31

Strategies for Enhancement in Food Production

TOPIC 1
Animal Husbandry

01 Which of the following is not a step in Multiple Ovulation Embryo Transfer Technology (MOET)? **[NEET 2021]**

(a) Cow is administered hormone having LH like activity for super ovulation
(b) Cow yields about 6-8 eggs at a time
(c) Cow is fertilised by artificial insemination
(d) Fertilised eggs are transferred to surrogate mothers at 8-32 cell stage

Ans. *(a)*

Multiple Ovulation Embryo Transfer Technology (MOET) is a programme for herd improvement.

In this method, cow is administered hormone, having FSH (not LH) like activity to induce follicular maturation and super ovulation.

02 Inbreeding depression is **[NEET (Oct.) 2020]**

(a) reduced motility and immunity due to close inbreeding.
(b) decreased productivity due to mating of superior male and inferior female
(c) decrease in body mass of progeny due to continued close inbreeding
(d) reduced fertility and productivity due to continued close inbreeding

Ans. *(d)*

Inbreeding depression is continued inbreeding, especially close breeding which reduces fertility and even productivity in animals. This problem is usually overcome by outbreeding.

03 By which method was a new breed 'Hisardale' of sheep formed by using Bikaneri ewes and Marino rams? **[NEET (Sep.) 2020]**

(a) Mutational breeding
(b) Cross breeding
(c) Inbreeding
(d) Outcrossing

Ans. *(b)*

Hisardale is a new breed of sheep developed in Punjab by crossing Bikaneri ewes and Marino rams. In cross-breeding, superior male of one breed is mated with superior female of another breed.

04 Select the incorrect statement regarding inbreeding. **[NEET (Odisha) 2019]**

(a) Inbreeding helps in the elimination of deleterious alleles from the population
(b) Inbreeding is necessary to evolve a pureline in any animal
(c) Continued inbreeding reduces fertility and leads to inbreeding depression
(d) Inbreeding depression cannot be overcome by outcrossing

Ans. *(d)*

The incorrect statement regarding inbreeding is the option (d). It is because continuous inbreeding among cattle causes inbreeding depression. It decreases the fertility and even productivity of an animal.

It can be overcome by applying outbreeding in which mating is done between different breeds or individuals of the same breed but having no common ancestors. Outbreeding includes outcrossing, cross-breeding and interspecific hybridisation.

05 Mad cow disease in cattle is caused by an organism which has **[NEET (Odisha) 2019]**

(a) inert crystalline structure
(b) abnormally folded protein
(c) free RNA without protein coat
(d) free DNA without protein coat

Ans. *(b)*

Mad cow disease in cattle is caused by prions which are abnormally folded proteins. It is also known as Bovine Spongiform Encephalopathy (BSE). It is a progressive neurological disorder of cattle.

06 Which of the following statements about methanogens is not correct? **[NEET (Odisha) 2019]**

(a) They can be used to produce biogas
(b) They are found in the rumen of cattle and their excreta
(c) They grow aerobically and breakdown cellulose rich food
(d) They produce methane gas

Ans. *(c)*

Statement (c) is incorrect. Correct information about the statement is as follows

Certain bacteria, which grow anaerobically on cellulosic material, produce large amount of methane along with CO_2 and H_2. These bacteria are collectively called methanogens and one such example is *Methanobacterium*. Rest statements are correct.

07 Homozygous purelines in cattle can be obtained by **[NEET 2017]**

(a) mating of related individuals of same breed
(b) mating of unrelated individuals of same breed
(c) mating of individuals of different breed
(d) mating of individuals of different species

Ans. *(a)*

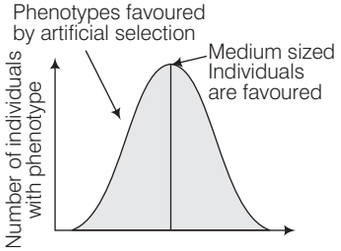
When closely related species of same organisms are crossed continuously for few successive generations, it results in accumulation of recessive characters, thus homozygous purelines are obtained.

