID only
    d. PAN card only

II. Fill in the Blanks

1. The PM-KISAN Samman scheme is a Central Sector Scheme that provides _____ funding from the Government of India.
2. Under PM-KISAN, the first state to implement a similar model called _____ was Telangana.
3. The PM-KUSUM scheme, launched in 2019, aims to add _____ MW of solar capacity by March 2026.
4. In the PM-KUSUM funding pattern, the farmer's individual contribution is set at _____%.
5. The PM-FME scheme aims to cover _____ micro food processing units over a five-year period.
6. As part of the PM-FME scheme, SHG members are eligible for seed capital of _____ per member.
7. The total corpus of the Agriculture Infrastructure Fund (AIF) is _____.

8. Loans under the AIF have a maximum repayment period of _____ years, which includes a moratorium of up to 2 years.
9. The PM-RKVY scheme was launched to incentivize states to achieve a _____% annual growth in agriculture.
10. Funding for PM-RKVY is allocated based on _____ (SAPs) and local priorities.

II. One Mark Questions

1. The main purpose of KCC is to provide _____ to farmers.
2. The insurance scheme linked with KCC for crop protection is _____.
3. Farmers can call KCC from a _____ or mobile.
4. The scheme for elderly farmers linked with KCC is _____.
5. KCC coverage was extended to smallholders and _____ farmers.
6. FTAs stand for Farm _____ Advisors.
7. KCC provides loans for allied activities like _____ and fisheries.
8. Kisan Call Centres operate in multiple _____ across India.
9. Farmers can access KCC services through Common Service _____ (CSCs).
10. The mobile app launched for farmer advisories under Kisan Credit Card (KCC) is _____.

III. Two Marks Descriptive Questions

1. Mention one way in which Kisan Credit Card helps tenant farmers access credit.
2. Name any two levels of personnel involved in resolving queries at Kisan Call Centres.
3. What is the main feature of a revolving credit facility under the Kisan Credit Card Scheme?
4. What is the role of Subject Matter Specialists at Kisan Call Centres, and how do they assist Farm Tele Advisors?
5. Mention one benefit of linking Kisan Credit Card with livestock insurance schemes.

IV. Three Marks Descriptive Questions

1. Explain how Kisan Call Centres help farmers plan their crop management.
2. State two advantages of the interest subvention scheme under the Kisan Credit Card.
3. Name any three digital platforms or government portals through which farmers can apply for the Kisan Credit Card.
4. Describe two challenges faced by farmers in accessing the Kisan Credit Card.
5. Mention two ways the Kisan Credit Card improves financial inclusion in rural areas.

V. Five Marks Descriptive Questions

1. Explain the objectives of the Kisan Credit Card Scheme in detail.
2. Describe the structure and functioning of Kisan Call Centres in India.
3. Discuss the key features and benefits of the KCC Scheme for small and marginal farmers.
4. Explain how Kisan Call Centres contribute to enhancing farmers' decision-making and productivity.
5. Suggest five strategies to improve the effectiveness of Kisan Call Centres in providing advisory services.

Module XVI Safe Application of Agro-Chemicals

16.1. A. Introduction to agrochemicals – classification, type and role of agrochemicals in agriculture
16.1. B. Compatibility of Agro Chemical

II. Multiple Choice Questions

1. Application rate in low volume spray ranges from _____ L/ha

a. > 400	b. 5 to 400
c. <5	d. None of these

2. _____ type sprayer is used for small areas like kitchen garden and experimental laboratory plots

a. Hand atomizer	b. Knapasack
c. Boom	d. Foot

3. Pesticide equipment used for application of chemicals in powder form is _____

a. Sprayer	b. Calibrator
c. Duster	d. Sprinkler

4. Which of the followings is not a manually operated sprayer?

a. Foot sprayer	b. Rocking sprayer
c. Knapsack sprayer	d. Boom sprayer

5. Operating pressure of power sprayer varies from _____

a. 20 to 55 kg/cm^2	b. 5 to 15 kg/cm^2
c. 33 to 56 kg/cm^2	d. 10 to 20 kg/cm^2

6. Drone sprayer can cover an area of ___ ha per hour.

a. 0.4	b. 0.6
c. 1	d. 2

7. _____ imparts rotational motion to the liquid passing through it

a. Nozzle cap	b. Swirl plate
c. Spring	d. Washer

8. _____ nozzle forms a spray pattern in a narrow elliptical shape.

a. Hollow cone	b. Solid cone
c. Flat fan	d. Adjustable

9. Application rate in ultra low volume (ULV) spray ranges from _____

a. > 400	b. 5 to 400
c. <5	d. None of these

10. Pesticide Application Equipment is calibrated as per BIS code No.

a. IS: 11429-1985	b. IS: 6316-1993
c. IS: 9164-1979	d. IS: 4366-1985

III. Fill in the Blanks

1. Agrochemicals are substances used to manage agricultural ecosystems and optimize plant _____, yield, and quality.
2. The practice of mixing different agrochemicals to save on costs can lead to _____, which is harmful or toxic to the plants themselves.
3. Compatibility issues between agrochemicals can be classified into three types: physical, chemical, or _____.
4. To test if two chemicals can be safely mixed before filling a large spray tank, farmers should perform a _____.
5. _____ are a specific type of agrochemical used to manage or prevent the growth of unwanted plants.
6. According to the compatibility chart, mixing a fertilizer with a _____ is generally considered safe.
7. _____ are chemicals like Gibberellic acid or Ethephon used to promote or control flowering and fruiting.
8. To improve soil structure and adjust pH levels, farmers use _____ such as lime or gypsum.
9. Chemicals used specifically to kill plant-parasitic nematodes, such as Carbofuran, are classified as _____.
10. One of the primary risks of agrochemical misuse, beyond reduced efficacy, is _____.

III. One Mark Questions

1. Equipment used to apply pesticide chemicals in the form of small droplets is called?
2. Which sprayer generates pressure through pressure vessel?
3. How much pressure can be generated in rocker sprayer?
4. Field capacity of Self Propelled High Clearance Boom Sprayer is ?
5. In which nozzle the spray liquid is fed into a whirl chamber through a tangential entry or spiral passage?
6. Adjustable nozzle is also knows as ?

IV. Two Marks Descriptive Questions

1. Write about types of sprays.
2. Write a brief note on power sprayers.

3. Write a brief note on Hydraulic Sprayers
4. Write the basic functions of spray nozzle.
5. Explain the working of hollow cone nozzle and flat fan nozzle.
6. Write about pre calibration checks to be performed.

