

Nagaland Board Class 12, 2026 Agriculture (Vocational) Question Paper with Solutions

Time Allowed :3 Hours	Maximum Marks :70	Total questions :38
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The paper is divided into Section A and Section B.
2. Section A includes objective-type questions.
3. All questions in Section A are compulsory.
4. Section B includes short answer, and long answer type questions.
5. Answers must be written legibly within the word limit.
6. Use of unfair means or electronic devices is prohibited.
7. Follow the correct format and instructions for each section.

Section - A

1. Which of the following nutrients is required in the largest quantity by plants?

- (A) Iron
- (B) Nitrogen
- (C) Zinc
- (D) Copper

Correct Answer: (B) Nitrogen

Solution:

Step 1: Understanding plant nutrients.

Plants require several essential nutrients for their growth, metabolism, and development. These nutrients are broadly divided into two categories: macronutrients and micronutrients.

Macronutrients are needed in relatively large quantities, whereas micronutrients are required in very small amounts but are still essential for plant health.

Step 2: Importance of nitrogen in plants.

Nitrogen is one of the most important macronutrients for plants. It is a fundamental component of amino acids, proteins, nucleic acids (DNA and RNA), and chlorophyll. Chlorophyll is the pigment responsible for photosynthesis, the process through which plants produce food using sunlight. Because nitrogen participates in these critical biological processes, plants require it in large amounts for proper growth.

Step 3: Comparison with other options.

- **(A) Iron:** Iron is an essential micronutrient involved in enzyme systems and chlorophyll formation, but plants require it only in trace amounts.
- **(B) Nitrogen:** Correct. Nitrogen is a primary macronutrient and is required by plants in the largest quantity among the given options.
- **(C) Zinc:** Zinc is a micronutrient that helps regulate enzyme activity and hormone production, but it is required only in small quantities.
- **(D) Copper:** Copper is also a micronutrient that participates in electron transport and enzyme reactions but is needed in very small amounts.

Step 4: Conclusion.

Among the given nutrients, nitrogen is required in the largest quantity by plants because it is a major macronutrient essential for protein synthesis, chlorophyll formation, and overall plant growth.

Final Answer: Nitrogen.

Quick Tip

Plants require macronutrients such as nitrogen (N), phosphorus (P), and potassium (K) in large quantities. Micronutrients like iron, zinc, and copper are required only in trace amounts.

2. Which method of irrigation is considered most efficient in water use?

- (A) Flood irrigation
- (B) Furrow irrigation
- (C) Drip irrigation
- (D) Basin irrigation

Correct Answer: (C) Drip irrigation

Solution:

Step 1: Understanding irrigation methods.

Irrigation is the artificial supply of water to crops to support plant growth, especially in regions where rainfall is insufficient. Different irrigation techniques are used in agriculture, and their efficiency depends on how effectively water reaches the plant roots while minimizing losses due to evaporation, runoff, and seepage.

Step 2: Principle of drip irrigation.

Drip irrigation is a modern irrigation technique in which water is delivered slowly and directly to the root zone of plants through pipes, tubes, and emitters. The water is supplied drop by drop, ensuring that plants receive the required amount of moisture without excessive wastage.

Step 3: Comparison with other irrigation methods.

- **(A) Flood irrigation:** Water is allowed to spread across the entire field. This method causes significant water loss due to evaporation and runoff.
- **(B) Furrow irrigation:** Water flows through channels between crop rows. Although better than flooding, it still results in water loss.
- **(C) Drip irrigation:** Correct. Water is supplied directly to the plant roots in controlled amounts, minimizing wastage and making it the most efficient irrigation method.
- **(D) Basin irrigation:** Water is applied in basins around plants, but some water may still be lost through evaporation or percolation.

Step 4: Conclusion.

Since drip irrigation supplies water directly to the root zone and minimizes evaporation and runoff losses, it is considered the most efficient irrigation method in terms of water use.

Final Answer: Drip irrigation.

Quick Tip

Drip irrigation is often called micro-irrigation because it provides water directly to the root zone of plants. It can save a significant amount of water compared to traditional irrigation techniques.