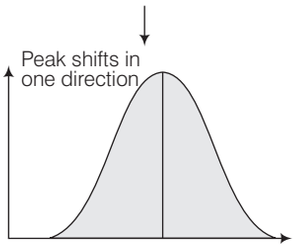
08 Artificial selection to obtain cows yielding high milk output represents **[NEET 2017]**

(a) stabilising selection as it stabilises this character in the population
(b) directional as it pushes the mean of the character in one direction
(c) disruptive as it splits the population into two, one yielding higher output and the other lower output
(d) stabilising followed by disruptive as stabilises the population of produce higher yielding cows

Ans. *(b)*

The directional selection leads to change in the phenotypic characters of a population in one direction. In the case of artificial selection, it is intentionally done to increase the milk production, so directional selection operates.





Diagrammatic representation of the

09 Interspecific hybridisation is the mating of **[NEET 2016, Phase II]**

(a) animals within same breed without having common ancestors
(b) two different related species
(c) superior males and females of different breeds
(d) more closely related individuals within same breed for 4-6 generations

Ans. *(b)*

The interspecific hybridisation is the mating or cross between two different related species belonging to same genus.

10 Among the following edible fishes, which one is a marine fish having rich source of omega-3 fatty acids? **[NEET 2016, Phase II]**

(a) Mystus (b) Mangur
(c) Mrigala (d) Mackerel

Ans. *(d)*

Mackerel is a marine fish having rich quantity of omega-3 fatty acid.

11 Outbreeding is an important strategy of animal husbandry because it **[CBSE AIPMT 2015]**

(a) help in accumulation of superior genes
(b) is useful in producing purelines of animals
(c) is useful in overcoming inbreeding depression
(d) exposes harmful recessive genes that are eliminated by selection

Ans. *(c)*

The breeding of stocks or individuals that are not closely related is called outbreeding. It is an important strategy of animal husbandry because it is useful in overcoming inbreeding depression.

Inbreeding depression is the condition in which the fertility and the productivity of animals is reduced due to the continuous breeding in same species.

12 In cloning of cattle a fertilised egg is taken out of the mother's womb and **[CBSE AIPMT 2007]**

(a) in the eight cell stage, cells are separated and cultured until small embryos are formed which are implanted into the womb of other cows
(b) in the eight cell stage the individual cells are separated under electrical field for further development in culture media
(c) from this up to eight identical twins can be produced
(d) the egg is divided into 4 pairs of cells which are implanted into the womb of other cows

Ans. *(a)*

During cloning of a cattle a fertilised egg is taken out of the mother's womb and in the eight cell stage, cells are separated and cultured until small embryos are formed which are implanted into the womb of other cows.

13 Compared to a bull a bullock is docile because of **[CBSE AIPMT 2007]**

(a) higher levels of cortisone
(b) lower levels of blood testosterone
(c) lower levels of adrenaline/noradrenaline in its blood
(d) higher levels of thyroxine

Ans. *(b)*

Compared to a bull a bullock is docile because of lower levels of blood testosterone.

A bullock is a castrated bull. Bulls are castrated to make them more meek and docile.

Castration is the removal or destruction of one or both testicles and results in sterility, decreased sexual desire and inhibition of secondary sex characteristics. It is performed for the purpose of improving the quality of meat and decreasing the aggressiveness of farm animals; in pet animals it prevents unwanted mating behaviour, reproduction and wandering.

14 Which one of the following is a viral disease of poultry? **[CBSE AIPMT 2007]**

(a) Coryza
(b) New castle disease
(c) Pasteurellosis
(d) Salmonellosis

Ans. *(b)*

New castle disease is a viral disease of poultry. It is a highly contagious zoonotic bird disease affecting many domestic and wild avian species. Its effects are most notable in domestic poultry due to their high susceptibility and the potential for severe impacts of an epidemic on the poultry industries. It is endemic to many countries.