V. Three Marks Descriptive Questions

1. Explain Power operated and Hydraulic sprayers
2. Write a note on Selection of a spray nozzle
3. Write a brief note Components of a nozzle
4. Write a note on Care and Maintenance of Pesticide application Equipment
5. Briefly explain about Self Propelled High Clearance Boom Sprayer

VI. Five Marks Descriptive Questions

1. Explain different manually operated pesticide application equipment
2. Write a note on Drone sprayer
3. Write about Classification of spray nozzles
4. Explain the procedure for calibration of pesticide application equipment
5. Explain care and maintenance of sprayers and precautions to be taken for safe use of pesticides

16.2. A. Types of Pesticide Application Equipment
16.2. B. Spray Nozzles and Their Classification
16.2. C. Calibration and care of Pesticide application Equipment

III. Multiple Choice Questions

1. Pesticide application equipment are broadly classified into

a. Sprayers and harvesters
b. Sprayers and dusters
c. Ploughs and sprayers
d. Seeders and dusters

2. Ultra Low Volume (ULV) spray application rate is

a. > 400 L/ha
b. 100–200 L/ha
c. < 5 L/ha
d. 5–400 L/ha

3. Knapsack sprayer is carried on

a. Shoulder
b. Head
c. Back
d. Hand

4. Which sprayer is operated by foot?

a. Knapsack sprayer
b. Foot sprayer
c. Power sprayer
d. Rocking sprayer

5. The main function of a nozzle is to

a. Store liquid
b. Increase pressure only
c. Atomize liquid into droplets
d. Mix chemicals

6. Flat fan nozzle produces

a. Circular spray
b. Narrow elliptical spray
c. Jet stream
d. Cone spray only

7. Calibration ensures

a. Low cost
b. Exact quantity of spray
c. Faster spraying
d. Less labor

8. Red label pesticide indicates

a. Slightly toxic
b. Moderately toxic
c. Highly toxic
d. Extremely toxic

9. IPM stands for

a. Integrated Plant Management
b. Integrated Pest Management
c. Internal Pest Method
d. Input Pest Mechanism

10. Pesticide Application Equipment is calibrated as per BIS code No.

a. IS: 11429-1985
b. IS: 6316-1993
c. IS: 9164-1979
d. IS: 4366-1985

II. Fill in the Blanks

1. Spraying refers to application of fluids in the form of _____.
2. High volume spray rate is _____.
3. Knapsack sprayer can cover about _____.
4. Drone sprayers are powered by _____.
5. Nozzle tip contains the final _____.
6. Calibration follows BIS code _____.
7. Protective clothing includes gloves, mask and _____.
8. Excess pesticide use leads to _____ in pests.

9. MRL stands for _____.
10. Green label pesticides are _____.

III. Two Marks Descriptive Questions

1. Define spraying.
2. What is a knapsack sprayer?
3. List any two functions of a nozzle.
4. What is calibration of sprayers?
5. What is PPE?

IV. Three Marks Descriptive Questions

1. Explain types of spray based on volume.
2. Describe any three manual sprayers.
3. Explain the classification of spray nozzles.
4. Write three harmful effects of indiscriminate pesticide use.
5. What are the basic precautions during pesticide handling?

V. Five Marks Descriptive Questions

1. Explain different types of pesticide application equipment in detail.
2. Describe the components and functions of spray nozzles.
3. Explain the procedure for calibration of sprayers.
4. Discuss harmful effects of indiscriminate use of agro-chemicals.
5. Explain precautionary measures in procurement, handling and application of agro-chemicals.

16.3. A. Harmful effect of indiscriminate use of agricultural inputs

16.3. B. Pesticide Residues and Safety to consumers

16.3. C Precautionary Measures in procurement, handling and application of Chemicals and other agricultural inputs

I. Multiple Choice Questions

1. Which of the following is a harmful effect of indiscriminate pesticide use?
   a. Higher soil fertility
   b. Pest resistance
   c. Increased biodiversity
   d. Safer food for consumers

2. Maximum Residue Limit (MRL) refers to:
   a. The maximum pesticide a farmer can buy
   b. The maximum pesticide that can be stored in a shop
   c. The maximum pesticide residue legally allowed in food
   d. The maximum fertilizer dose allowed per hectare

3. Which organization in India sets standards for pesticide residues in food?
   a. NABARD
   b. ICAR

c. FAO
d. FSSAI

4. Red label on a pesticide container indicates:
   a. Slightly toxic
   b. Highly toxic
   c. Safe for humans
   d. Extremely toxic

5. Which of the following is a personal protective equipment (PPE) for pesticide handling?
   a. Sunglasses
   b. Rubber gloves
   c. Sports shoes
   d. Woolen cap

6. Which farming approach promotes minimal chemical use?
   a. High Input Management
   b. Integrated Pest Management (IPM)
   c. Monocropping
   d. Intensive Irrigation

7. Pre-harvest interval means:
   a. Time between sowing and harvest
   b. Time between last spray and harvest
   c. Time between purchase and sale of pesticides
   d. Time between rainfall and irrigation

8. Which pest control option is considered a biopesticide?
   a. Glyphosate
   b. Carbaryl
   c. Neem oil
   d. Atrazine

9. Which of the following should NOT be done with empty pesticide containers?
   a. Triple rinsing
   b. Crushing
   c. Reusing for storing water
   d. Burying in a pit

10. Drone spraying helps farmers because:
   a. It reduces labor exposure to chemicals
   b. It increases pesticide dose
   c. It replaces crop monitoring
   d. It eliminates weeds completely

II. Fill in the Blanks

1. _____ is a holistic approach to pest control that combines cultural, biological, chemical, and mechanical methods to manage pests while minimizing environmental impact.
2. The _____ is the pest density at which the cost of crop damage equals the cost of implementing control measures.
3. In biological control, the _____ beetle is a natural predator that feeds specifically on aphids.

4. To prevent fungal diseases and grain spoilage in storage, the moisture content of the grain should be maintained below _____.
5. Natural insecticidal compounds called _____, found in Chrysanthemum flowers, are known for their rapid "knockdown" effect on pests.
6. The primary bioactive ingredient in Pongamia (Karanj) oil, which acts as an insect growth regulator, is _____.
7. _____ rodenticides, such as Zinc Phosphide, are single-dose poisons that release phosphine gas in the pest's stomach.
8. Mixing different agrochemicals can sometimes lead to _____, which causes visible injury or toxicity to the treated plants.
9. To test the compatibility of two or more chemicals before mixing a full tank, farmers should perform a small-scale _____.
10. Pesticide application rates exceeding 400 liters per hectare are classified as _____ sprays.

III. One Mark Questions

1. Define pesticide residue.
2. Mention one harmful effect of excessive urea application on soil.
3. What does a yellow label on a pesticide container indicate?
4. Name one personal protective equipment used during pesticide spraying.
5. Expand IPM.

IV. Two Marks Descriptive Questions

1. State two harmful effects of indiscriminate use of pesticides on human health.
2. What is meant by Maximum Residue Limit (MRL)?
3. List two precautionary steps to be followed while storing pesticides.
4. Why should expired pesticides not be used?
5. Mention two benefits of using drones for spraying pesticides.

V. Three Marks Descriptive Questions

1. Explain how pesticide residues pose a risk to consumers.
2. Describe three harmful impacts of indiscriminate pesticide use on the environment.
3. Write short notes on pre-harvest interval and re-entry interval.
4. What are the advantages of using biopesticides? Give examples.
5. List three safe practices in handling pesticides at the farm level.'

VI. Five Marks Descriptive Questions

1. Discuss the harmful effects of indiscriminate use of agro-chemicals on soil, water, human health, and biodiversity.
2. Explain the concept of pesticide residues in food and describe the measures to keep residues within safe limits.
3. Describe in detail the precautionary measures to be taken in procurement, storage, handling, and disposal of pesticides.

4. Explain the role of Integrated Pest Management (IPM) and Good Agricultural Practices (GAP) in reducing agro-chemical hazards.
5. "Safe use of agro-chemicals protects both farmers and consumers." Discuss this statement with examples.