3. Which of the following is a Kharif crop?

- (A) Wheat
- (B) Mustard
- (C) Rice
- (D) Gram

Correct Answer: (C) Rice

Solution:

Step 1: Understanding cropping seasons.

In India, agricultural crops are broadly classified into three main cropping seasons: Kharif, Rabi, and Zaid. Kharif crops are those crops that are grown during the monsoon season when rainfall is abundant. These crops are usually sown at the beginning of the rainy season, around June or July, and harvested in September or October.

Step 2: Characteristics of Kharif crops.

Kharif crops require warm weather and a good amount of rainfall for proper growth and development. These crops thrive in the humid conditions of the monsoon season. Some common examples of Kharif crops include rice, maize, cotton, jute, and groundnut.

Step 3: Analysis of the given options.

- **(A) Wheat:** Wheat is mainly grown in the winter season and therefore it is classified as a Rabi crop.

- **(B) Mustard:** Mustard is also cultivated during the winter months and belongs to the Rabi crop category.
- **(C) Rice:** Rice requires large quantities of water and warm temperatures, making it one of the most important Kharif crops.
- **(D) Gram:** Gram (chickpea) is generally grown in the winter season and is therefore considered a Rabi crop.

Step 4: Conclusion.

Among the given options, rice is the crop that is cultivated during the monsoon season and therefore belongs to the Kharif crop category.

Final Answer: Rice.

Quick Tip

Kharif crops are sown during the monsoon season (June–July) and harvested around September–October. Common examples include rice, maize, cotton, and groundnut.

4. Which nutrient deficiency causes yellowing of leaves in plants?

- (A) Nitrogen
- (B) Potassium
- (C) Phosphorus
- (D) Calcium

Correct Answer: (A) Nitrogen

Solution:

Step 1: Importance of nutrients in plants.

Plants require essential nutrients for proper growth, development, and metabolism. These nutrients are categorized into macronutrients and micronutrients. Macronutrients such as nitrogen, phosphorus, and potassium are required in larger quantities and play major roles in plant physiology.

Step 2: Role of nitrogen in plants.

Nitrogen is a crucial nutrient because it forms an important part of chlorophyll, the green pigment responsible for photosynthesis. It also helps in the formation of proteins, enzymes, and nucleic acids that support plant growth.

Step 3: Effect of nitrogen deficiency.

When plants suffer from nitrogen deficiency, they are unable to synthesize sufficient chlorophyll. As a result, the leaves lose their green color and gradually turn yellow. This condition is known as chlorosis and it usually begins in older leaves before spreading to other parts of the plant.

Step 4: Comparison with other options.

- **(A) Nitrogen:** Correct. Lack of nitrogen causes chlorosis which results in yellowing of leaves.
- **(B) Potassium:** Potassium deficiency generally causes scorching or burning of leaf edges rather than yellowing of the entire leaf.
- **(C) Phosphorus:** Phosphorus deficiency often leads to dark green or purplish coloration of leaves.
- **(D) Calcium:** Calcium deficiency mainly affects growing points and young tissues rather than causing general yellowing.

Step 5: Conclusion.

Since nitrogen is essential for chlorophyll production, its deficiency results in yellowing of leaves in plants.

Final Answer: Nitrogen.

Quick Tip

Yellowing of leaves caused by lack of chlorophyll is called chlorosis. The most common nutrient responsible for this condition is nitrogen.

5. Which of the following is a biological method of pest control?

- (A) Pesticides
- (B) Insecticides
- (C) Release of natural predators
- (D) Chemical sprays

Correct Answer: (C) Release of natural predators

Solution:

Step 1: Understanding pest control methods.

Pest control refers to the methods used to manage or eliminate organisms that damage crops. These methods can be broadly categorized into chemical control, mechanical control, and biological control. Biological control specifically involves using living organisms to reduce or control pest populations in an environmentally friendly way.

Step 2: Concept of biological control.

