CBSE Class 12 Biology
Important Questions
Chapter 9
Strategies for Enhancement in Food Production

1 Marks Questions

1.Why is inbreeding necessary in animal husbandary?
Ans.Inbreeding increases homozygosity.

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2. Name two fungal diseases of Crop plants.
Ans. Brown rust of wheat, Smut of wheat, red rot of Sugar cane, Late blight of potato.

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3. Which product of Apiculture is used in cosmetics and polishes?
Ans. Beewax.

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4. Semi-dwarf varieties of a crop plant were derived from IR-8. Name that crop.
Ans. Paddy crop (rice)

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5. Write two qualities of Saccharum officinarum (Sugarcane) grown in South India.
Ans. Thicker stem and higher sugar content.

6.Name any two semi – dwarf varieties of wheat introduced into all wheat growing places of India?
Ans. Sonalika & Kalyan sona.

7.What is Biofortification?
Ans. The breeding of crops to increase the levels of vitamins, minerals & higher proteins & healthier fats content is called biofortification.

8.Give an example where mutation breeding has been Successfully carried out for introducing disease resistance.

Ans. varieties of mung bean have been successfully developed that are resistant to yellow mosaicvirus & powdery mildew.

9.Name two better yielding varieties of rice developed in India?
Ans. Jaya & Ratna

10.Name the microbe that is grown for use as protein – rich food?
Ans. Methylophilus methylotropous.

11.Why is mutation breeding necessary for breeding for disease resistance?
Ans. because there is limited availability of disease – resistance genes in the crop plants & wide varieties.

12.Give any two commercial products produced from Apis species?
Ans. Honey & bee wax

13.What is the major advantage of producing plants by micropropagation?
Ans. a large number of plants can le grown in a short period of time.

14.What is a somaclones?
Ans. Somaclones are the genetically identical plants developed from any part of a plant laymicropropagation.

15.Name any two fresh water fishes?
Ans. Rohu & catla.

2 Marks Questions

1. A new breed of sheep was developed in Punjab by crossing two different breeds of Sheep. Name the two breeds which were crossed and the new breed developed.

Ans. By crossing Bikaneri ewes and Marino rams, the new breed Hisardale was developed.

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2. Study the table given below and fill in the blanks marked A, B, C and D

S.No		Crop Variety	Resistant to Disease
1. 2. 3. 4.	Wheat Brassica (C) Chilli	Himgiri (B) Pusa Koma (D)	(A) White rust Bacterial blight Chilly mosaic Virus, Tobacco mosaic Virus and leaf curl

Ans.A - Leaf and Stripe rust, hill bunt.

B - Pusa swarnim (Karan rai).

C - Cowpea

D - Pusa Sadabahar

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3. Why are proteins synthesized from Spirulina called Single celled Proteins? What is the significance of such a protein?

Ans. The protein rich food produced by microbes is called as single called protein (SCP) Spirulina is a microorganisms which has more protein. It is a quick method of protein production because the growth rate of microbes is enormous. Hence, it provides a protein rich diet for human beings.

4. Differentiate between inbreeding and outbreeding in animals.

Ans. When breeding is between animals of the same breed, it is callednbreeding, while cross between different breeds in called out breeding.

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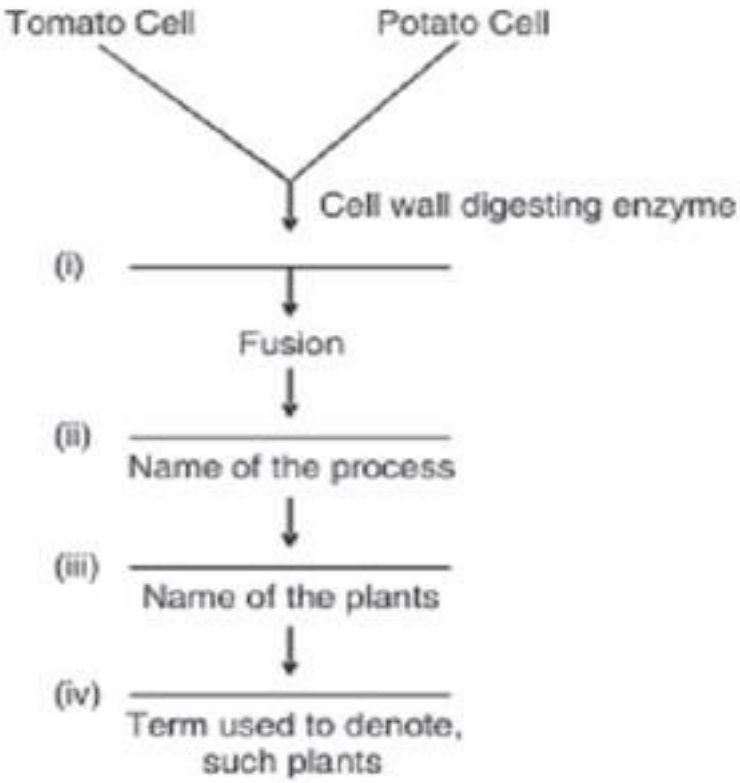
5. Observe the process of Somatic hybridisation given below and fill in the blanks. (i), (ii), (iii) and (iv)



Ans.(i) Isolation of protoplast of Tomato cell and Potato cell.