ANSWERS

Module I: Basics of Agriculture / Agro Ecological Situations
1.1. Overview of Agricultural Production Systems

I. Multiple Choice Questions (MCQs)

1	c	2	a	3	b	4	d	5	a	6	a	7	b	8	a	9	a	10	c

II. Fill in the Blanks

1	Personal Consumption	2	Profit
3	Monocropping	4	Livestock
5	Synthetic	6	Recycling
7	Residential	8	Sensors
9	Rainfall	10	Rainfall

III. One Mark Questions

1	Integrated Farming System (IFS)	2	Rice-Fish farming
3	Sikkim	4	Organic farming
5	Rainfed farming		

1.2. A. Agro-ecological situation and Agro-eco system approach

1.2. B. Agro Climatic Zones of India

I. Multiple Choice Questions

1	b	2	b	3	c	4	a	5	d	6	b	7	c	8	b	9	a	10	c

II. Fill in the Blanks

1	Synthetic	2	Lampkin
3	Recycling	4	Household
5	Sensors	6	Rainfall
7	Rabi	8	Intercrop
9	60	10	Rainfall

1.3. A. Weather Parameters/ Agro Meteorological Information and their impact on Agricultural Production.
1.3. B. Climate Change, Climatic Variability, Global Warming, Causes of Climate Change and its Impact on Regional and National Agriculture.

I. Multiple Choice Questions

1	b	2	c	3	a	4	b	5	c	6	b	7	d	8	c	9	c	10	c

II. Fill in the Blanks

1	Measurable	2	Hotness
3	Thermometer	4	High
5	1013.25	6	Water Vapour
7	Rain Gauge	8	Photosynthesis
9	Transpiration	10	Greenhouse

1.4. Components of IFS / Agroforestry and Its Advantages - Site Specific Development of IFS Model for Different Agro-Climatic Zones in Rainfed, Irrigated and Irrigated Dry Conditions A. Multiple Choice Questions (MCQs)

I. Multiple Choice Questions

1	b	2	a	3	b	4	d	5	c	6	d	7	b	8	a	9	a	10	b

II. Fill in the Blanks

1	Forestry	2	Recycling
3	Income	4	Risk
5	Integrated	6	Ponds
7	Rainfall	8	Balance
9	Components	10	Input

Module II: SOIL HEALTH MANAGEMENT

2.1. Soil Profile, Types and Characteristics

I. Multiple Choice Questions

1	c	2	a	3	b	4	a	5	d	6	c	7	c	8	b	9	c	10	a

II. Fill in the Blanks

1	Weathering	2	Horizons
3	C	4	Fertile
5	Water	6	Nitrogen
7	Clay	8	Particles
9	Acidity	10	Humus

2.2. A. Importance of Soil Testing

I. Multiple Choice Questions

1	d	2	c	3	c	4	b	5	a	6	c	7	b	8	a	9	d	10	b

II. Fill in the Blanks

1	17	2	Quartering
3	2015	4	12
5	Acidic		

2.2. B. Problematic Soils and their Management

I. Multiple Choice Questions

1	c	2	b	3	b	4	a	5	c	6	d	7	d	8	c	9	a	10	b

II. Fill in the Blanks

1	Sulphuric acid	2	1807
3	Phosphorus (P)	4	70% Sand, 18% Clay
5	500 gms		

2.3. Crop nutrition- Essential elements -Importance of major, secondary and micro nutrients. Macro-Micro Nutrient deficiencies + Toxicity and their symptoms

I. Multiple Choice Questions

1	b	2	b	3	a	4	c	5	c	6	b	7	a	8	b	9	b	10	c

II. Fill in the Blanks

1	Deficiency; Toxicity	2	Carbon dioxide; Water
3	Phosphorus (P); Potassium (K)	4	Yellowing
5	Purplish	6	Molybdenum
7	Cracked fruits	8	Manganese
9	Integrated Nutrient Management	10	Lime; Gypsum

2.4. Manures and Fertilizers- Classification-Nutrient Content-Nutrient Use Efficiency-Factors Effecting NUE

I. Multiple Choice Questions

1	c	2	b	3	d	4	d	5	b	6	c	7	d	8	c	9	b	10	c

II. Fill in the Blanks

1	MANOEUVRER	2	Fertil
3	Gaseous ammonia; 46	4	30–50
5	1 to 100	6	70–80%; clay lattices
7	Amount of nutrient applied	8	Complex; Mixed
9	10–20%; Ca–P	10	Fertigation

Chapter - 2.5 Compost – preparation of compost from agricultural wastes – urban compost preparation - Vermicomposting – preparation and properties

I. Multiple Choice Questions

1	a	2	b	3	b	4	c	5	c	6	b	7	c	8	d	9	d	10	b

II. *Fill in the Blanks*

1	Componere	2	Roth Amsted
3	1922	4	Three times
5	1949; Aerobic	6	4:1; Copper sulphate
7	Eisenia foetida	8	2,000; 3,000
9	18°C to 35°C; 60–70%	10	45–60 days; 2–3 tonnes

2.6. A. Bio fertilizers – classification with examples – constraints for use in agriculture – bio fertilizers used for different crops/situations

2.6. B. Bio fertilizers – Storage, shelf life and marketing. Factors influencing the efficacy of Bio fertilizers.

2.6. C. Plant Growth Promoting Bio-fertilizers (PGPR) and Plant Growth Regulators

I. Multiple Choice Questions

1	a	2	a	3	b	4	d	5	b	6	b	7	d	8	c	9	b	10	b

II. *Fill in the Blanks*

1	Nitrogen; Phosphorus	2	1. 20%; 30%
3	Cyanobacteria (BGA) / Anabaena / Nostoc; Rhizobium / Azotobacter	4	Mycorrhizae
5	4°C; 25°C	6	3–6 months; 6–12 months
7	LDPE	8	Physiological
9	Auxins (Planofix); Ethylene (Ethrel)	10	Gibberellic Acid (GA3); Tillering

Chapter - 2.7. Integrated Nutrient Management

I. Multiple Choice Questions

1	d	2	c	3	b	4	d	5	b	6	a	7	d	8	c	9	a	10	b

II. *Fill in the Blanks*

1	Soil health	2	2:1:1
3	Rhizobiaceae; 50	4	Azotobacteriaceae; Neutral
5	10–20%	6	Anabaena azollae
7	10 kg/ha; 10 days	8	Vesicular–Arbuscular–Mycorrhizal (VAM); 560 kg
9	350°C; 700°C	10	135; 488 kg ha^{-1}

Module III: Crop Production Technologies of Major Local Crops

3.1. A. Paddy

3.1. B. Wheat

I. Multiple Choice Questions

1	b	2	a	3	a	4	a	5	a	6	b	7	d	8	d	9	c	10	c

II. Fill in the Blanks

1	21 pairs	2	Noren-10
3	Crown root initiation	4	25 %
5	lower plant population		

3.2. Cereals: Jowar, Bajra, Maize/ Millets

I. Multiple Choice Questions

1	d	2	c	3	d	4	b	5	b	6	b	7	a	8	b	9	b	10	a

II. Fill in the Blanks

1	Nutri-cereals	2	364 mg
3	*Pennisetum glaucum*	4	7–8 kg ha^{-1}
5	25 g	6	250–500 mm
7	0.75–1.0 kg/ha	8	5.0–6.0 t/ha
9	10–12%	10	2023

