12 Improvement in Food Resources

Fastrack Revision

- **Food:** It is an essential organic substance that supplies proteins, carbohydrates, fats, vitamins and minerals, all of which we require for body development, growth and health.
- **Sources of Food:** Both plants and animals are the major sources of food which are obtained by agriculture and animal husbandry.
- **Need to Improve Food Resources:** To meet the demands of growing population, there is a need to improve food resources. This led to green revolution and white revolution.

Knowledge BOOSTER

Green revolution has contributed to increased food grain production and white revolution has resulted in better and efficient availability of milk.

- **Crops:** When plants of the same variety are cultivated on a large scale, they are called crops. The crops are divided on the basis of the seasons in which they grow.
  - **Types of Crops**
    - **Cereal Crops:** Wheat, rice, maize, millets and sorghum.
    - **Pulses:** Gram, pea, black gram, green gram, etc.
    - **Oilseed Crops:** Soyabean, groundnut, castor, etc.
    - **Vegetable, Spices and Fruits:** Cabbage, onion, pepper, etc.
    - **Fodder Crops:** Berseem, oats, sudan grass, etc.
  - **Classification of Crops**
    - **Kharif Crops:** The crops which are grown in hot and rainy season (Kharif season from June to October), *e.g.*, paddy, soybean, pigeon pea, maize, cotton, etc.
    - **Rabi Crops:** The crops which are grown in winter season (Rabi season from November to April), *e.g.*, wheat grain, peas, mustard, linseed, etc.
  - **Factors for Successful Crop Production**
    - Understanding how crops grow and develop.
    - Effect of various nutrients, climate and water on the growth of the plant.
    - Modification and management of each factor for increasing the yield of the crop.
- **Improvement in Crop Yield:** It involves the group of activities such as:
  - Crop variety improvement.
  - Crop production management.
  - Crop protection management.
  - **Crop Variety Improvement:** It can be done either by hybridisation or by introducing a gene.
    - **By Hybridisation:** Hybridisation is crossing between genetically dissimilar plants. This crossing may be intervarietal (between different varieties), interspecific (between two different species of the same genus) or intergeneric (between different genera).
    - **By Introducing a Gene:** This provides the desired characteristics and results in genetically modified crops.

Knowledge BOOSTER

Intervarietal hybridisation is the most common method used in plant breeding.

  - **Factors of Crop Variety Improvement**
    - Higher yield to increase productivity of crop per acre.
    - Improved quality that varies from crop to crop, *e.g.*, protein quality in, pulses, oil quality in oilseeds, etc.
    - Biotic (diseases, insects, etc.) and abiotic (drought, salinity, water logging, heat, cold, etc.) resistances.
    - Change in maturity duration making a crop more economical.
    - Wider adaptability stabilises crop production.
    - Desirable agronomic characteristics increases productivity.
  - **Crop Production Management:** It involves management of nutrients, irrigation and cropping patterns.
    - **Management of Nutrients:** Nutrients are supplied by air, water and soil to plants. Air supplies carbon and oxygen, hydrogen comes from water and soil supplies the other thirteen nutrients to plants. Among these thirteen, six are macronutrients (nitrogen, phosphorus, potassium, calcium, magnesium and sulphur) and other seven are micronutrients (iron, manganese, boron, zinc, copper, molybdenum and chlorine). Deficiency of these nutrients affects physiological processes in plants including reproduction, growth and susceptibility to diseases.
    - **Manure:** These are bulky sources of organic matter obtained through decomposition of plant and animal wastes. These are:
      1. **Compost:** It includes farm waste material such as vegetable waste, animal refuse, sewage waste, etc., which are decomposed in pits and the process is composting.

Knowledge BOOSTER

An earthworm plays the role of aerator, crusher and mixer, chemically as degrader and biologically as a stimulator of decomposition.

2. **Vermicompost:** Compost made by the decomposition of plant and animal refuse through earthworms.
3. **Green Manure:** Plants like sun hemp or guar are grown and mulched by ploughing them into the soil which are then turned into green manure. It helps in enriching the soil in nitrogen and phosphorus.

- **Fertilizers:** They are organic and inorganic sources of plant nutrients used to increase soil fertility and are manufactured commercially from chemicals. They supply Nitrogen, Phosphorus and Potassium (NPK).

Knowledge BOOSTER

Biofertilizers are microorganisms or biologically active products which are used to enrich soil fertility, e.g., legume- Rhizobium symbiosis.

- **Organic Farming:** It is an environment friendly farming system in which chemical fertilizers, herbicides or pesticides are used either in lesser quantity or are not used at all.
- **Irrigation:** It is the process of supplying water to the crop fields using canals, wells, tubewells, etc. Irrigation or water requirements of crops depend on the nature of crop and the nature of soil.
- **Cropping Patterns:** It includes different ways of growing crops so as to get the maximum benefit such as mixed cropping, intercropping, crop rotation.

Knowledge BOOSTER

Drought is a situation that arises due to scarce or inadequate distribution of rainfall.

- **Mixed Cropping:** Growing two or more crops simultaneously on the same piece of land, *e.g.*, wheat + gram.
- **Intercropping:** Growing two or more crops simultaneously on the same field in definite pattern, *e.g.*, soyabean + maize.
- **Crop Rotation:** Growing of different crops on a piece of land in a pre-planned succession.

- **Crop Protection Management:** It includes methods for protection from weeds, insect pests and diseases.
  - **Weeds:** These are unwanted plants in the cultivated field, *e.g.*, *Xanthium* (gokhroo), *Parthenium (gajar ghas)*, etc.
  - **Insect Pests:** They attack the plants by cutting the root, stem and leaf, sucking the cell sap from various parts of plant or by boring into stem and fruits.
  - **Crop Diseases:** These are caused by pathogens such as bacteria, fungi and viruses.

Knowledge BOOSTER

Biopesticides are biological agents used to control insects and pathogens such as viruses, mites, etc.

- **Storage of Grains:** It is done by proper treatment and by systematic management of warehouses.
- **Animal Husbandry:** It is the branch of agriculture which deals with rearing, feeding, breeding and caring of animals. It refers to scientific management of livestock.
- **Cattle Farming:** It is done for milk and drought labour for agricultural works, *e.g.*, cattle, goat, sheep, poultry and fish farming.
- **Milch Animals:** Milk producing females or dairy animals, *e.g.*, sahiwal, gir, etc.
- **Draught Animals:** They are used for farm labour, *e.g.*, malvi, oxen, etc.
- **Animals Feed:** It includes:
  - Roughage which is largely a fibre.
  - Concentrates which are low in fibre and contain relatively high levels of protein and other nutrients.
- **Poultry Farming:** It is the practice of raising poultry birds like chicken (hen), ducks, etc., for the production of eggs and meat.
- **Production of Poultry Birds:** Good management practices are important for good production of poultry birds that includes maintenance of temperature and hygienic conditions in housing and poultry feed as well as prevention and control of diseases and pests.
- **Egg and Broiler Production:** The housing, nutritional and environmental requirements of broilers are some what different from those of egg layers. The ration (daily food requirement) for broilers is protein rich with adequate fat. The levels of vitamins A and K is kept high in the poultry feeds.
- **Fish Production:** Two ways of obtaining fish are:
  - Natural resources called capture fishing.
  - Fish farming called culture fishery.