15 Which one of the following pair is mismatched? **[CBSE AIPMT 2007]**

(a) *Pila globosa* — Pearl
(b) *Apis indica* — Honey
(c) *Kenia lacca* — Lac
(d) *Bombyx mori* — Silk

Ans. *(a)*

Out of the following the option (a) is mismatched because pearl is obtained from pearl oyster (*Pinctada vulgaris*) while, honey from *Apis indica*, lac from *Kenia lacca* and silk from *Bombyx mori*.

16 The world's highly prized wool yielding 'Pashmina' breed is **[CBSE AIPMT 2005]**

(a) goat
(b) sheep
(c) goat-sheep cross
(d) Kashmir sheep–Afghan sheep cross

Ans. *(a)*

Pashmina refers to a type of Kashmir wool and textiles made from it. This wool comes from a special breed of goat indigenous to high altitudes of the Himalayan mountains. The Himalayan mountain goat, sheds its winter coat every spring and the fleece is caught on thorn bushes. One goat sheds approximately 3-8 ounces of the wool fibre.

17 Honey is **[CBSE AIPMT 1997]**

(a) acidic
(b) neutral
(c) alkaline
(d) basic after some days

Ans. *(a)*

Honey is acidic as its pH is 2.5-4.0.Honey is a byproduct of bee keeping. It is sweet in taste and white to black in colour. Smell of honey varies according to juices collected from different flowers.

18 High milk yielding varieties of cows are obtained by **[CBSE AIPMT 1997]**

(a) super ovulation
(b) artificial insemination
(c) use of surrogate mother
(d) All of the above

Ans. *(a)*

In superovulation, a high milk yielding cow is induced to shed 4-6 eggs every 6-8 weeks (instead of 20-21 days).
The superovulated donor is artificially inseminated with semen from a quality bull. the embryos developing from the eggs so fertilised are flushed out. These good quality embryos are now transferred to surrogate mother for delivery.

19 Pebrine is a disease of **[CBSE AIPMT 1997]**

(a) honeybee (b) fish
(c) silkworm (d) *lac* insect

Ans. *(c)*

Pebrine disease is one of the most damaging disease of silkworm. It is caused by *Nosema bombycis nageli*. The other diseases of silk worm are Flacherie which is an infectious viral disease marked by body flaccidity and digestive disorders.
Muscaridine, which is a fungal disease caused by *Spicaria* or *Botrytis*.

20 Pasteurisation of milk involve heating for **[CBSE AIPMT 1996]**

(a) 60 min at about 90°C
(b) 30 min at about 50°C
(c) 30 min at about 65°C
(d) 60 min at 100°C

Ans. *(c)*

Pasteurisation of milk involves heating of milk at 60-70°C for about 30 min so as to kill the pathogens.

21 The earliest animal to have been domesticated by man was most likely the **[CBSE AIPMT 1996]**

(a) horse (b) cow
(c) dog (d) pig

Ans. *(c)*

Dog was one of the earliest animals to be domesticated by man.

22 The long-term prospects for a truly human civilisation depend in a large measure on **[CBSE AIPMT 1996]**

(a) the ability of humanity to moderate its fecundity
(b) increasing the food production
(c) colonisation of under populated areas
(d) control of human diseases

Ans. *(d)*

The long term prospects for a truly human civilisation depend on a large measure on control of human disease.

23 The silkworm silk is the product of **[CBSE AIPMT 1995]**

(a) cuticle of the larva
(b) cuticle of the adult
(c) salivary gland of the larva
(d) salivary gland of the adult

Ans. *(c)*

Caterpillar larva of *Bombyx mori* secretes liquid silk from its salivary glands.

TOPIC 2
Plant Breeding

24 Which of the following is not an objective of biofortification in crops? **[NEET 2021]**

(a) Improve protein content
(b) Improve resistance to diseases
(c) Improve vitamin content
(d) Improve micronutrient and mineral content

Ans. *(b)*

Biofortification is the method developed to produce crops with high level of vitamins, proteins and minerals to improve public health.
Improving resistance to disease is not the objective of biofortification hence option (b) is correct.