III. One Mark Questions

1	Nutri-cereals	2	Finger millet
3	Shoot fly	4	Thiram / Carbendazim
5	Atrazine	6	10–12%
7	Drip irrigation	8	Sorghum
9	Pearl millet	10	Foxtail millet

3.3. Pulses: Red gram, Green gram, Black gram and Bengal gram

I. Multiple Choice Questions

1	c	2	a	3	b	4	d	5	b	6	c	7	d	8	b	9	a	10	c

I. Fill in the Blanks

1	18–25%	2	*Cajanus cajan*
3	5–10 g/k.g	4	Pod borer (*Helicoverpa armigera*)
5	*Aceria caja*	6	24%
7	80–85%	8	Mungbean yellow mosaic virus
9	5–8 cm	10	1,200–1,500 kg/ha

3.4. Oilseeds: Groundnut, Sesamum, Safflower, Sunflower, Soybean and Castor

I. Multiple Choice Questions

1	b	2	c	3	a	4	c	5	b	6	d	7	a	8	b	9	c	10	a

II. Fill in the Blanks

1	48–50%	2	50–60 kg N/ha
3	15%	4	Queen of oilseeds
5	5.5–8.0	6	Kusuma
7	90–100 days	8	Golden Bean
9	80	10	48–56%

III. One Mark Questions

1	Arachis hypogaea	2	Til
3	Soybean	4	Groundnut
5	Safflower	6	Capitulum
7	Castor oil	8	Glycine max
9	Sesamum indicum	10	Ricinus communis

3.5. Commercial Crops: Cotton, Chilies, Sugarcane etc. Multiple Choice

I. Multiple Choice Questions

1	a	2	c	3	a	4	b	5	d	6	c	7	b	8	b	9	c	10	d

II. One Mark Questions

1	Gossypium spp.	2	Cotton
3	Capsaicin	4	Sugarcane
5	Setts	6	Solanaceae
7	Bollworm	8	Capsanthin
9	Poaceae	10	Bt cotton

Chapter 3.6. Fruit Crops: Mango, Sapota, Custard Apple, Aonla, Grape and Pomegranate

I. Multiple Choice Questions

1	a	2	b	3	d	4	c	5	b	6	c	7	c	8	a	9	b	10	c

II. Fill in the Blanks

1	180–200 days	2	Topping
3	12–18 months	4	King of fruits
5	*Manilkara achras* (syn. *Achras Zapota*)	6	*Annona squamosa*
7	*Annona squamosac*	8	Viticulture
9	National fruit	10	5–7 months

3.7. Production Technology of Vegetable Crops

I. Multiple Choice Questions

1	a	2	b	3	a	4	b	5	c	6	b	7	b	8	a	9	b	10	b

II. *Fill in the Blanks*

1	21−24 ∘ C	2	60-90 cm
3	Blossom-end rot	4	Mature Green
5	Potassium	6	Buttoning
7	Blanching	8	India
9	Bowers	10	Blood sugar levels

3.8. Medicinal and Aromatic Plants

I. Multiple Choice Questions

1	c	2	b	3	c	4	c	5	b	6	d	7	b	8	b	9	b	10	c

II. *Fill in the Blanks*

1	Winter Cherry	2	Vinblastine
3	High blood pressure (or Hypertension)	4	Isabgol (or Blond Psyllium)
5	Root suckers	6	Forskolin
7	Sennosides	8	Kalmegh
9	Khus	10	Steam distillation

3.9. Floriculture

I. Multiple Choice Questions

1	d	2	c	3	b	4	c	5	d	6	a	7	c	8	b	9	d	10	d

II. *Fill in the Blanks*

1	Citronella	2	Perfume
3	Six	4	Vitamin A
5	Citral	6	East Indian
7	Full bloom	8	Oil glands
9	Immiscible	10	Senna

III. One Word Questions

1	Rose, Chrysanthemum, Carnation, Orchids, etc	2	GA3 (Gibberilic acid)
3	De-suckering	4	Incidence of pests and diseases
5	1000-3000 ppm	6	IBA (Indole Buteric Acid)
7	Black Polythese sheet	8	Rose, Chrysanthemum
9	Rose, Marigold, Jasmine, Tuberose	10	*Jasminum multiflorum* (Kakada)

Chapter 3.10. Production Technologies of Plantation Crops

I. Multiple Choice Questions

1	b	2	c	3	a		4	d	5	c	6	b	7	c	8	a	9	a	10	d

II. Fill in the Blanks

1	Vetiver	2	Shade
3	Vitamin A	4	Citral
5	Palmarosa	6	Viable seeds
7	24	8	Frost
9	Water	10	Immiscible

Module IV: WEED MANAGEMENT

4.1. Importance of Weed Management in Crops and types of Weeds

I. Multiple Choice Questions

1	c	2	b	3	a	4	a	5	b	6	b	7	b	8	b	9	a	10	d

II. Fill in the Blanks

1	Nutrients	2	10 billion US dollars
3	Weed seeds	4	Integrated Weed Management (IWM)
5	Mechanical (or Physical)	6	Contact
7	Pre-emergence	8	2,4-D
9	Quizalofop Ethyl	10	Resistance

4.2. A. Classification of herbicides based on chemical nature - time and method of application. Classes of herbicides based on – selectivity – spectrum – translocation – residual nature – soil sterilants and fumigants

4.2. B. Compatibility of herbicides with agro-chemicals and their application

4.2. C. New developments in herbicides – micro-herbicides & nano-herbicide

4.3. Integrated Weed Management (Physical, Chemical, Biological method)

I. *Multiple Choice Questions*

1	a	2	b	3	a	4	b	5	c	6	d	7	b	8	b	9	c	10	a

II. Fill in the Blanks

1	Caedere	2	Inorganic
3	Pre-Planting	4	Pre-Emergence
5	Post-Emergence	6	Foliar
7	Non-Selective	8	Systemic
9	Residual	10	Bare

III. One Mark Questions

1	Weed	2	Critical Period
3	Weed prevention	4	Eradication
5	Contact Herbicides	6	Systemic Herbicides
7	Selective herbicides	8	Non-selective herbicides
9	Narrow spectrum herbicides	10	Broad Spectrum Herbicides
11	Pre-plant incorporation	12	Pre-emergence
13	Post-emergence	14	Allelopathy
15	Hand weeding		

Module V: Integrated Pest Management (IPM)

5. 1.A. Importance of Pest and Disease Control in Agriculture

5.1. B. Harmful and Beneficial insects.

5.1. C Important species of pollinators, weed killers and scavengers and their importance in agriculture. Predators and Parasitoids

I. Multiple Choice Questions

1	c	2	d	3	d	4	a	5	b	6	c	7	b	8	b	9	c	10	a

II. Fill in the Blanks

1	Economical threshold	2	Last resort
3	Summer ploughing	4	Bio-pesticides (or natural enemies)
5	Aphids	6	Parasitoids
7	Cotton bollworm (or sugarcane borers)	8	Honeybees
9	Dung beetles (or termites)	10	Soil

5.2. A. Insect and Disease Symptoms, Difference among symptoms of Insect, Disease, Nutritional deficiencies and Physiological disorders

5.2. B. Mouth parts

5.2. C. Types of larvae and pupae – differences between nymph and larva

I. Multiple Choice Questions

1	c	2	c	3	d	4	b	5	c	6	b	7	a	8	a	9	d	10	a
11	b	12	a	13	d	14	b	15	b	16	c	17	c	18	c	19	b	20	a