Knowledge BOOSTER

Composite fish culture is fish production in which a combination of 5 or 6 fish species are cultivated in a single pond having different food habits so that they do not compete for food with each other.

- **Marine Fisheries:** Popular marine fishes are pomphret, mackerel, tuna, sardines and bombay duck. High economic value marine fishes are finned fishes and shellfishes.
- **Inland Fisheries:** It includes fishery in freshwater and brackish water.
- **Bee-keeping:** It refers to keeping of bees and this practice of rearing, care and management of honey bees to obtain honey, bees wax, etc., from the beehive is called apiculture.
- **Honeybee Varieties:** For commercial production of honey in India, both indigenous and exotic varieties of honeybees are used and apiaries as well as bee farms are established.
  - **Indigenous Varieties:** *Apis cerana indica* (Indian bee), *Apis dorsata* (Rock bee), etc.
  - **Exotic Varieties:** *Apis mellifera* (Italian bee), *Apis adansonii* (South African bee).

Practice Exercise

Multiple Choice Questions

Q 1. Growing of two or more crops simultaneously on the same piece of land is:
a. disjoint cropping b. alter cropping
c. mixed cropping d. None of these

Q 2. Preventive and control measures adopted for the storage of grains include: *(NCERT EXEMPLAR)*
a. strict cleaning b. proper disjoining
c. fumigation d. All of these

Q 3. Plants acquire nitrogen from:
a. water b. soil
c. node d. None of these

Q 4. What do we call the kind of farming with no use of chemicals?
a. Organic farming b. Inorganic farming
c. Cattle farming d. None of these

Q 5. Fertilization between genetically different species is referred as:
a. selection b. introduction
c. hybridisation d. emasculation

Q 6. Which one is an oil yielding plant among the following? *(NCERT EXEMPLAR)*
a. Lentil b. Sunflower
c. Cauliflower d. Hibiscus

Q 7. Which one is not a source of carbohydrate? *(NCERT EXEMPLAR)*
a. Rice b. Millets
c. Sorghum d. Gram

Q 8. Find out the wrong statement from the following: *(NCERT EXEMPLAR)*
a. White revolution is meant for increase in milk production
b. Blue revolution is meant for increase in fish production
c. Increasing food production without compromising with environmental quality is called as sustainable agriculture
d. None of the above

Q 9. To solve the food problem of the country, which among the following is necessary? *(NCERT EXEMPLAR)*
a. Increased production and storage of food grains
b. Easy access of people to be food grain
c. People should have money to purchase the grains
d. All of the above

Q 10. Find out the correct sentence:
(i) Hybridisation means crossing between genetically dissimilar plants.
(ii) Cross between two varieties is called as inter specific hybridisation.
(iii) Introducing genes of desired character into a plant gives genetically modified crop.
(iv) Cross between plants of two species is called as inter varietal hybridisation. *(NCERT EXEMPLAR)*
a. (i) and (iii) b. (ii) and (iv)
c. (ii) and (iii) d. (iii) and (iv)

Q 11. Weeds affect the crop plants by: *(NCERT EXEMPLAR)*
a. killing of plants in field before they grow
b. dominating the plants to grow
c. competing for various resources of crops (plants) causing low availability of nutrients
d. All of the above

Q 12. Find out the correct sentence about manure:
(i) Manure contains large quantities of organic matter and small quantities of nutrients.
(ii) It increases the water holding capacity of sandy soil.
(iii) It helps in draining out of excess of water from clayey soil.
(iv) Its excessive use pollutes environment because it is made of animal excretory waste. *(NCERT EXEMPLAR)*
a. (i) and (iii) b. (i) and (ii)
c. (ii) and (iii) d. (iii) and (iv)

Q 13. Which one of the following nutrients is not available in fertilizers? *(NCERT EXEMPLAR)*
a. Nitrogen b. Phosphorus
c. Iron d. Potassium

Q 14. Poultry farming is undertaken to raise:
a. egg production b. feather production
c. chicken meat d. Both a. and c.

Q 15. What are broilers?
a. Birds grown for meat
b. Birds grown for productivity
c. Birds grown for egg
d. None of the above

Q 16. Birds grown for obtaining egg are:
a. layers b. broilers
c. chicks d. None of these

Q 17. Bombay duck differ from common carp on the basis of:
a. habitat b. type of water they live
c. inland habitat d. None of these

Q 18. Composite fish culture system is a technology to grow:
a. local and national fish species
b. local and imported fish species
c. local and aquatic fish species
d. None of the above

Q 19. Which of the following are Indian cattle? *(NCERT EXEMPLAR)*
(i) Bos indicus (ii) Bos domestica
(iii) Bos bubalis (iv) Bos vulgaris
a. (i) and (iii) b. (i) and (ii)
c. (ii) and (iii) d. (iii) and (iv)

Q 20. Which one of the following species of honeybee is an Italian species? *(NCERT EXEMPLAR)*
a. *Apis dorsata* b. *Apis florae*
c. *Apis cerana indica* d. *Apis mellifera*

Q 21. Cattle husbandry is done for the following purposes:
(i) Milk production **(ii) Agricultural work**
(iii) Meat production **(iv) Egg production**
(NCERT EXEMPLAR)
a. (i), (ii) and (iii) b. (ii), (iii) and (iv)
c. (iii) and (iv) d. (i) and (iv)

Q 22. Which of the following are exotic breeds?
(i) Brawn **(ii) Jersey**
(iii) Brown Swiss **(iv) Jersey Swiss** *(NCERT EXEMPLAR)*
a. (i) and (iii) b. (ii) and (iii)
c. (i) and (iv) d. (ii) and (iv)

Q 23. Poultry fowl are susceptible to the following pathogens: *(NCERT EXEMPLAR)*
a. Viruses b. Bacteria
c. Fungi d. All of these

Q 24. Which one of the following fishes is a surface feeder? *(NCERT EXEMPLAR)*
a. Rohus b. Mrigals
c. Common carps d. Catlas

Q 25. Animal husbandry is the scientific management of:
(i) animal breeding **(ii) culture of animals**
(iii) animal livestock **(iv) rearing of animals**
(NCERT EXEMPLAR)
a. (i), (ii) and (iii) b. (ii), (iii) and (iv)
c. (i), (ii) and (iv) d. (i), (iii) and (iv)

Assertion & Reason Type Questions

Directions (Q. Nos. 26-35): *Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but Reason (R) is false.
d. Assertion (A) is false but Reason (R) is true.