Biological pest control uses natural enemies of pests such as predators, parasites, or pathogens. These organisms naturally reduce pest populations without the use of harmful chemicals. A common example is the release of ladybird beetles to control aphids in agricultural fields.

Step 3: Analysis of the options.

- **(A) Pesticides:** These are chemical substances used to kill pests and are part of chemical pest control.
- **(B) Insecticides:** These are chemicals specifically used to kill insects and therefore belong to chemical control methods.
- **(C) Release of natural predators:** Correct. This method involves introducing organisms that feed on pests, making it a biological method of pest control.
- **(D) Chemical sprays:** These are chemical agents applied to crops and are not biological methods.

Step 4: Conclusion.

Since biological pest control relies on living organisms to suppress pest populations, the release of natural predators is the correct example of a biological pest control method.

Final Answer: Release of natural predators.

Quick Tip

Biological pest control is environmentally friendly because it reduces the use of harmful chemicals and relies on natural ecological relationships between predators and pests.

6. Which soil is most suitable for growing cotton?

- (A) Sandy soil
- (B) Alluvial soil
- (C) Black soil
- (D) Laterite soil

Correct Answer: (C) Black soil

Solution:

Step 1: Understanding soil requirements of cotton.

Cotton is a major commercial crop that requires specific soil conditions for healthy growth. The soil should have good moisture retention capacity, proper aeration, and adequate nutrients to support the crop during its growing period.

Step 2: Characteristics of black soil.

Black soil, also known as regur soil, is rich in clay and has a high capacity to retain moisture. It contains essential nutrients such as calcium carbonate, magnesium, potash, and lime. This soil swells when wet and shrinks when dry, helping maintain soil moisture for longer periods.

Step 3: Comparison with other soil types.

- **(A) Sandy soil:** Sandy soil drains water quickly and has poor nutrient retention, making it less suitable for cotton cultivation.
- **(B) Alluvial soil:** Although fertile and suitable for many crops, it does not retain moisture as effectively as black soil for cotton growth.
- **(C) Black soil:** Correct. Its high moisture retention and nutrient content make it ideal for cotton cultivation.

- **(D) Laterite soil:** Laterite soil is generally acidic and low in fertility, making it less suitable for cotton.

Step 4: Conclusion.

Because of its high moisture retention capacity and nutrient-rich composition, black soil is the most suitable soil type for growing cotton.

Final Answer: Black soil.

Quick Tip

Black soil is also called regur soil and is popularly known as cotton soil because it provides ideal moisture and nutrient conditions for cotton cultivation.

Section - B

7. Discuss the concept of safe food and important food regulations.

Solution:

Step 1: Define Safe Food.

Safe food refers to food that is free from harmful contaminants such as microorganisms, chemicals, toxins, or physical impurities and is suitable for human consumption. It is prepared, handled, and stored under hygienic conditions so that it does not cause illness or harm to consumers.

Step 2: Explain the importance of food safety.

Food safety is essential to protect public health and prevent food-borne diseases. Contaminated food can lead to serious health problems such as infections, food poisoning, and long-term illnesses. Ensuring food safety helps maintain the nutritional quality of food and increases consumer confidence in food products.

Step 3: Mention important food regulations.

Food regulations are rules and standards established by governments to ensure the safety, quality, and hygiene of food products. These regulations control food production, processing, storage, packaging, labeling, and distribution to protect consumers from unsafe food.

Step 4: Examples of important food regulations.

Some important food regulations include standards for food additives, limits for pesticide residues, hygienic handling of food, proper labeling of packaged food, and inspection of food industries. In India, the Food Safety and Standards Authority of India (FSSAI) regulates food safety and ensures that food products meet prescribed standards.

Step 5: Conclude the concept.

Therefore, safe food and food regulations play a crucial role in maintaining public health by ensuring that the food available in the market is clean, nutritious, and free from harmful substances.

Quick Tip

Safe food means food that is free from contamination, while food regulations are legal standards that ensure the quality, hygiene, and safety of food products.

8. Enlist major post-harvest management steps of fruits and vegetables.

Solution:

Step 1: Understanding Post-Harvest Management.