(ii) Somatic hybridisation.

(iii) Pomato

(iv) Somatic hybrid

6.What is single cell protein? What is its significance?

Ans. The production of edible proteins on a large scale from microorganisms for human beings &animals is called Single cell protein. It is important because :-

1. it provide protein – rich supplement in diet.
2. It reduces pressure on agriculture for supply of desired proteins.
3. It helps to minimise environmental pollution

7.Expand MOET. How is it carried out?

Ans. Moet is multiple ovulation Embryo transfer. It involves following steps :-

1. a cow is administered hormones to induce follicular motivation & super ovulation.
2. Cow is mated with a selected bull.
3. Fertilized eggs at 8-32 celled stage are recovered & transferred to surrogate mother.

8.What is germplasm? Why is it necessary to have gemplasm collection?

Ans. The sumtotal of all the alleles of the gene present in a plant & its relative is called Germplasm. Germplasm collection is very essential for effective exploitation of natural genes available in the population.

9.What is inbreeding depression? Why do self – pollinated crops do not show the ill-effects of inbreeding depression?

Ans. Continued inbreeding especially close inbreeding usually reduces fertility & even productivity.This is called inbreeding depression. In self – pollinated crops, since the male & female reproductiveparts are of the same flower & are compatible with each other to cause fertilisation : it does notshow ill – effects of inbreeding depression.

10.What is interspecific hybridization. Give an example?

Ans. It is a method of outbreeding in which male & female animal of two different species are crossed to combine the desirable features of both the parents into one eg, mule is produced by a cross between donkey & a female horse.

11.What are the advantages of breeding for disease-resistance in plants?

Ans. Plant breeding for disease resistance has two advantages

i)Enhance food production lay reducing losses due to diseases.

ii)Reduced dependence on use of fungicides & bacteriocides

12.Which part of the plant is best suited for making virus free plants & why?

Ans. Apical & intercalary buds having apical mexistem are best suited part of the plant body for making virus free plants as they are free from viral infection.

13.What is artificial insemination? What are the advantages of this technique?

Ans. It is a process in which the semen collected from a superior male is injected into the reproductivetract of the selected female by the breeder.

Advantages :-

1. Semen can be used immediately or stored
2. Semen can be transported in frozen from to a distant place.
3. Semen from one selected made can be used on number of females.

14.Why was hybridization carried out between species of Sugarcane in North India & that grown in south India?

Ans. Saccharum barberi grown in North India but had poor sugar content & Yield. Saccharum officarumhad thicker Stem & high sugar content but cannot grow well in north India. The hybrid of these twovarieties has desirable quality of high yield, thick stem, high sugar & ability to grow in North India.

15.Name the variety developed & disease to which it is resistant in case of :-

i) Brassica

ii) Cowpea

Ans.i) Pusa swarnim variety developed against white rust.

ii) Pusa komal variety developed against Bacterial blight.

16.What is meant by the term “breed”. What are the objectives of animal breeding?

Ans. The group of animal having similar ancestral characters size, general appearance etc – are calledbreed.

Objectives of Animal Breeding :-

(a) Increase the yield of animals.

(b) Improvement in the desirable qualities of the produce.

3 Marks Questions

1. What is micropropagation? Why are plants produced by this technique called somaclones? Name any two food plants which are produced on commercial scale using this method.

Ans. The method of producing many plants through tissue culture is called micropropagation.

The plants produced through micropropagation will be genetically identical to the original plant from which they were grown, hence are called somaclones.

Tomato, banana, apple are produced on commercial scale using this method.

2. What is mutation? Explain the significance of mutation in plant breeding. Give an example of a disease resistant variety of cultivated plant induced by mutation.

Ans. Mutation : Sudden inheritable change in the characters of an organism due to change in the sequence of bases in the gene(s).

Mutation results in a new character or trait, not found in the parental type It can also be induced by using mutagens like gamma radiations.

Such plant materials are used as such or used for breeding new variaties.

Mung bean resistance to yellow mosaic virus and powdery mildew.