Q 26. Assertion (A): Manure contains large quantities of organic matter and small quantities of nutrients.
Reason (R): Manure helps in avoiding water logging in clayey soil.

Q 27. Assertion (A): Removal of weeds from cultivated fields during the early stages of growth of crops is essential for a good harvest.
Reason (R): Weeds compete for food, space and light and they take up nutrients and reduce the growth of the crop.

Q 28. Assertion (A): Cereals such as wheat, rice, maize and millets provide us carbohydrates.
Reason (R): Vegetables, spices and fruits provide a range of vitamins and minerals in addition to small amounts of proteins, carbohydrates and fats.

Q 29. Assertion (A): Some nutrients are required by plants in large quantities and are called macronutrients whereas some nutrients are required in small quantities and are called micronutrients.
Reason (R): Zinc, boron, iron and chlorine are macronutrients whereas nitrogen, phosphorus, calcium, potassium etc., are micronutrients.

Q 30. Assertion (A): In intercropping, two or more crops are grown simultaneously on the same piece of land and there is no definite pattern for sowing the seeds.
Reason (R): Intercropping ensures maximum utilisation of nutrients and prevent spread of diseases and pests.

Q 31. Assertion (A): Bee-keeping is the practice of rearing bee to get honey and wax.
Reason (R): Pasturage is the availability of flowers to the bees for nectar and pollen collection.

Q 32. Assertion (A): Milk production in cattle can be raised by increasing the lactation period.
Reason (R): Exotic breeds are selected for short lactation periods.

Q 33. Assertion (A): Proper cleaning for cows and buffaloes is required.
Reason (R): Proper cleaning maintains the health of animals and also helps in clean milk production.

Q 34. Assertion (A): An egg laying poultry is called layer and the poultry reared for obtaining meat is called broiler.
Reason (R): The housing, nutritional and environmental requirements of broilers are different from those of egg layers.

Q 35. Assertion (A): Fish and few other varieties of aquatic animals are used as food.
Reason (R): Fish and other varieties of sea food constitute good source of protein.

Answers

1. (c) mixed cropping
2. (d) All of these
3. (b) soil
4. (d) None of these
5. (c) hybridisation
6. (b) Sunflower
7. (d) Gram
8. (d) None of the above
9. (d) All of the above
10. (a) (i) and (iii)
11. (c) competing for various resources of crops (plants) causing low availability of nutrients.
12. (b) (i) and (ii)
13. (c) Iron

14. (d) Both a. and c.
15. (a) Birds grown for meat
16. (a) layers
17. (b) type of water they live
18. (a) local and national fish species
19. (a) (i) and (iii)
20. (d) *Apis mellifera*
21. (a) (i), (ii) and (iii)
22. (b) (ii) and (iii)
23. (d) All of these
24. (d) Catlas
25. (d) (i), (iii) and (iv)
26. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
27. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
28. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
29. (c) Assertion (A) is true but Reason (R) is false.
30. (d) Assertion (A) is false but Reason (R) is true.
31. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
32. (c) Assertion (A) is true but Reason (R) is false.
33. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
34. (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
35. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Case Study Based Questions

Case Study 1

Kharif and Rabi refer to two cropping patterns that a lot of Asian countries adopt in accordance with the monsoon. The cropping season of Kharif crops begins with the commencement of monsoon and ends when it gets over. Alternatively, Rabi crops grow in winter. In other words, farmers sow them at the end of monsoon and harvest them before the onset of the summer season. Kharif crops need a hot and wet climate while Rabi crops require a cold and dry climate.

Read the given passage carefully and give the answer of the following questions:

Q 1. The crops sown in October-November and harvested in March-April are called:
a. Rabi crops b. Kharif crops
c. Zaid crops d. Fodder crops

Q 2. What kind of weather do Kharif crops require?
a. Hot and dry b. Hot and wet
c. Cold and wet d. Cold and dry

Q 3. Choose the correct combination of Rabi crops.
a. Wheat, green gram, mustard, cotton
b. Paddy, pea, mustard, linseed
c. Maize, gram, soyabean, peas
d. Wheat, gram, mustard, linseed

Q 4. Which of the following is a protein containing Kharif crop?
a. Green gram b. Pigeon pea
c. Black gram d. All of these

Q 5. Which of the following is correctly matched?

a.  Kharif Crop
b.  Rabi Crop
c.  Rabi Crop
d.  Kharif Crop

Answers

1. (a) Rabi crops
2. (b) Hot and wet
3. (d) Wheat, gram, mustard, linseed
4. (d) All of these
5. (a)  Kharif Crop

Case Study 2

Cattle farming involve rearing and management of two types of animals, one group for food requirements like milk and other for labour purposes like tilling, irrigation and carting. Animals which provide milk are called milch animals whereas animals which are used for labour are called drought animals.

Read the given passage carefully and give the answer of the following questions:

Q 1. Select the incorrect statement(s) about proper cattle management.
(i) Proper cleaning and shelter facilities are required.
(ii) Cattle feed should only include roughage.
(iii) Animals should be sheltered under well-ventilated roofed sheds.
(iv) The floor of the cattle shed needs to be sloping, so that it facilitates cleaning.
a. (i) and (ii) b. Only (ii)
c. (i), (iii) and (iv) d. (i), (ii), (iii) and (iv)

Q 2. Which of the following breeds of cow shows excellent resistance to diseases?
a. Red Sindhi b. Sahiwal
c. Both a. and b. d. Brown Swiss

Q 3. Which of the following organs of cattle is affected by worms?
(i) Intestine (ii) Stomach
(iii) Liver (iv) Skin
a. (i) and (ii) b. Only (ii)
c. (ii) and (iii) d. Only (iv)

Q 4. Milk production in cattle depends on:

a. duration of lactation period
b. food type
c. breed
d. All of the above

Q 5. Select the correct statement(s) about concentrates that are added in cattle feed.

(i) They are largely fibre.
(ii) They are low in fibre and contain relatively high levels of proteins and other nutrients.
(iii) They protect the cattle from major viral and bacterial diseases.
(iv) They promote milk output in them.

a. Only (i) b. Only (ii)
c. (i), (iii) and (iv) d. (iii) and (iv)

Answers

1. (b) Only (ii)
   Cattle feed includes roughage and concentrates.
2. (c) Both a. and b.
3. (a) (i) and (ii)
4. (d) All of the above
5. (b) Only (ii)

Case Study 3

There are two ways of obtaining fish for our food. One is from natural resources, which is called capture fishing. The other way is by fish farming, which is called culture fishery.
Fishery is further divided into inland fishery and marine fishery. In inland fishery, fishing is done in freshwater resources such as canals, ponds, etc., and brackish water resources such as lagoons. Marine fishery consist of fishing in sea water along the coastline and the deep seas beyond it. Some marine fishes of high economic values are mullets, bhetki, shellfish such as prawns and oysters.