Post-harvest management refers to the series of processes and treatments carried out after harvesting fruits and vegetables in order to maintain their quality, reduce losses, and extend their shelf life before reaching consumers.

Step 2: Harvesting and Handling.

The first step is careful harvesting of fruits and vegetables at the proper stage of maturity. Proper handling during harvesting helps prevent physical damage such as bruising or cuts which may lead to spoilage.

Step 3: Cleaning and Sorting.

After harvesting, the produce is cleaned to remove dirt, dust, and microorganisms. Sorting and grading are then carried out to separate fruits and vegetables according to their size, quality, and ripeness.

Step 4: Packaging and Storage.

Proper packaging protects the produce from mechanical damage during transportation. Storage under controlled conditions such as appropriate temperature, humidity, and ventilation helps to slow down respiration and delay spoilage.

Step 5: Transportation and Marketing.

The final step involves safe transportation and efficient distribution to markets. Proper transport conditions ensure that fruits and vegetables reach consumers while maintaining freshness and nutritional value.

Quick Tip

Major post-harvest steps include harvesting, cleaning, sorting, grading, packaging, storage, and transportation to reduce spoilage and maintain quality.

9. Discuss the role of food production in national economy and national food security.

Solution:

Step 1: Explain the meaning of food production.

Food production refers to the process of growing crops, raising livestock, and producing food items that are essential for human consumption. It forms the backbone of the agricultural sector and plays a very important role in supporting the economy of a country.

Step 2: Contribution to the national economy.

Food production contributes significantly to the national economy by generating income and increasing the Gross Domestic Product (GDP). Agriculture and food-related industries provide livelihood to a large portion of the population. It also supports industries such as food processing, transportation, packaging, and storage.

Step 3: Generation of employment.

A large number of people are engaged in activities related to food production such as farming, harvesting, marketing, and distribution. These activities create employment opportunities in rural and urban areas, helping to reduce poverty and improve the standard of living.

Step 4: Role in national food security.

Food security means that all people have access to sufficient, safe, and nutritious food at all times. Adequate food production ensures the continuous supply of food grains, fruits, vegetables, and other food items required by the population of a country.

Step 5: Prevention of hunger and maintenance of food reserves.

When food production is sufficient, governments can maintain buffer stocks of food grains. These reserves help in managing food shortages during natural disasters, droughts, or other emergencies and ensure that the population does not suffer from hunger and malnutrition.

Quick Tip

Food production is essential for economic development because it generates employment, contributes to GDP, and ensures food availability for the entire population.

10. Make a flow chart for making mango pickle.

Solution:

Step 1: Selection of raw mangoes.

Fresh and firm raw mangoes are selected for preparing pickle. The mangoes should be free from damage or spoilage so that the pickle remains safe and tasty for a long time.

Step 2: Washing and drying of mangoes.

The mangoes are washed thoroughly with clean water to remove dirt and impurities. After washing, they are properly dried to remove any moisture, which helps prevent spoilage of the pickle.

Step 3: Cutting the mangoes.

The dried mangoes are cut into small pieces using a clean knife. The pieces should be of suitable size so that they absorb the spices properly during the pickling process.

Step 4: Mixing with salt and spices.

The mango pieces are mixed with salt, turmeric powder, chili powder, mustard seeds, and other spices according to taste. Edible oil is also added, which helps preserve the pickle and enhance its flavor.

Step 5: Filling in jars and curing.

The prepared mixture is filled in clean and dry glass jars or containers. These jars are kept in sunlight for several days so that the mango pieces absorb the spices and the pickle develops its proper taste.

Step 6: Final product preparation.

After a few days of curing in sunlight, the mango pickle becomes ready for consumption and can be stored for a long period.

Flow Chart:

Selection of Raw Mangoes → Washing → Drying → Cutting into Pieces → Mixing with Salt and Spices → Adding Oil → Filling in Containers → Sun Drying / Curing → Mango Pickle Ready

Quick Tip

Proper drying of mango pieces and the correct proportion of salt and oil help preserve mango pickle and prevent microbial spoilage.