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3. How can we improve the success rate of fertilisation during artificial insemination in aminal husbandary programmes?

Ans. The Multiple Ovulation Embryo Transfer (MOET) technology can improve the success rate of fertilisation.

In the procedure, a cow is given hormonal treatment (FSH), so that more than one ova/eggs (6-8) are produced per cycle. After mating or artificial insemination the embryos at 8-32 celled stage, are transferred to different surrogate mother cows. This technology has been successfully used for cattle sheep, rabbit, mares and buffalloes.

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4. Biofortification is the most practical means to improve public health. Justify the statement with examples.

Ans. Biofortification is the plant breeding programme designed to increase Vitamins, minerals, heigher proteins and healthier fat content in crops. This programme improves the quality of food products. It is required to prevent hidden hunger. Some of the examples of fortified crops are:

(i) New hybrid of maize : has twice the amount of amino acid lysine and tryptophan.

(ii) Wheat : Atlas 66, having a high protein content.

(iii) Rice : 5 times iron than the normal amount. IARI Delhi has released several crops which are rich in vitamins and minerals. Consumption of such biofortified food will vastly improve the public health.

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5. What is meant by germplasm Collection? Describe its significance in plant breeding programmes.

Ans. The collection of all the diverse alleles of all the genes of crop plant is called germ plasm collection.

In plant breeding programmes, the germplasm provides the entire of genes and alleles, and the characterstics which they express. The plant breeders select the most favourable characters of a particular gene and manipulate its transfer to a desirable parent.

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6. To which product, following products are related (a) Blue revolution (b) white revolution (c) Green revolution

Ans. (a) Fish production (b) Milk production (c) Crop production

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7.What measures would you undertake to improve the quality & quantity of milk production?

Ans. The quality & quantity of milk production depends on three factors :-

1. Genetic makeup.
2. Nutrition &
3. Environment

Thus, the following steps should be taken to improve management of livestock :-

a.SHEDS :- Sheds should be neat & clean, well – ventilated with pucca floor & will drained channel.

b.BALANCED DIET :- a balanced feed consists of appropriate quantities of carbohydrates, proteins, vitamins, minerals & water. The feed consists of two main components :-

i.Roughage – include fodder, hay, straw & Silage.

ii.Concentrates – broken forge crops, grams, cereals, mullets, cotton, seeds.

a.CLEAN WATER :

b.HEALTH CARE:- It requires regular inspection with proper record keeping.

8.What is "tissue culture". What are the steps involved in tissue culture?

Ans."Tissue culture is an experimental process through which a mass of cells (callus) is produced froman explant tissue & used directly to regenerate plant It invoices following steps :-

1. Selection of an elite plant
2. Preparation of suitable culture media
3. Sterilisation of an explant & inoculation on culture media under controlled temp ~ 250 c in light
4. Callus induction in explant.
5. Organogenesis :- a high cytokine : auxin ratio induce Shoot formation while high auxin : cytokinin ratio induce root formation.
6. Acclamatization :- test tube rooted plantlets are first subjected to acclimatization in green house & then transferred to the field.

9.What are the measures that need to be taken for effective poultry farm management?

Ans.i) It requires a crowd – free, rainproof, well ventilated & protected brood house.

ii).Brood house should be clean & disinfected.

iii).Good drainage system.

iv).Proper fed & clean & fresh drinking water.

v).Proper light management for optimum egg production.

vi).Poultry are more sensitive to heat so, measures should be adopted to overcome heat shock.

a).Sheds should be covered with grass or low vegetation.

b).Provide sprinklers on roof.

c).Maximum Ventilation.

vii)Disease – free & suitable breeds should be selected for breeding.

10.The steps in a programme are :-

Collection of germplasm, crossbreeding the selected parents, selection superior recombinant progeny & Testing, releasing & marketing new cultivars?

i) What is this programme related to?

ii) Name two special qualities as the basis of selection of progeny.

iii) What was the outcome of the programme?

iv) What is the popular term given to this outcome? Also name the India Scientist who is credited with chalking out of this programme.

v) Among the above – mentioned step which is the most crucial step of this programme& why?

Ans. i). Plant breeding.

ii). Disease resistance & yield.

iii). Production of improved varieties.

iv). The popular term give to this outcome is HYBRID. Dr. S. Swamminathan is credited with chalking out of this programme.

v). Selection of superior progeny is the most crucial step of this programme because it yields plants thatare superior to both parents & are then self – pollinated for several generations.

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11. What is apiculture? What are the requirements to consider for bee–keeping?

Ans.The culturing of honey bees for the production of honey or beewax is called Apiculture.