Read the given passage carefully and give the answer of the following questions:

Q 1. Differentiate between capture fishing and culture fishery.
Q 2. Differentiate between inland fishery and marine fishery.
Q 3. Mention the names of some marine fish of high economic value.
Q 4. Give two examples of shellfishes.
Q 5. How does catla differ from mrigal?

Answers

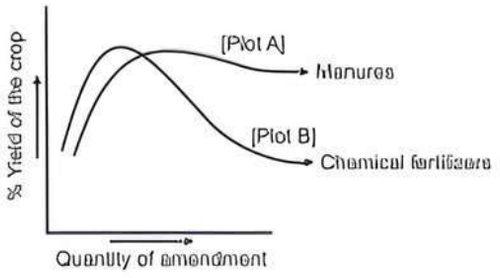
1.

Capture fishing	Culture fishery
It is a method of obtaining fishes from natural resources.	It is a method of obtaining fishes from fish farming.

2. Inland fishery is the rearing of fish in freshwater and brackish water resources.
   Marine fishery is the rearing of fish in sea water.
3. Mullets, prawns, bhetki, etc.
4. Prawns and Molluscs.
5. Catla is a surface feeder while mrigal is a bottom feeder.

Case Study 4

The figure given below shows two crop fields (plot *A* and plot *B*) that have been treated by manures and chemical fertilizers respectively, keeping other environmental factors same. Answer the questions that follow:



Read the given passage carefully and give the answer of the following questions:

Q 1. Why does plot *B* show sudden increase and then gradual decrease in yield?
Q 2. Why is the highest peak in plot *A* graph slightly delayed?
Q 3. What is the reason for the different pattern of the two graphs?
Q 4. Name the nutrients which are supplied by green manure to the soil.
Q 5. How is the use of manure particularly useful for sandy soils?

Answers

1. There is a sudden increase in yield due to the release of nutrients in high quality by chemical fertilizers. The gradual decrease may be due to continuous use of chemicals which decreases soil fertility.
2. It shows that the manures supply nutrients to the soil at a slow rate.
3. The different pattern of the two graphs indicates that the type of fertilizer (natural or chemical) used directly affects the quality and quantity of the crops and their yield.
4. Nitrogen and phosphorus.
5. Manure increases the water holding capacity in sandy soils.

Very Short Answer Type Questions

Q 1. What is the advantage of selecting seeds of crops with wider adaptability for agriculture?

Ans. If seeds with wider adaptability are sown, then there will be comparatively less damage of crop and the crop yield will be of good quality and quantity.

Q 2. Mention any two abiotic factors that affect crop production.

Ans. Temperature, wind, rain, etc., are the abiotic factors which affect the crop production.

Q 3. Name two protein containing Rabi crops.

Ans. Pulses, cereals and gram are the proteinous nutrients containing Rabi crops.

Q 4. State one importance of photoperiod in agriculture.

Ans. Photoperiod is important for the growth of plants and flowering.

Knowledge BOOSTER

Photoperiod is the number of daylight hours best suited to the growth and maturation of an organism.

Q 5. Name any two macronutrients required by plants.

Ans. Carbon and sulphur are the macronutrients required by plants.

Q 6. Why even excessive application of manure does not cause pollution?

Ans. Manures are biodegradable, so they do not cause any harm or pollution.

Q 7. Name two plants which are used as biopesticides in organic farming.

Ans. Turmeric and *neem* leaves are used as biopesticides in organic farming.

Q 8. What kinds of crops are grown in intercropping?

Ans. Two or more crops having different nutrient requirements are selected to be grown in intercropping, *e.g.*, soyabean + maize, bajra + lobia, etc.

Q 9. What is the main benefit of mixed cropping?

Ans. Mixed cropping reduces risks and gives some insurance against failure of one of the crops.

Q 10. Give an example of the crops grown in two year rotation.

Ans. Maize-potato-sugarcane-peas are the crops grown in two year rotation.

Q 11. Name two cattle breeds which show excellent resistance of diseases.

Ans. Red sindhi and sahiwal are the two cattle breeds that show excellent resistance of diseases.

Q 12. Name the two vitamins which are added in the poultry feed.

Ans. Vitamins A and K are added in the poultry feed.

Q 13. Choose the odd one:
Mullets, Bhetki, Prawns, Pearl spots.

Ans. Prawns is the odd one (All others are finned fishes but prawn is a shellfish).

Q 14. Why fish culture is done with a combination of rice?

Ans. Fish culture is done with a combination of rice so that fishes get ample food in the paddy field and the latter can get water.

Q 15. An Italian bee variety *A. mellifera* has been introduced in India for honey production. Write about its merits over other varieties.

Ans. Merits of Italian bee variety *A. mellifera* are:
(i) It stings less.
(ii) It has high honey collection capacity.
(iii) It stays in given beehive for longer periods and breeds very well.

Q 16. Why bee-keeping should be done in good pasturage?

Ans. Bee-keeping should be done in good pasturage because it provides more quantity and quality of nectar for honey to honey bees.

Short Answer Type-I Questions

Q 1. Differentiate between Kharif and Rabi crops. Mention the months in which these are sown. Give one example of each.

Ans. Difference between Kharif and Rabi crops:

Basis of Difference	Kharif	Rabi
Growing season	These crops are grown during rainy season (June to October).	These crops are grown during winter season (November to April).
Example	Example of *Kharif* crop is paddy.	Example of *Rabi* crop is mustard.

Q 2. Group the following and tabulate them as energy yielding, protein yielding, oil yielding and fodder crop.
Wheat, rice, berseem, maize, gram, oat, pigeon gram, sudan grass, lentil, soyabean, groundnut, castor and mustard. *(NCERT EXEMPLAR)*

Ans. (i) Energy yielding crops —wheat, rice, maize.
(ii) Protein yielding crops—gram, pigeon gram, lentil, soyabean.
(iii) Oil yielding crops—groundnut, castor, mustard, soyabean.
(iv) Fodder crops—berseem, oat, sudan grass.

Q 3. Define the term hybridisation and photoperiod. *(NCERT EXEMPLAR)*

Ans. Hybridisation: Hybridisation refers to crossing between genetically dissimilar organisms.
Photoperiod: Duration of sunlight available to the plant is called as photoperiod. It affects the growth, flowering and maturation of crops.

Q 4. Give one word for the following and give one example of each:
(i) Growing one row of crop alternately with the other crop.
(ii) Growing two or more crops simultaneously in the same field.