II. Fill in the Blanks

1	Symptoms	2	Chewing
3	Piercing-sucking	4	Mining
5	Metamorphosis	6	Complete (or Holometabolous)
7	Nymph	8	Pupa
9	Scarabaeiform	10	Obtect

IV. One Mark Questions

1	Piercing-sucking	2	Caterpillar
3	Grub	4	Pathogens like fungi, bacteria, viruses, phytoplasmas, and nematodes.
5	fungus	6	nitrogen deficiency
7	K deficiency	8	Boran deficiency
9	BPH	10	Bacterial disease

5.3. A. Integrated Pest Management

5.3. B. Concepts and principles of IPM – Economic Threshold Level (ETL) – Economic Injury Level (EIL) and General Equilibrium Position (GEP)

I. Multiple Choice Questions

1	b	2	a	3	c	4	d	5	c	6	b	7	b	8	d	9	b	10	b

II. Fill in the Blanks

1	Holistic	2	Economic Injury Level (EIL)
3	Economic Threshold (ET or action threshold)	4	Crop rotation
5	Intercropping	6	Trap cropping
7	*Chrysoperla carnea*	8	*Beauveria bassiana*
9	Last resort	10	Resistance to change

5.4. A. Storage pests and their Management

I. Multiple Choice Questions

1	a	2	b	3	b	4	d	5	c	6	b	7	c	8	b	9	b	10	c

II. Fill in the Blanks

1	Quantitative	2	Rice weevil (*Sitophilus oryzae*)
3	45^0C	4	12%
5	Neem Kernel	6	Entoleter
7	Zinc Phosphide	8	Bromadiolone
9	Palmyra	10	Owl perches

5.4. B. Rodents- Important major rodent sps. - Nature of damage- management - Rodenticides – zinc phosphide, aluminium phosphide, bromodilone; Fumigants - aluminium phosphide

I. Multiple Choice Questions

1	c	2	d	3	b	4	c	5	a	6	b	7	c	8	b	9	c	10	b

II. One Mark Questions

1	Rattus norvegicus	2	Zinc Phosphide
3	Phosphine gas (PH-3)	4	Domestic Cat
5	Mammalia	6	Bromadiolone
7	Rice	8	Destroy and expose rodent burrows
9	Bromadiolone	10	Kalli (*Euphorbia tirucalli*)

5.5 Introduction to conventional pesticides for pest management -Botanical Insecticides- Plant derived insecticides - neem based products - different commercial formulations containing azadirachtin, neem seed kernel extract, neem cake and their uses – nicotine, rotenone, plumbagin and pyrethrum – source – properties and uses

I. Multiple Choice Questions

1	b	2	c	3	c	4	c	5	b	6	a	7	a	8	b	9	a	10	b
11	c	12	b	13	b	14	c	15	c	16	b	17	d	18	b	19	c	20	b

II. Fill in the Blanks

1	Biodegradable	2	Karanjin
3	Nicotine	4	Sticking agent (or emulsifier)
5	Pyrethrins	6	Respiratory
7	Custard apple (*Annona squamosa*)	8	Roots
9	Short residual activity	10	*Mentha*

III. One Mark Questions

1	Azadirachtin	2	Nicotine
3	Pyrethrin	4	Karanjin
5	Plumbagin		

Module VI Organic and Natural Farming

6.1. A. Organic Cultivation: Principles, Practices and Ecological Implications

I. Multiple Choice Questions

1	c	2	c	3	b	4	b	5	b	6	c	7	c	8	b	9	c	10	d
11	d	12	b	13	a	14	a	15	c										

II. Fill in the Blanks

1	Farmyard manure	2	354
3	Soil organic carbon	4	Fairness
5	Synthetic chemicals	6	Crop rotation
7	Care	8	Input costs
9	Urban	10	Mission Organic Value Chain Development

6.2. A. Organic nutrient management-types of organic manures – bio-fertilizers-efficient use

I. Multiple Choice Questions

1	c	2	b	3	b	4	b	5	c	6	b	7	a	8	c	9	c	10	b
11	a	12	c	13	c	14	b	15	c										

II. Fill in the Blanks

1	Returned	2	Aeration / Porosity
3	Farmyard Manure	4	Vermicomposting
5	Biofertilizers	6	Precision Nutrient Monitoring
7	20-25	8	Drones
9	Oil cakes	10	Soil microbial biomass

6.2. B. Weed management in organic farming – cultural-mechanical-Biological –Bio herbicides.

I. Multiple Choice Questions

1	b	2	b	3	b	4	b	5	b	6	b	7	b	8	b	9	b	10	b
11	b	12	d	13	b	14	c	15	c										

II. Fill in the Blanks

1	Synthetic chemicals (or Herbicides	2	Preventive
3	Mulching	4	Mechanical
5	Thermal	6	Biological
7	Bioherbicides	8	Precision
9	Robovator (or Robocrop/IC-cultivator)	10	Holistic (or Integrated)

6.3. Insect Pest and Disease Management in Organic Farming: Key Components and Strategies

I. Multiple Choice Questions

1	c	2	c	3	b	4	d	5	c	6	b	7	b	8	c	9	b	10	a
11	b	12	b	13	b	14	b	15	c										

II. Fill in the Blanks

1	Soil fertility	2	Parasitoids (or Parasites)
3	Predators	4	Bacillus thuringiensis (Bt)
5	Physical	6	Pheromone traps
7	Panchagavya	8	Sulphur
9	Kaolin	10	Prevent

III. One Mark Questions

1	Predators	2	Parasitoids
3	Bt (Bacillus thuringiensis)	4	Define: Bt (Bacillus thuringiensis)
5	Define: organic pest management		

6.4. Organic Certification Process

I. Multiple Choice Questions

1	b	2	b	3	c	4	b	5	a	6	c	7	a	8	c	9	a	10	d

II. Fill in the Blanks

1	Certification	2	National Programme for Organic Production
3	Participatory Guarantee System	4	Agricultural and Processed Food Products Export Development Authority
5	Conversion	6	Transaction
7	Tracenet	8	Pledge

9	Stocking Density	10	Buffer zone

6.5. Natural Farming Principles and Methods

I. Multiple Choice Questions

1	b	2	b	3	c	4	b	5	a	6	c	7	a	8	c	9	a	10	d

II. Fill in the Blanks

1	Ghan-Jeevamrutha	2	Neemastra
3	Whapasa	4	Pest Control (Broad Spectrum)
5	Gram flour (Besan)	6	Beejamrutha
7	Mulching / Acchadana	8	True
9	Humus	10	Leguminous

Module VII: Irrigation and Watershed Management

7.1.A. Basic Principles in Irrigation

7.1. B. Water use Efficiency and Methods of Irrigation

7.1. C. Importance of Water Management in Crop Production

I.Multiple Choice Questions

1	c	2	d	3	b	4	d	5	a	6	b	7	a	8	b	9	b	10	c

II. Fill in the Blanks

1	Waste	2	Leveling And Shaping
3	Effective Crop Root Zone Depth	4	Critical Growth Period
5	Scheduling	6	Feel And Appearance
7	Water Application	8	Wild Flooding
9	Drip	10	Rainwater Harvesting