11. Enlist the major components of IPM, and discuss briefly.

Solution:

Step 1: Define Integrated Pest Management (IPM).

Integrated Pest Management (IPM) is an eco-friendly pest control strategy that combines different management techniques to keep pest populations below the economic threshold level while minimizing harm to the environment, humans, and beneficial organisms.

Step 2: Cultural Control Methods.

Cultural methods involve modifying farming practices to reduce pest infestation. These include crop rotation, timely sowing, proper irrigation, balanced fertilization, field sanitation, and removal of infected plant parts. These practices help create unfavorable conditions for pests.

Step 3: Mechanical and Physical Control Methods.

Mechanical and physical methods involve the direct removal or destruction of pests. Examples include hand-picking insects, using traps, barriers, light traps, sticky traps, and

mechanical removal of infected plant parts. These methods reduce pest population without using chemicals.

Step 4: Biological Control Methods.

Biological control uses natural enemies of pests such as predators, parasites, and pathogens. Examples include ladybird beetles controlling aphids, parasitoid wasps, and microbial agents like *Bacillus thuringiensis*. These methods help maintain ecological balance.

Step 5: Chemical Control Methods.

Chemical methods involve the use of pesticides when pest populations exceed economic threshold levels. In IPM, chemicals are used carefully and selectively so that beneficial organisms and the environment are not harmed.

Quick Tip

IPM integrates cultural, mechanical, biological, and chemical control methods to manage pests effectively while protecting the environment.

12. Enlist various irrigation methods used in India? Discuss the drip method in brief.

Solution:

Step 1: Define Irrigation.

Irrigation refers to the artificial supply of water to agricultural crops to support their growth and development, especially in areas where rainfall is insufficient or irregular.

Step 2: Major Irrigation Methods Used in India.

Various irrigation methods used in India include:

1. Surface irrigation
2. Sprinkler irrigation
3. Drip irrigation
4. Subsurface irrigation

These methods are adopted depending on the availability of water, soil type, and crop requirements.

Step 3: Explain Drip Irrigation Method.

Drip irrigation is a modern irrigation technique in which water is delivered directly to the root zone of plants through a system of pipes, tubes, valves, and emitters. Water is applied drop by drop in small quantities.

Step 4: Advantages of Drip Irrigation.

This method reduces water wastage due to evaporation and runoff. It ensures efficient water use, improves crop yield, minimizes weed growth, and helps maintain proper soil moisture around the plant roots.

Step 5: Importance of Drip Irrigation.

Drip irrigation is especially useful in water-scarce regions and for crops such as fruits, vegetables, and plantation crops. It helps conserve water and increases agricultural productivity.

Quick Tip

Drip irrigation delivers water directly to the root zone in small droplets, reducing water loss and improving irrigation efficiency.

13. What is the concept of integrated nutrient management? Discuss its major components in detail.

Solution:

Step 1: Define Integrated Nutrient Management (INM).

Integrated Nutrient Management (INM) is a balanced and sustainable approach of supplying nutrients to crops by combining chemical fertilizers, organic manures, and biological sources. The main aim of INM is to maintain soil fertility, improve crop productivity, and minimize environmental damage while ensuring the efficient use of available nutrients.

Step 2: Importance of Integrated Nutrient Management.

INM helps in improving soil health by maintaining the balance of nutrients in the soil. It also increases crop yield and quality while reducing the dependency on chemical fertilizers. This method ensures long-term sustainability of agricultural production and reduces soil degradation.

Step 3: Major component – Chemical fertilizers.

Chemical fertilizers are important sources of essential nutrients such as nitrogen, phosphorus, and potassium. These fertilizers provide nutrients in readily available forms that can be quickly absorbed by plants. However, they should be used in balanced quantities to avoid soil pollution and nutrient imbalance.

Step 4: Major component – Organic manures.

Organic manures include farmyard manure (FYM), compost, green manure, and vermicompost. These materials improve soil structure, increase water-holding capacity, and enhance microbial activity in the soil. Organic manures also provide essential nutrients in a slow and steady manner.