Ans. (i) Intercropping, *e.g.*, soyabean + maize.
(ii) Mixed cropping, *e.g.*, wheat + gram.

Q 5. What are the advantages of intercropping? Explain giving one example.

Ans. Advantages of Intercropping:
(i) It ensures maximum utilisation of the nutrients supplied.
(ii) It also prevents pests and diseases from spreading to all the plants in the field. In this way, crops can give better returns.
(iii) Soil erosion is effectively resisted.
(iv) It helps to maintain soil fertility.
Example: Soyabean + maize or finger millet (bajra) + cowpea (lobia).

Q 6. What is mixed cropping? How does it help a farmer?

Ans. Mixed cropping is the practice of growing two or more crops simultaneously on the same piece of land. Some mixed cropping practices are:

(i) Soyabean + Pigeon pea

(ii) Heat + Mustard

Advantages of Mixed Cropping:

(i) The risk of total crop failure due to uncertain monsoon gets reduced.

(ii) Farmers tend to harvest a variety of products such as cereal, pulses, vegetables or fodder to meet the daily requirements of family or of an agricultural farm.

Q 7. State two methods by which you can control growth of weeds in agricultural fields.

Ans. Various methods to control weeds are:

(i) Mechanical Method: Uprooting weeds with *Khurpi* or hand ploughing, burning and flooding.

(ii) Preventive Method: Proper seed bed is prepared, seed is sown timely and intercropping and crop rotation are done.

Q 8. What are the factors responsible for storage losses in agricultural production?

Ans. The factors responsible for storage losses in agricultural produce are mainly of two types:

(i) Biotic factors such as insects, rodents, birds, mites and bacteria.

(ii) Abiotic factors such as moisture content, temperature and humidity.

Q 9. Mention the preventive and control measures used for storage of grains.

Ans. Preventive measures:

(i) Drying of storage grains.

(ii) Maintenance of hygiene.

(iii) Prophylactic treatment.

(iv) Improved storage structures.

Control measures:

(i) Chemical Control: Spraying of chemicals like insecticides by mechanical sprayer.

(ii) Fumigation: Insecticide solution is converted into fumes to kill the insects.

(iii) Plant Products: Vegetable or mineral oil are used in small quantities to protect the grains from insects and pests. *Neem* kernel powder, crushed dried fruit of black pepper or cloves are also used for controlling insects.

Q 10. (i) What are concentrates in animal feed?

(ii) Name two internal parasites that cause diseases in animals.

Ans. (i) Concentrates are the substances which are rich in one or more nutrients such as cotton seeds, oilseeds, oil cakes and some cereals like gram and *bajra*.

(ii) Worms and flukes are internal parasites that cause diseases in animals.

Q 11. What factors does the food requirement of dairy animals depend on?

OR

State the food requirements of dairy animals.

Ans. The food requirement of dairy animals depends on:

(i) Maintenance Requirement: To perform the basic functions of the body.

(ii) Milk-producing Requirement: The food requirement during lactation period in order to produce more milk.

Q 12. What are 'Sahiwal' and 'Jersey' breeds?

Ans. Sahiwal is an indigenous cow breed of superior variety, having excellent resistance to diseases. It is mainly found in the regions of Punjab, Haryana and Uttar Pradesh, while Jersey is an exotic breed of cow found in Islands of Jersey. Both Jersey and Sahiwal are high milk-yielding breeds of cow.

Q 13. Which method is commonly used for improving cattle breeds and why?

Ans. Cross-breeding is the method which is commonly used for improving cattle breeds. Cross-breeding between two good varieties of cattle will produce a new improved variety with desired qualities of both, e.g., long lactation period and resistance to diseases.

Q 14. Name two desirable traits for variety improvement in poultry farming.

Ans. Two desirable traits for which the improvement of poultry is done are:

(i) The quality and size of eggs.

(ii) Dwarf broilers for egg production (so that they consume lesser nutrition for body growth).

Q 15. Suggest some preventive measures for the diseases of poultry birds.

Ans. Some preventive measures for poultry bird diseases are:

(i) Cleaning of poultry farms.

(ii) Proper sanitation of poultry farms.

(iii) Spraying of disinfectants at regular intervals.

(iv) Appropriate vaccination of birds.

Q 16. List any three management practices to be considered while designing a shelter for cattle.

Ans. Management practices to be considered in designing shelter for cattle are:

(i) The shelter should be well-ventilated.

(ii) The shelter should protect the cattle from rain, cold and heat.

(iii) The floor of the shed needs to be sloping so as to stay dry.

Q 17. Define animal husbandry. Why livestock production needs to be improved?

Ans. Animal husbandry is the science of rearing, feeding, caring, breeding and utilisation of animals. In other words, it refers to scientific management of livestock.

As the population increases, the living standard as well as the demand for milk, egg and meat also increases. This growing need has made it necessary for humans to improve the livestock production so that the requirements can be met sufficiently.

Q 18. What are the fresh initiatives in the field of irrigation?

Ans. Fresh initiatives in the field of irrigation are:

(i) **Rainwater Harvesting** is used to conserve rainwater for various purposes like washing, gardening, etc.

(ii) **Watershed Development** involves building of check-dams which help to increase groundwater levels.

Q 19. Give two advantages of apiculture.

Ans. Advantages of apiculture are:

(i) It increases the crop yield because bees act as a good pollinator.

(ii) The honey and wax from the honey combs can be used to make several natural products.

Q 20. Give one example each of local variety and foreign variety of bee.

Ans. **Local Variety:** *Apis cerana indica*
Foreign Variety: *Apis mellifera*

Short Answer Type-II Questions

Q 1. What are the desirable agronomic characteristics for crop improvement?

Ans. Agronomic characteristics are different for different crops.

(i) Cereals should be dwarf but with large ears. Dwarfness makes their stems stronger. They can withstand logging effect of strong winds. Nutrient requirement is also less. Large ears help to produce more grains.

(ii) Legumes should have more pods which generally develop in relation to stems branching. Therefore, more branching and good foliage enhance their productivity.

(iii) Fodder crops meant for feeding cattle must have profuse branching, good foliage, juicy stems and should be of large size.

Q 2. Name the environmental factors related to cultivation practices and crop yield. Explain how they are related to crop yield?

Ans. The environmental factors are as follows:

(i) **Weather:** Climatic conditions should be favourable for growing crops like duration of sunlight, temperature, etc.

(ii) **Soil Quality:** Soil acts as a medium that provides nutrients for plant growth. So, soil should be rich in nutrients and should have a balanced pH for the growth of crops.

(iii) **Availability of Water:** Irrigation should be proper for better production of crops.

Q 3. What is a GM crop? Name any one such crop which is grown in India.