Bee – keeping can be practised in any area where there is sufficient bee pastures of some wild shrubs, fruits orchards & cultivated crops. The following points are important for successful bee – keeping :-

1. Knowledge of nature & habits of bee.
2. Selection of suitable location of keeping beehives.
3. Catching & hiving of swarms.
4. Management of beehives during different seasons.
5. Handling & collection of honey &beewax.

12.What are the major steps involved in Plant breeding?

Ans.The major steps involved in plant breeding are :-

i). Collection of varieties :- collection & preservation of all the different wild varieties, species & relatives ofthe cultivates species.

ii). Evaluation & Selection of Parents :- Germplasm collected is evaluated to identify plants with desirablecharacter. The selected plants are multiplied & used.

iii). Hybridisation of Selected Parents :- The selected parents are hybridized so that the traits in them can becombined in the hybrid progeny.

iv). Selection & Testing of Superior Recombinants :- Individuals with desired combination of characters haveto be selected from among the progeny. Such hybrids are superior to both the parents.

v). Testing, Release & commercialization of New cultivars :-

Evaluation is done by growing these plants in the research field & recording their performance under ideal conditions of irrigation, fertilizers & other crop practices. The selected plants are then tested in the farmer's field for at least three growing seasons. The material thus selected is certified & released as a variety.

5 Marks Questions

1. Does apiculture offer multiple advantages to farmers? List its advantages, if it is located near a place of commercial flower cultivation. Name the most common species of bee which is reared in India.

Ans. Apiculture or Bee-Keeping is the maintenance of hives of honeybees for the production of honey. Apiculture is beneficial for farmers in many ways. Honey bee also produces beewax which is used in industries, such as in preparation of cosmetics and polishes of various kinds. If Bee keeping is practiced in any area the commercial flowers are cultivated, it will be beneficial in the following ways.

(i) Bees are pollinators of many crop species including flowering crops such as sunflower.

(ii) It improves the honey yield, because honeybees collect the nectar from flowers for making honey.

Apis indica is the msot common species whch is reared in India.

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2. What is somatic hybridisation? Describe the various steps in producing somatic hybrids from protoplasts. Mention any two uses of somatic hybridisation.

Ans. Somatic Hybridisation : The process of fusing protoplasts of Somatic cells derived from different varieties or species of plants to produce a hybrid.

Steps :

(i) Removal of cell wall of fusing cells by digestion with a combination of pectinase and cellulase to form protoplasts.

(ii) Fusion between protoplasts of selected parents is induced by the use of poly ethylene glycol (PEG).

(iii) The resulted product is cultured on a suitable medium to regenerate cell walls.

(iv) The cells obtained begin to divide to produce plantlets called somatic hybrids.

Uses/Applications :

(i) Somaclonal variations can be created

(ii) Lines or varieties/species of plants which can not be sexually hybridised, they can be hybridised.

(iii) Allopolyploids can be raised by the method.

3.What do you mean by “Out – breeding”. What are the different methods employed for out breeding.

Ans. Breeding between the unrelated ale & female animals is called Outbreeding. It can be done in following ways:-

i)OUT CROSS :- The mating of animals within the same breed but do not have any common ancestor on either side of their pedigree for 4-6 generation is called an out cross. It is the best method of breeding of animals that are below average in milk production, growth rate of beef cattle etc.

ii)CROSS–BREEDING :- It is a cross between superior males of one breed & Superior females of another breed. It allows the desirable qualities of two different breeds to be combined & are used for commercial production eg . Hisardale, a new breed of sheep is developed by crossing bikaneri ewes & Marino rams.

iii)INTERSPECIFIC HYBRIDISATION :- male & female animals of two different related species are mated so, that progeny may combine desirable features of both parents eg. mule is produced by crossly donkey & a female house.

4.What is somatic hybridization – Explain the steps involved in the production of somatic hybrids?

Ans. Somatic hybridization is the process of fusing protoplasts of somatic cells derived from twodifferent varieties or species of a plant on a suitable nutrient culture medium under sterilecondition. One example of somatic hybrid is topato produced by fusion of protoplast of tomato &potato.

Somatic hybridization involves the following steps:-

I).Isolation of protoplast from two different varieties of plants – each having a desirable character,

II). Fusion of cytoplasm of two protoplast results in coalescence of cytoplasm. The nuclei of twoprotoplasts may or may not fuse together even after fusion of cytoplasm, fusion of protoplast requires a suitable agent called fusogen eg. PEG or polyethylene glycol.

III). Under favourable conditions, hybrid protoplast synthesise new cell wall around it. Hybrid cellfunctions as a single cell & then undergo sustained division to form callus.

IV). The regenerated callus is transferred to a new culture plates containing suitable culture