7.2. A. Installation and Management of Micro irrigation Systems (Sprinkler & Drip Irrigation)

7.2. B. Budget requirement for Installation of Micro Irrigation System

I. Multiple Choice Questions

1	b	2	b	3	a	4	d	5	a	6	b	7	d	8	d	9	d	10	b

II. Fill in the Blanks

1	70	2	Rabi
3	Drip irrigation	4	Sugarcane
5	Tubing	6	Laser
7	0.5	8	2.5
9	Ortho Phosphoric (or Nitric)	10	Screen

7.3. A. Agricultural drainage – Surface and Sub-surface drainage systems

I. Multiple Choice Questions

1	c	2	b	3	b	4	d	5	d	6	c	7	b	8	a	9	a	10	c

II. Fill in the Blanks

1	Agricultural Drainage	2	16.4 To 21
3	11.2	4	Sugarcane And Rice
5	Salinization	6	Perforated Pipes
7	1.0 To 2.0	8	Envelope
9	8	10	Watershed

7.3. B Water harvesting, importance and its techniques- In-situ and Ex-situ water harvesting in arid and semiarid areas.
7.3. C. Principles and concept of Integrated Watershed Management

I. Multiple Choice Questions

1	a	2	a	3	c	4	b	5	c	6	c	7	b	8	d	9	b	10	d

II. Fill in the Blanks

1	In-situ	2	Ex-situ
3	Farm pond	4	Check dams
5	Mulching	6	Infiltration
7	Arid	8	Percolation
9	Contour farming	10	Terracing

7.4. A. Rainfed Agriculture: Introduction, types- Dry farming, dryland farming and Rainfed farming

I. Multiple Choice Questions

1	c	2	a	3	d	4	a	5	d	6	a	7	b	8	a	9	b	10	a

II. Fill in the Blanks

1	Rainfed	2	Dry
3	68	4	85
5	Dryland		

III. One Mark Questions

1	Rainfed agriculture	2	24%
3	Water erosion	4	Dry farming areas
5	1190 mm	6	

7.4. B. Management of crops and cropping systems in rainfed areas – Intercropping, sequence cropping and crop rotation- Choice of crops and cropping systems based on length of crop growing season – Potential cropping systems

I. Multiple Choice Questions

1	a	2	b	3	c	4	a	5	b	6	a	7	b	8	d	9	a	10	b

II. Fill in the Blanks

1	Intercropping	2	Telangana
3	Sequence	4	Intercropping
5	Monoculture (Or Mono)		

III. One Mark Questions

1	Rainfed Agriculture	2	Double Cropping
3	>900 Mm	4	Sequential Cropping
5	Greengram/Blackgram/Cowpea	6	Cotton/Pigeonpea

Module VIII: Seed & Seed Production
8.1. A. Basics of Seeds
8.1. B. Difference between seeds and grains
8.1. C. Importance of Quality Seeds in crop production
8.1. D. Classes of seeds
8.1. E. Seed treatment- Importance and procedure

I. Multiple Choice Questions

1	c	2	c	3	b	4	c	5	b	6	d	7	d	8	b	9	c	10	c

II. Fill in the Blanks

1	Seed	2	Certified

3	Genetic	4	20-25 (Or Up To 25)
5	Azura	6	Seed Treatment
7	Seed-Borne	8	Grains
9	Vigor	10	Genetic

8.2. A. Principles and practices of Seed Production
8.2. B. Seed Certification Process

I.Multiple Choice Questions

1	b	2	a	3	b	4	c	5	c	6	b	7	d	8	b	9	d	10	b

II. Fill in the Blanks

1	15-25	2	Genetic
3	Breeder	4	Certified
5	Truthfully Labelled	6	Isolation
7	Roguing	8	Nine
9	Six	10	Revoke

8.3. A. Seed drying – methods of seed drying
8.3. B. Seed storage and maintenance- general principles – Stages and factors affecting – Seed longevity during storage – Measures for pest and disease control during storage

I. Multiple Choice Questions

1	b	2	c	3	a	4	b	5	d	6	c	7	d	8	b	9	a	10	c

II. Fill in the Blanks

1	Drying	2	Tempering
3	Spherical/Round	4	Physical/Natural/Sun
5	Ventilators	6	Electronic blowers/Blowers
7	Wooden	8	Barton
9	Malathion	10	14

Module IX: Farm Mechanization
9.1 Farm Mechanization: Scope and Importance
9.2 Name and utility of various farm implements and machinery
9.3 Sources and cost estimation of farm implements and machinery

I. Multiple Choice Questions

1	a	2	d	3	d	4	d	5	c	6	b	7	a	8	c	9	b	10	b

II. Fill in the Blanks

1	40 And 45	2	4.0
3	2.3	4	Tractors
5	Rotavator	6	10
7	8	8	Plough
9	Power Chaff Cutter	10	Specialized

9.4. Custom hiring Centers: Concept and Importance in the present

I. Multiple Choice Questions

1	b	2	c	3	d	4	c	5	d	6	b	7	a	8	a	9	d	10	d

II. Fill in the Blanks

1	Custom Hiring Center (Or CHC)	2	Cost Of Cultivation (Or Capital Investment)
3	Timely	4	Sub-Mission
5	Farmer Producer Organizations	6	Laser Land Leveler
7	Zero-Till Drill	8	Roads (Or Transport)
9	Maintenance	10	Sustainability

III. One Mark Questions

1	Combine Harvester	2	Laser Land Leveler
3	Custom Hiring Centers	4	Post-harvest machines.
5	Madhya Pradesh	6	Karnataka.

Module X: Leveraging Agricultural Value Chains through Collectives

10.1. Role and Impact of Farmer Producer Organizations in Empowering Smallholders

I. Multiple Choice Questions

1	b	2	c	3	b	4	c	5	a	6	d	7	d	8	b	9	b	10	a

II. Fill in the Blanks

1	86	2	**Enterprise-Oriented**
3	Collectivize	4	Credit
5	Marketing	6	Quality
7	Minimum Support Price	8	Federations

9	Gender (Or Women)	10	Collective Entrepreneurs

III. One Mark Questions

1	FPO	2	Small Farmers' Agribusiness Consortium (SFAC)
3	June 25, 2024	4	e-NAM (Electronic National Agriculture Market)
5	Social Capital		

10.2. Agricultural Cooperatives: Understanding Their Role, Importance, Functioning and Societal Impact

I. Multiple Choice Questions

1	b	2	b	3	c	4	a	5	d	6	b	7	b	8	b	9	d	10	a

II. Fill in the Blanks

1	Common Goal	2	Working Together
3	Dairy	4	Middlemen
5	Loans (Or Credit)	6	Poor Governance (Or Lack Of Participation)
7	Computerisation	8	Audits
9	Women's	10	Business Entitie

III. One Mark Questions

1	IFFCO	2	Amul
3	Primary Agricultural Credit Societies	4	NAFED
5	Democratic Member Control	6	e-NAM
7	Sikkim IFFCO Organics Limited		