Ans. Crop which has been developed by introducing a new gene from any other source in order to obtain the desired character, is called as Genetically Modified (GM) crop.

Bt cotton is an example of a GM crop which is made insect resistant by introducing a new gene from a bacteria.

Q 4. Differentiate between Macronutrients and Micronutrients.

Ans.

Basis of Difference	Macronutrients	Micronutrients
Quantity	Macronutrients are required in large quantities.	Micronutrients are required in very small quantities.
Concentration	Concentration of each macronutrient in plants is more than 1 mg per g of dry matter.	Concentration of a micronutrient is quite below 1 mg per g of dry matter.
Structure	They take part in building plant body and different protoplasmic structures.	Micronutrients have no such function.

Q 5. What are manures? State two kinds of manures. How does manure affect the soil fertility?

Ans. Manures are organic substances obtained through the decomposition of plant wastes like straw and animal wastes such as cow dung brought about by the microbes.

Two kinds of manures are green manure, compost or vermicompost.

Manure helps to enrich the soil with nutrient and organic matter and thus increases the soil fertility.

Q 6. Why are manures and fertilizers used in fields? A farmer irrigated his field excessively just after applying fertilizers. Explain why this is not a correct practice?

Ans. Manures and fertilizers are added to fields mainly to replenish minerals which get depleted due to withdrawal by crop plants and leaching down to lower strata of soil. The other benefits are:

(i) Manures add small quantity of all minerals to the soil. They improve soil hydration, soil aeration and activity of soil microorganisms, some of which are required for solubilisation of heavy minerals.

(ii) Fertilizers are nutrient-specific which contain one or more minerals in concentrated form. They meet the immediate and complete mineral requirement of high yielding varieties.

A farmer irrigating his field excessively just after applying fertilizers is not a correct practice because excess fertilizers can lead to water pollution.

Knowledge BOOSTER

Leaching leads to loss of water-soluble plant nutrients from the soil, due to rain and irrigation.

Q 7. (i) Differentiate between compost and vermicompost.
(ii) Mention the long term benefits of using manure in crop production.

Ans. (i) Compost is farm waste material, domestic waste, sewage waste etc. which is decomposed in pits. But vermicompost is prepared by using earthworms to hasten the process of decomposition of plant and animal refuse.

(ii) Manure helps to enrich the soil with nutrients and organic matter and increase soil fertility. The bulk of organic matter in manure helps to improve the soil structure.

Q 8. State one point of difference between biofertilizers and fertilizers. Give one example of each. What is the advantage of using biofertilizers over fertilizers?

Ans. Biofertilizers are produced by a culture of living organisms as a means of supplying nutrients.
Example: Blue-green algae.
But fertilizers are commercially produced by chemicals.
Example: NPK (Nitrogen, Phosphorus and Potassium)
Biofertilizers ensure maximum input of organic manure as a means of substituting chemicals.

Q 9. (i) Define weed. Give two examples.
(ii) Why is it essential to remove weeds from agricultural fields?

Ans (i) Weeds are small-sized unwanted plants which grow along with a cultivated crop in the field. Example: *Xanthium, Parthenium*, etc.

(ii) It is highly recommended to remove the weeds from the agricultural fields as they can severely reduce the crop yield by competing for light, water and nutrients.

Q 10. Which method is commonly used for improving the cattle breeds and why?

Ans. Cross-breeding indigenous breeds with exotic breeds improves the cattle breeds.
Foreign or exotic breeds have higher milk yield and longer lactation period as compared to indigenous or local breeds. Therefore, indigenous breeds should be cross-breed with exotic breeds. Also, the indigenous breeds are resistant to several diseases.

Q 11. (i) Differentiate between broilers and layers.
(ii) Nutritional requirements of broilers differ from those of egg layers. Justify the statement.
(iii) Mention any two factors that can cause diseases to poultry fowls.

Ans. (i) Broilers are raised for chicken, meat and egg. Layers are raised for eggs.

(ii) Broilers need more proteins with adequate fat but egg layers are given more of vitamins A and K.

(iii) The two factors that can cause diseases to poultry fowls are:
(a) Virus, fungi, bacteria and parasites.
(b) Nutritional deficiencies.

Q 12. Explain a way of intensive fish farming with the help of one example.

Ans. Composite fish culture system is a way of intensive fish farming in which five or six different species of fishes are grown in the same pond. The fishes having different food habits and which do not compete with each other for food are taken, *e.g.*, Catla, Rohu, Mrigal, Common Carp, Grass Carp are all cultivated in the same pond.
Catla fish feeds on water surface. Rohu are middle-zone feeders, Mrigal and Common Carp are bottom feeders while Grass Carp feed on weeds. Thus, all types of fish live peacefully and proper utilisation of food resources is taken care of which also increases the fish yield.

Q 13. (i) Distinguish between:
(a) Inland fishery and marine fishery.
(b) Culture fishery and capture fishery.
(ii) List one problem associated with composite fish culture.

Ans. (i) (a) Marine fisheries are concerned with obtaining fish from oceans and seas whereas inland fisheries include capturing fish from fresh water resources.

(b) Culture fishery is a way of obtaining fish by fish farming. On the other hand, capture fishery is obtaining fish from natural resources.

(ii) Problem associated with composite fish culture is the lack of availability of good seed.

Long Answer Type Questions

Q 1. (i) List six factors for which the variety improvement of crops is aimed at.
(ii) Mention the factors that are taken into consideration for deciding choice of crops for intercropping and crop rotation. Also mention one advantage of each of these cropping patterns.

Ans. (i) Six factors for which variety improvement of crops is aimed at, are:

(a) High Yield: Crops with high yield are required to meet the demand for crop, for feeding the growing population.

(b) Disease Resistance: Diseases reduce yield and hence disease-resistant crop characters should be aimed from improvement of variety.

(c) Response to Fertilizer: Crop which gives good response to fertilizers also gives good yield.

(d) Product Quality: Good quality products always fetch a better price and hence farmers should focus at this aspect.

(e) Water Demand: Low water intensive characteristic helps farmers to cultivate good crops even in non-rainy seasons.

(f) Early Maturity: Crop which matures early gives the yield early.

(ii) In intercropping, crops are selected in such a way that their nutrient requirements are different. In crop rotation, crops are selected based on availability of moisture and irrigation facilities.

Advantages of Cropping Patterns:

(i) Intercropping: It ensures maximum utilisation of the nutrients supplied.

(ii) Crop Rotation: It enhances production by increasing the soil fertility.

Q 2. Explain the ways by which crop production can be increased.

Ans. Crop production can be increased by adopting suitable practices in farming and can be categorised into three major groups of activities:

(I) Crop Variety Improvement: This approach depends on the search of a crop variety that can give a good yield. Varieties of crop can be selected by breeding those having various useful characteristics such as disease resistance, response to fertilizer, product quality and high yield.