Step 5: Major component – Biofertilizers.

Biofertilizers are microorganisms that help in increasing the availability of nutrients to plants. Examples include Rhizobium, Azotobacter, and blue-green algae. These microorganisms fix atmospheric nitrogen or solubilize phosphorus, making nutrients more available to crops.

Step 6: Overall benefit of INM.

By integrating chemical fertilizers, organic manures, and biofertilizers, INM ensures sustainable crop production. It maintains soil fertility, reduces environmental pollution, and improves the overall productivity of agricultural systems.

Quick Tip

Integrated Nutrient Management combines chemical fertilizers, organic manures, and biofertilizers to maintain soil fertility and achieve sustainable agricultural production.

14. Discuss the major Government Schemes for the food sector.

Solution:

Step 1: Importance of government schemes in the food sector.

Government schemes play an important role in strengthening the food sector by supporting farmers, improving food production, ensuring food security, and promoting food processing industries. These schemes help improve the availability and distribution of food across the

country.

Step 2: National Food Security Mission (NFSM).

The National Food Security Mission aims to increase the production of important food crops such as rice, wheat, pulses, and coarse cereals. The scheme focuses on improving crop productivity through the use of modern agricultural practices, improved seeds, and better nutrient management.

Step 3: Pradhan Mantri Kisan Samman Nidhi (PM-KISAN).

Under the PM-KISAN scheme, financial assistance is provided to small and marginal farmers. Farmers receive direct income support from the government, which helps them purchase seeds, fertilizers, and other agricultural inputs required for food production.

Step 4: Mid-Day Meal Scheme.

The Mid-Day Meal Scheme provides nutritious meals to school children in government and government-aided schools. This scheme helps improve the nutritional status of children and encourages school attendance while ensuring food security at the basic level.

Step 5: Public Distribution System (PDS).

The Public Distribution System is a government program that distributes essential food items such as rice, wheat, sugar, and kerosene to economically weaker sections of society at subsidized prices. It plays a major role in ensuring food security for low-income families.

Step 6: Pradhan Mantri Kisan Sampada Yojana.

This scheme focuses on the development of food processing industries and infrastructure. It aims to reduce food wastage, increase farmers' income, and improve the overall efficiency of the food supply chain.

Quick Tip

Government schemes such as NFSM, PM-KISAN, PDS, and Mid-Day Meal Scheme help improve food production, support farmers, and ensure food security in the country.

15. Availability of funds is a major concern for starting a business. A delay in source of finance delay in starting or running business.

Solution:

Step 1: Importance of finance in business.

Finance is one of the most essential requirements for starting and operating any business. It is needed to purchase raw materials, machinery, equipment, land, and to meet day-to-day operational expenses such as wages, electricity, and transportation.

Step 2: Role of timely availability of funds.

For a business to begin smoothly, adequate funds must be available at the right time. Timely availability of finance helps entrepreneurs establish infrastructure, hire workers, and start production or service activities without interruption.

Step 3: Impact of delay in sources of finance.

If there is a delay in obtaining funds from sources such as banks, financial institutions, investors, or government schemes, the business startup process gets delayed. Entrepreneurs may not be able to purchase necessary resources or begin operations on time.

Step 4: Effect on running business operations.

Even after the business starts, delay in financial support can affect working capital management. It may lead to production delays, inability to pay employees or suppliers, and disruption of business activities.

Step 5: Conclusion.

Therefore, availability of funds is a critical factor for starting and maintaining a business. Proper financial planning and timely access to sources of finance ensure smooth functioning and growth of the enterprise.

Quick Tip

Finance is the backbone of any business. Without timely funding, starting and managing business operations becomes very difficult.

16. Water treatment specialist, Water Auditor, Water policy Analyst, Water resource planning manager, Water Quality Monitoring, Water conservation Representative.

Solution:

Step 1: Introduction to water management careers.

Water resource management is an important field that focuses on the sustainable use, conservation, and monitoring of water resources. Several professional roles are involved in maintaining water quality and ensuring proper management of water resources.