10.3. Optimizing Agricultural Value Chains - A Comprehensive Overview of Agri-Marketing Strategies

I. Multiple Choice Questions

1	b	2	a	3	c	4	b	5	d	6	b	7	a	8	b	9	c	10	b

II. Fill in the Blanks

1	Value Chain	2	Partner
3	Assured	4	Contrat Farming
5	Ciss-F	6	Fragmented
7	Inefficiencies	8	Value Chain Finance

9	Public-Private-Producer Partnerships	10	Small And Marginal

Module XI: Latest Technologies in Agriculture

11.1. A. Precision Agriculture: Concepts and techniques; their issues and concerns for Indian Agriculture

11.1. B. Use of nano-technology in Agriculture

I. Multiple Choice Questions

1	d	2	c	3	c	4	b	5	b	6	c	7	b	8	d	9	a	10	b

II. Fill in the Blanks

1	GPS	2	VRT (Variable Rate Technology)
3	Remote	4	Pest/Disease
5	Land		

11.2. Drone-Based Solutions for Agriculture: Applications in Monitoring, Spraying and Analysis, SOPs for Use of Drones

I. Multiple Choice Questions

1	b	2	a	3	b	4	a	5	d	6	d	7	b	8	c	9	b	10	b

II. Fill in the Blanks

1	Dynamic	2	20
3	labour	4	agrochemicals (or pesticides)
5	90	6	Standard Operating Procedures
7	Drone	8	multispectral imaging (or crop monitoring)
9	Drone Seeding Device	10	service providers (or technology bridge)

11.3. A. Transforming Agriculture: Practical Applications of Artificial Intelligence and Machine Learning

11.3. B. Block chain Technology for Traceability and Transparency in Food Systems

I.Multiple Choice Questions

1	a	2	a	3	b	4	c	5	d	6	d	7	a	8	b	9	a	10	c

II. Fill in the Blanks

1	Ledger	2	QR

3	Smart	4	Sensors
5	Machine Learning	6	Sensors
7	Block	8	Moisture
9	Cost	10	History

11. 4. A. Application of ICTs in Agriculture

11.4. B. Social Media, Portals and Mobile application including NPSS (National Pest Surveillance System)

I. Multiple Choice Questions

1	d	2	d	3	b	4	a	5	b	6	b	7	c	8	a	9	b	10	a

II. One Mark Questions

1	Information	2	Social
3	Pest	4	Real-time
5	Government	6	Social
7	Information	8	Advisory
9	Pests	10	Agricultural

11.5. A. Latest PHTs and Secondary Agriculture

11.5. B. Use of Plastics in Agriculture

I. Multiple Choice Questions

1	a	2	b	3	b	4	d	5	c	6	d	7	a	8	b	9	b	10	c

II. Fill in the Blanks

1	Harvesting	2	Internal
3	Antioxidants	4	Traceability
5	Microplastic	6	Plasticizers
7	Agroecological	8	Contamination
9	Drone Seeding Device	10	Monoculture

11.6. A. Hi-tech Agriculture

11.6. B. Protected cultivation – Importance and scope

11.6. C. Vertical Farming and Urban Agriculture: Novel Production Systems Hydroponics

I. Multiple Choice Questions

1	a	2	d	3	c	4	a	5	d	6	d	7	c	8	c	9	b	10	d

II. Fill in the Blanks

1	Hi-Tech	2	Hydroponics
3	Nutrient Film Technique	4	Deep Flow Technique
5	Floating	6	Capillary
7	Aeroponics	8	Internet Of Things
9	Climate Change	10	Higher Yields

III. One Word Questions

1	Green House effect	2	Plasticulture
3	Bt Cotton having resistance to Boll worm	4	Integrated Pest and Disease Management (IPM & IDM)
5	Meghadhooth, E-sap, Plantix, etc		

Module XII: Overview of Allied Sectors

12.1. Livestock Feed and Supplements: Opportunities for Agri-Input Dealers

I. Multiple Choice Questions

1	c	2	a	3	b	4	a	5	b	6	c	7	d	8	d	9	c	10	b

II. Fill in the Blanks

1	60-70	2	Feed
3	Feed Supplements	4	Feed Additives
5	Reproduction	6	Feed Additives
7	Amul	8	Mineral
9	Voeden India	10	sustainable

12.2. Exploring the World of Livestock Enterprises: Key Concepts and Practices; Dairy, Poultry, Fisheries, etc.

I. Multiple Choice Questions

1	b	2	b	3	a	4	c	5	d	6	c	7	c	8	b	9	d	10	a

II. Fill in the Blanks

1	Mechanized	2	Productivity
3	Feed	4	Agribusineses
5	Victims	6	Biology
7	Welfare	8	Circular
9	Market	10	Agility

12.3. A. Apiculture
12.3. B. Lac Culture
12.3. C. Sericulture

I. Multiple Choice Questions

1	b	2	c	3	d	4	d	5	a	6	b	7	a	8	c	9	c	10	b

II. Fill in the Blanks

1	L. L. Langstroth	2	Apis Cerana
3	Workers	4	Drones
5	Silk (Or Labial)	6	Bombyx Mori
7	Grasserie	8	Uzi
9	Nylon Nets	10	Uzitrap (Tablet)

III. One Mark Questions

1	Apiculture	2	Sericulture
3	Lac culture	4	Bombyx mori
5	Honey	6	Lac
7	Larva	8	Queen
9	Palas	10	Reeling

Module XIII: Extension Approaches and Agri-Entrepreneurship Development

13.1. Soft Skills for Agri-Input Dealers

I. Multiple Choice Questions

1	c	2	b	3	b	4	b	5	c	6	b	7	a	8	a	9	b	10	b

II. Fill in the Blanks

1	69	2	1:750
3	Two-way	4	Encode
5	Hard	6	Intensity
7	Intrinsic	8	Eustress
9	Adapt	10	Initial Disclosure

III. One Mark Questions

1	Encoding	2	Extrinsic
3	Eustress	4	Disclosure

5	Response		

13.2. Market-led Extension: Meaning, Role of Input dealers in promoting forward and backward linkages of farmers

I. Multiple Choice Questions

1	b	2	a	3	c	4	b	5	b	6	b	7	b	8	b	9	a	10	d

II. Fill in the Blanks

1	Market demand	2	Market intelligence
3	Passive recipient	4	Bi-directional
5	Backward	6	Forward
7	Aggregation	8	PMKSY (Pradhan Mantri Kisan Sampada Yojana
9	Produce what sells	10	Local market demand

13.3. Extension Methods such as Training, Demonstration, Exhibition, Kisan melas (purpose and procedure for organising each methods)

I. Multiple Choice Questions

1	c	2	a	3	d	4	a	5	c	6	b	7	b	8	a	9	b	10	d

II. Fill in the Blanks

1	Ways or techniques	2	Doing
3	Skills	4	Use
5	Individual	6	Traditional
7	Peer	8	Awareness
9	Mass	10	Extension teaching methods mix (Multimedia approach)

13.4. Agricultural Entrepreneurship: Opportunities and Challenges

I. Multiple Choice Questions

1	a	2	d	3	d	4	b	5	b	6	c	7	b	8	c	9	a	10	a

II. Fill in the Blanks

1	Third	2	Rashtriya Krishi Vikas Yojana
3	10	4	20

5	Farmer-Producer Organisations (FPOs)	6	Infrastructure
7	Food Processing	8	Organic farming
9	Agri-tech	10	Guides / Mentors

II. One Mark Questions

1	Entrepreneurship	2	Agri-entrepreneur
3	Value addition	4	Startup India
5	Risk	6	Direct marketing
7	Innovation	8	Credit
9	Training	10	Agro-processing