One way of incorporating desired characters is hybridisation. Another way of improving the crop variety is introduction of gene that would provide the desired character.

(II) Crop Production Improvement: It depends on the financial condition of the farmer. Crop production is of three types, *e.g.*, low cost, high cost and no cost production. Use of manures and fertilizers, mixed cropping, intercropping, crop rotation are some of the crop production practices available for crop production improvement.

(iii) Crop Protection Management: Crops in the field must be protected from weeds, pests or other diseases. All these cause damage to the crop. Crops can be protected by the following methods:

(a) Use of pesticides.
(b) Use of resistant varieties.
(c) Crop rotation and other cropping systems.
(d) Summer ploughing.

Knowledge BOOSTER

In summer ploughing, fields are ploughed deep during summers to destroy weeds and pests.

Q 3. India has a wide variety of water resources and a highly varied climate. Describe in brief any four kinds of irrigation systems adopted to supply water to agricultural fields.

Ans. Five kinds of irrigation systems are:

(i) Dug Well: Water is collected from water bearing strata.

Tube Well: Water is collected from deeper strata. From these wells, water is lifted by pumps for irrigation.

(ii) Canals: It is an extensive irrigation system that receives water from one or more water reservoirs or rivers. The main canal is divided into branch canals to irrigate fields.

(iii) River Lift System: Water is directly drawn from the rivers for supplementing irrigation in areas close to rivers.

(iv) Tanks: These are small storage reservoirs which intercept or store the run-off of smaller catchment area.

Q 4. What are weeds? Give their examples. How are they harmful? How can they be controlled?

Ans. Weeds are unwanted and undesirable plants which are grown along with the crops and are not beneficial in any way.

Weeds are of two types:

Narrow Leaf Weed	Broad Leaf Weed
In Kharif Crops:	**In Kharif Crops:**
Cypernicus rotundus (motha) and *Sorghum* (jangli jowar).	*Amaranthus* (chaulai) and *Trianthema* (saathi).
In Rabi Crops:	**In Rabi Crops:**
Phalaris (mandossi) and wild oat (jangli jai).	*Chenopodium* (bathua) and *convolvulus* (hiran khuri).

Weeds are harmful due to the following reasons:

(i) They are harmful as they attract many pests and pathogens of diseases.
(ii) They decrease the food production of crops.
(iii) They compete with the crop for nutrition, space, light and water.

Method to Control Weeds:

(I) Mechanical Methods: Weeds can be removed either by handpicking or uprooting them using a *khurpi*, deep ploughing or hand-hoeing.

(II) Cultural Methods: Timely sowing of crops, crop rotation and intercropping are the main precautions to avoid weeds.

(iii) Chemical Methods: They can be removed by the application of weedicides.

(iv) Biological Methods: In this method, predator of the weed is used to destroy it, *e.g.*, to control *Lemna*, a fish called Carps is used.

Knowledge BOOSTER

Hand-hoeing is an old method of weed control used to shape soil, remove weeds, clear soil and harvest root crops.

Q 5. (i) Ajay, an illiterate farmer does not understand the difference between manures and fertilizers. Help him to differentiate between the two.

(ii) How is fumigant different from pesticides? Name one natural substance which can be used in place of fumigant.

Ans. (i) Difference between manures and fertilizers.

Basis of Difference	Manures	Fertilizers
Definition	A manure is a natural substance obtained by the decomposition of animal wastes and plant residues.	A fertilizer is a man-made substance. It may be an inorganic salt or an organic compound.
Composition	Manure contains small amounts of essential plant nutrients such as nitrogen, phosphorus and potassium.	Fertilizers are very rich in plant nutrients such as nitrogen, phosphorus and potassium.
Addition of organic matter	Manure adds great amount of organic matter in the form of humus in the soil.	Fertilizers do not add any humus to the soil.
Absorption of nutrients	Nutrients present in the manure are absorbed slowly by the crop plants, since manure is not soluble in water.	Because they are soluble in water, nutrients present in a fertilizer are readily absorbed by the crop plants.
Nutrient contents	Manure is not nutrient-specific and tends to remove general deficiency of the soil.	It is nutrient-specific and can provide specifically nitrogen, phosphorus and potassium to the soil.

(ii) The pesticides that are used to control pests in gaseous form are called fumigants. The process by which they spread is called fumigation. Practice of crop rotation, cover cropping, soil solarisation, etc., reduces the amount of pests in the crop and hence can be used in place of fumigant.

Q 6. (i) Which of the two factors bring about loss of food grains during storage? Give one example for each.

(ii) How these factors affect the produce?

(iii) What are the benefits of cattle farming?

Ans. (i) The two factors that bring about loss of food grains during storage are:

(a) Biotic Factors: These include rodents, fungi, insects, mites and bacteria.

(b) Abiotic Factors: These are like inappropriate moisture and temperature conditions in the place of storage.

(ii) These factors affect the produce by following ways:

(a) Degradation in quantity
(b) Loss in weight
(c) Poor germinability
(d) Poor marketability

(iii) Benefits of Cattle Farming:

(a) Good quality and quantity of milk can be produced.
(b) Draught labour animals can be produced for agricultural work.
(c) New variety that are resistant to diseases can be produced by crossing two varieties having the desired traits.

Q 7. (i) What management practices are common in dairy and poultry farming?

(ii) Cross breeding programme is successfully done in poultry farming for variety improvement. Enlist some desirable traits for which cross breeding is done in poultry birds.

Ans. (i) Common management practices in dairy and poultry farming are:

(a) Proper shelter facilities and their regular cleaning.
(b) Some basic hygienic conditions such as clean water, nutritious food, etc.
(c) Animals are kept in spacious, airy and ventilated places.
(d) Prevention and cure of diseases at the right time is ensured.

(ii) The cross breeding programmes between Indian breed like Aseel and foreign breed like Leghorn are carried for variety improvement. It focuses on developing new varieties for the following desirable traits:

(a) The cross breed variety should produce good quality chicks in large quantity.
(b) Dwarf Broiler Parent for commercial chick production.
(c) The variety should be adaptable to survive in high temperature and different climatic conditions.
(d) Low Maintenance Requirement
(e) Reduction in the Size of Egg-laying bird with ability to utilise more fibrous and cheaper diets formulated using agricultural by-products.

Q 8. (i) Name two common sources from which fish are captured.

(ii) As marine fish stock get depleted, how the demand for more fish can be met?

(iii) How are marine fish caught?

(iv) What is honey? What does the quality of honey depend upon?

Ans. (i) Sources from which fish are captured, are seas and oceans.

(ii) Yields can be increased by locating large schools of fishes in open seas using satellites and echo sounders.