Step 2: Water Treatment Specialist.

A water treatment specialist is responsible for treating and purifying water to make it safe for drinking and other uses. They manage treatment plants and ensure removal of contaminants and harmful substances from water.

Step 3: Water Auditor and Water Policy Analyst.

A water auditor evaluates water usage and identifies areas where water can be conserved or used more efficiently. A water policy analyst studies water policies and regulations and develops strategies for sustainable water management and distribution.

Step 4: Water Resource Planning Manager.

A water resource planning manager plans and manages water supply systems, irrigation projects, and water conservation programs to ensure efficient use of available water resources.

Step 5: Water Quality Monitoring and Water Conservation Representative.

Water quality monitoring professionals regularly test and monitor water sources to ensure safety and compliance with environmental standards. Water conservation representatives promote awareness and encourage communities to adopt practices that help save and protect water resources.

Quick Tip

Careers in water resource management focus on water treatment, monitoring, conservation, policy making, and sustainable use of water resources.

17. What is integrated pest management? Discuss biological control of pests in detail.

Solution:

Step 1: Define Integrated Pest Management (IPM).

Integrated Pest Management (IPM) is an environmentally friendly and sustainable approach used to control pests in agriculture. It combines different pest control techniques such as cultural, biological, mechanical, and chemical methods to keep pest populations below the economic threshold level while minimizing harm to humans, animals, and the environment.

Step 2: Objective of IPM.

The main objective of IPM is to manage pests effectively with minimal use of chemical pesticides. It aims to protect crops, reduce environmental pollution, preserve beneficial organisms, and maintain ecological balance in agricultural systems.

Step 3: Introduction to Biological Control.

Biological control is an important component of IPM. It involves the use of living organisms such as predators, parasites, and pathogens to control pest populations naturally. These organisms attack or suppress harmful pests and reduce their numbers in crop fields.

Step 4: Types of Biological Control Agents.

Biological control agents include predators like ladybird beetles that feed on aphids, parasitoids such as Trichogramma wasps that destroy insect eggs, and microbial agents like *Bacillus thuringiensis* (Bt) that infect and kill insect pests. These agents help maintain the natural balance of ecosystems.

Step 5: Advantages of Biological Control.

Biological control is safe, eco-friendly, and sustainable. It reduces the use of chemical pesticides, protects beneficial organisms, and prevents environmental pollution. It also helps in long-term pest management and improves agricultural productivity.

Quick Tip

Biological control uses natural enemies such as predators, parasites, and microorganisms to control pests without harming the environment.

18. Discuss post harvest treatment for storage of cereal crops.

Solution:

Step 1: Introduction to Post-Harvest Treatment.

Post-harvest treatment refers to the processes and practices carried out after harvesting crops in order to maintain quality, reduce losses, and ensure safe storage of agricultural produce. For cereal crops such as wheat, rice, and maize, proper post-harvest handling is essential to prevent spoilage and pest infestation.

Step 2: Cleaning and Drying of Grains.

After harvesting, the grains are cleaned to remove dust, chaff, stones, and other impurities. The grains are then dried properly to reduce moisture content. Low moisture levels help prevent fungal growth, insect infestation, and deterioration during storage.

Step 3: Proper Storage Methods.

Cereal grains should be stored in clean and dry storage structures such as granaries, metal bins, or warehouses. Proper ventilation and protection from moisture are necessary to maintain grain quality and prevent spoilage.

Step 4: Protection from Pests and Diseases.

Stored grains are protected from insects, rodents, and microorganisms through fumigation, use of safe pesticides, and regular inspection. Maintaining hygienic storage conditions helps prevent damage to stored cereals.

Step 5: Importance of Proper Storage.

Proper post-harvest treatment and storage help maintain the nutritional quality of cereal grains, reduce economic losses, and ensure food security. It also extends the shelf life of grains until they reach consumers or markets.

Quick Tip

Proper drying, cleaning, and storage are essential steps to prevent spoilage and pest attack in stored cereal grains.