13.5. A. Financial Management: Budgeting, Cost Analysis, and Record Keeping

13.5. B. Tapping into Credit: Understanding Agricultural Financing Options

13.5. C. The Importance of Record Keeping for Agri- Input Dealers: Best Practices and Benefits

I. Multiple Choice Questions

1	d	2	c	3	c	4	b	5	b	6	a	7	b	8	c	9	d	10	b

II. Fill in the Blanks

1	Monetary	2	Enterprise
3	Partial	4	Fixed
5	Break-even point	6	Implicit
7	Stock Register	8	Cash Book
9	Depreciation	10	Subsidies

III. One Mark Questions

1	Partial Budgeting	2	Whole Farm Budgeting
3	Semi-Variable Cost	4	NABARD
5	Short-Term Credit	6	4%
7	Sales Register	8	Purchase Register
9	External Hard Drive	10	Near-Expiry Stock

Module XIV: Business Ethics and Regulations

14.1 Seed Act, 1966; Seed Rules, 1968, Seed Control Order, 1983

I. Multiple Choice Questions

1	a	2	b	3	d	4	c	5	c	6	a	7	a	8	b	9	b	10	b

II. Fill in the Blanks

1	25	2	Vigor (or Seed Moisture/Health)
3	Committee	4	Kind or variety
5	Minimum	6	Seed Inspector
7	Dealer	8	Stop sale
9	500	10	Farmer

14.2. Insecticide Act, 1968; Insecticide Rules, 1971

I. Multiple Choice Questions

1	b	2	b	3	c	4	a	5	b	6	d	7	b	8	a	9	a	10	d
11	c	12	b	13	d	14	d	15	b										

II. Fill in the Blanks

1	Pesticides	2	Food chain
3	License	4	Food articles
5	Stock Register	6	Insecticide Inspector
7	Label	8	Environmental
9	DAESI	10	Public health

III. One Word Questions

1	38 Sections	2	1971
3	Unregistered Insecticides	4	Protective Clothing and First-Aid Facilities
5	Stock and Sales Registers	6	Used Containers and Packages
7	Separate and Secure Godowns	8	Samples

14.3. A. Fertilizer Control Order, 1985; Fertilizer Movement and Control Order (FMCO), 1973; Fertilizer Amendment Order, 2002/2023.

I. Multiple Choice Questions

1	b	2	b	3	a	4	d	5	d	6	b	7	c	8	a	9	b	10	c

II. Fill in the Blanks

1	Essential Commodities	2	Essential
3	Fertilizer	4	Specialty / Fortified
5	Direct Benefit Transfer (DBT)		

14.3. B DBT in Fertilizers, Sale of Fertilizers through e-POS Machine, Grant of License through Online.

I. Multiple Choice Questions

1	a	2	a	3	b	4	d	5	c	6	b	7	a	8	d	9	a	10	b

II. Fill in the Blanks

1	Aadhaar	2	e-POS (Electronic Point of Sale)
3	OLMSFERTI	4	Assistant Director of Agriculture
5	Letter of Authorization		

14.4. A. Essential Commodity Act, 1955

14.4. B. Consumer Protection Act, 1986; Food Adulteration Act, 1954/1976/2006

14.4. C. APMC Act

I. Multiple Choice Questions

1	b	2	c	3	c	4	a	5	c	6	b	7	c	8	c	9	d	10	c

II. Fill in the Blanks

1	Essential Commodities	2	10
3	Model APMC	4	Sowing
5	5	6	Pesticides
7	Moral	8	Honesty & Transparency
9	Hoarding	10	Food Safety and Standards Act

14.5. Business Ethicks

I. Multiple Choice Questions

1	b	2	c	3	c	4	d	5	b

II. Fill in the Blanks

1	Moral	2	Quality
3	Farmer Trust	4	Factual
5	Certified	6	Hoarding
7	Local	8	Licensing
9	Scientifically	10	Backbone

Module XV: Government schemes related to Agriculture Sector

15.1. Major flagship Schemes of Central/State Governments related to agriculture and allied

I. Multiple Choice Questions

1	b	2	c	3	c	4	c	5	b	6	c	7	b	8	b	9	c	10	b

II. Fill in the Blanks

1	2025-26	2	90%
3	udyamimitra.in	4	₹6,000
5	stand-alone solar-powered	6	One District One Product
7	3%	8	e-NAM
9	55%	10	Mission on Integrated Development of Horticulture

15.2. PMFBY

I. Multiple Choice Questions

1	b	2	c	3	d	4	b	5	c	6	c	7	a	8	b	9	a	10	b

II. Fill in the Blanks

1	Double	2	90:10
3	3%	4	Two
5	2021-22	6	Rs. 25 lakh
7	Drip	8	Har Khet Ko Pani
9	14th April 2016	10	1522

15.3. KCC (Kisan Credit Card and Kisan Call Centre)

I. Multiple Choice Questions

1	b	2	b	3	b	4	c	5	c	6	b	7	c	8	c	9	a	10	c

II. Fill in the Blanks

1	100%	2	Rythu Bandhu

3	34,800	4	10%
5	2,00,000	6	₹40,000
7	₹1 lakh crore	8	7
9	4%	10	State Agriculture Plans

III. One Mark Questions

1	Credit	2	PMFBY
3	Landline	4	Atal Pension
5	Tenant	6	Tele
7	Dairy	8	Languages
9	Centres	10	Kisan Suvidha

Module XVI Safe Application of Agro-Chemicals

16.1. A. Introduction to agrochemicals – classification, type and role of agrochemicals in agriculture

16.1. B. Compatibility of Agro Chemical

I. Multiple Choice Questions

1	b	2	a	3	c	4	d	5	a	6	d	7	b	8	c	9	c	10	a

II. Fill in the Blanks

1	Health	2	Phytotoxicity
3	Biological	4	Jar test
5	Herbicides	6	Insecticide
7	Plant Growth Regulators	8	Soil Conditioners
9	Nematicides	10	Environmental pollution (or health hazards)

III. One Mark Questions

1	Sprayer	2	Compression Sprayer
3	14 to 21 kg/cm^2	4	1.5 to 2.5 hectares per hour
5	Hollow Cone Nozzle	6	Triple Action Nozzle

16.2. A. Types of Pesticide Application Equipment

16.2. B. Spray Nozzles and Their Classification

16.2. C. Calibration and care of Pesticide application Equipment

I. Multiple Choice Questions

1	b	2	c	3	c	4	b	5	c	6	b	7	b	8	d	9	b	10	a

II. Fill in the Blanks

1	Fine droplets.	2	More than 400 L/ha.
3	0.5 ha/day.	4	LiPo batteries.
5	Orifice.	6	IS: 11429-1985.
7	Apron	8	Resistance
9	Maximum Residue Limit.	10	Slightly toxic

16.3. A. Harmful effect of indiscriminate use of agricultural inputs

16.3. B. Pesticide Residues and Safety to consumers

16.3. C Precautionary Measures in procurement, handling and application of Chemicals and other agricultural inputs

I. Multiple Choice Questions

1	b	2	c	3	d	4	d	5	b	6	b	7	b	8	c	9	c	10	a

II. Fill in the Blanks

1	Integrated Pest Management (IPM)	2	Economic Injury Level (EIL)
3	Lady bird	4	12%
5	Pyrethrins	6	Karanjin
7	Acute	8	Phytotoxicity
9	Jar test	10	High Volume

III. One Mark Questions

1	Pesticide Residue
2	Harmful effect of excessive urea on soil
3	Yellow Label on a pesticide container
4	Personal Protective Equipment
5	Integrated Pest Management

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