(iii) Marine fish can be caught by a number of ways:
(a) By using tangle nets, fixed nets, etc.
(b) Dredging is done to harvest oysters, etc., from seabed.
(c) Harpooning is highly specific for catching fishes.

(iv) Honey is a dense sweet liquid that contains 20-40% sugar, small amount of minerals and vitamins.
The quality of honey depends upon the pasturage or flowers available to the bees for nectar and pollen collection. In addition to this, the kinds of flowers available also determine the taste of honey.

Q 9. You are living in an area with abundant greenary and pasturage. A farmer living near your home is not satisfied with the income he gets from his agricultural land. Which additional income generating activity will you suggest him in such a scenario?

Ans. In such a scenario, apiculture is the best suited activity. It is a low investment, additional income generating activity.
Apiculture is the method of rearing, care and management of honeybees for obtaining honey, wax and other substances.

Utility of Apiculture:
(i) Honey is used for consumption and making other useful products.
(ii) Bees wax is used in various medicinal preparations.
(iii) Bees also help in cross-pollination from one flower to another to collect the nectar.

In apiculture, the following varieties of bees would be beneficial: *Apis cerana indica* (Indian bee), *Apis dorsata* (Rock bee), *Apis florea* (Little bee), *Apis mellifera* (Italian bee).

Advantages of Italian Bees:
(i) They have good honey collection capacity.
(ii) They stay in a given beehive for longer periods and breed very well.
(iii) They are good for commercial production of honey.

Also, the farmer should take good care of the pasturage around the apiary because the value or quality of honey depends on it.

Q 10. (i) What is the term used for the scientific management of livestock?
(ii) What is meant by the term apiary and pasturage?
(iii) How do you differentiate between capture fishing, mariculture and aquaculture?

Ans. (i) The term animal husbandry is used for the scientific management of livestock.

(ii) Apiary is a bee farm used for the commercial production of honey, etc. Pasturage is the number of flowers present around apiary to provide nectar to bees. It decides the quantity as well as quality of honey.

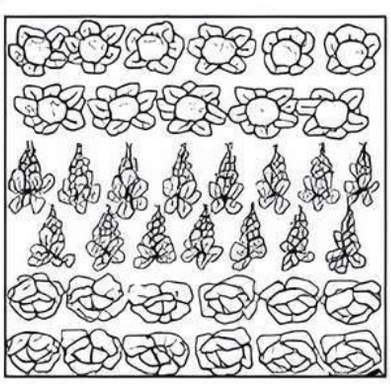
(iii)

Capture Fishing	Mariculture	Aquaculture
It is the method of obtaining fish from natural resources.	It is the culture of marine fish for commercial use.	It involves the production of aquatic animals that are of high economic value such as prawns, lobsters, fish, crabs, etc.

Chapter Test

Multiple Choice Questions

Q 1. Identify the cropping pattern from the given image:



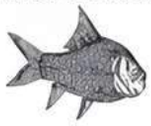
a. Intercropping
b. Mixed cropping
c. Crop rotation
d. None of these

Q 2. Observe the figure given below and identify the nutrients obtained from it:

a. Carbohydrates
b. Proteins
c. Water
d. Fats/oils

Q 3. Which of the following conditions will give the most benefits to the farmers?
a. Use of high quality seeds, fertilizers and no irrigation.
b. Use of high quality seeds, irrigation, use of fertilizers and crop protection measures.
c. Use of ordinary seeds, irrigation and use of fertilizers.
d. Use of high quality seeds, irrigation, excessive use of chemical fertilizers and crop protection measures.

Q 4. Which of the following has scientific name *Peneaus monodon?*

a. 

b. 

c. 

d. 

Assertion and Reason Type Questions

Directions (Q. Nos. 5-6): *Each of the following questions consists of two statements, one is* ***Assertion*** *(A) and the other is* ***Reason*** *(R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but Reason (R) is false.
d. Assertion (A) is false but Reason (R) is true.

Q 5. **Assertion (A):** Fumigation of the grains using chemicals is done before storage in warehouses.

Reason (R): Fumigation gives a nice colour to the grains.

Q 6. **Assertion (A):** Indigenous bee varieties are *Apis cerana indica*, *Apis dorsata* and *Apis florea* whereas *Apis mellifera* is an Italian variety used for commercial production of honey.

Reason (R): Italian bees have high honey collection capacity.

Case Study Based Question

Q 7. Mariculture is a specialised branch of aquaculture involving the cultivation of marine organisms for food and other animal products in artificial tanks, ponds or raceways which are filled with sea water. An example of this includes the farming of marine fish, including finfish, seaweed and shellfish.

Read the given passage carefully and give the answer of the following questions:

(i) **Which of the following correctly defines mariculture?**
a. Capturing fish from natural resources like rivers, sea, etc.
b. Culturing of fish and aquatic food in reservoirs, estuaries, etc.
c. Culturing of finned fishes (mullet), shellfish (prawn), muscles, oysters, etc., as well as seaweed in marine water.
d. Culturing of fishes in marine water.

(ii) **Which of the following is a marine fish of high economic value?**
a. Mullet b. *Bhetki*
c. Oyster d. All of these

(iii) **Which of the following is an example of shellfish?**
a. Prawn b. Catla
c. Mrigal d. Grass Carp

(iv) **Match the columns and select the correct option:**

	Column I		Column II
A.	Catla	(i)	Bottom feeder
B.	Rohu	(ii)	Surface feeder
C.	Mrigal	(iii)	Middle zone feeder
D.	Grass Carp	(iv)	Feeds on weed

a. A-(ii), B-(iii), C-(i), D-(iv)
b. A-(iii), B-(ii), C-(i), D-(iv)
c. A-(ii), B-(iii), C-(iv), D-(i)
d. A-(iv), B-(iii), C-(i), D-(ii)

Very Short Answer Type Questions

Q 8. An Italian bee variety *Apis Mellifera* has been introduced in India for honey production. Write about its merits over other varieties.

Q 9. How do plants get nutrients?

Short Answer Type-I Questions

Q 10. Differentiate between compost and vermicompost.

Q 11. Name two types of animal feed and write their functions.

Q 12. Name two desirable traits for variety improvement in poultry farming.

Short Answer Type-II Questions

Q 13. Compare the use of manure and fertilizers in maintaining soil fertility.

Q 14. How do you differentiate between capture fishing, mariculture and aquaculture?

Q 15. (i) Define animal husbandry.
(ii) Differentiate between bee-keeping and poultry farming.

Long Answer Type Questions

Q 16. (i) What are micronutrients? Give two examples of it.
(ii) Why do we select crops with different nutrient requirement for intercropping? Give two reasons.
(iii) What is crop rotation? Write two advantages of it.

Q 17. (i) Define composite fish culture system. What is the major problem of composite fish culture system? How can we overcome this?
(ii) Differentiate between layers and broilers.