25 Match the List -I with List - II.

	List-I		List-II
A.	Protoplast fusion	1.	Totipotency
B.	Plant tissue culture	2.	Pomato
C.	Meristem culture	3.	Somaclones
D.	Micropropagation	4.	Virus free plants

Choose tho correct answer from the options given below. **[NEET 2021]**

	A	B	C	D
(a)	3	4	2	1
(b)	2	1	4	3
(c)	3	4	1	2
(d)	4	3	2	1

Ans. *(b)*

(A)-(2), (B)-(1), (C)-(4), (D)-(3)
Pomato is the potato and tomato hybrid. Pomato can be formed by somatic hybridisation.
The mechanism by which two separate species of plant protoplasts fuse together to form hybrid is known as somatic hybridisation.

Totipotency is the basis of tissue culture. Cells from growing root tips or shoot tips or any other growing part can be grown in nutrient medium under sterilised condition. Afterwards, these cells divides and grow into a mass of tissue called callus.

Meristem culture is one of the most widely used methods for virus elimination from infected plants and production of virus-free plants. Apical meristem culture is a proven means of clonal propagation and also for eliminating viruses from infected plants.

The plants raised through micropropagation are called somaclones because they are genetically identical to the original plant from which they were grown. It helps in producing plants that are disease and pest resistant.

26 Mutations in plant cells can be induced by **[NEET 2021]**

(a) kinetin
(b) infrared rays
(c) gamma rays
(d) zeatin

Ans. *(c)*

Mutation is defined as the process by which genetic changes are created *via* changes in the sequences of bases present within genes. This results in the formation of a new trait or character not found in the parental type.

Thus, it is possible to induce mutations with the help of various chemicals or radiations such as gamma radiations artificially and then selecting and using plants with desirable traits as a source in breeding. This process is termed as mutational breeding.

27 In mung bean, resistance to yellow mosaic, virus and powdery mildew were brought about by **[NEET (Odisha) 2019]**

(a) mutation breeding
(b) biofortification
(c) tissue culture
(d) hybridisation and selection

Ans. *(a)*

In mung bean, resistance to yellow mosaic virus and powdery mildew were induced by mutation breeding. Mutation breeding is the process of exposing seeds to chemicals or radiation in order to generate mutants with desirable traits to be bred with other cultivars.

28 Which of the following is true for Golden rice? **[NEET 2018]**

(a) It is pest resistant, with a gene from *Bacillus thuringiensis*
(b) It is drought tolerant, developed using *Agrobacterium* vector
(c) It has yellow grains, because of a gene introduced from a primitive variety of rice
(d) It is vitamin-A enriched, with a gene from daffodil

Ans. *(d)*

Statement that Golden rice is vitamin-A enriched, with a gene from daffodil is true. Golden rice is genetically engineered variety of rice to biosynthesise β-carotene which is a precursor of vitamin-A. It contains *psy* gene (phytoene synthase) which is derived from daffodil. Other statements are not true for golden rice. The correct information about the statements is as follows The grains of golden rice appear yellow due to high level of β-carotene in it. Golden rice is neither drought tolerant nor pest resistant.

29 What triggers activation of protoxin to active *Bt* toxin of *Bacillus thuringiensis* in bollworm? **[NEET (National) 2019]**

(a) Moist surface of midgut
(b) Alkaline pH of gut
(c) Acidic pH of stomach
(d) Body temperature

Ans. *(b)*

Alkaline pH of gut triggers activation of protoxin to active *Bt* toxin of *Bacillus thuringiensis* in bollworm. The inactive protoxins contain toxic insecticidal protein crystals.

When the alkaline pH of insect gut solubilises the crystals, the activated toxin binds to the epithelial cells of the midgut and creates pores. It causes the cell to swell and burst, eventually causing the death of insect.

30 Select the incorrect statement. **[NEET (National) 2019]**

(a) Inbreeding is essential to evolve purelines in any animal
(b) Inbreeding selects harmful recessive genes that reduce fertility and productivity
(c) Inbreeding helps in accumulation of superior genes and elimination of undesirable genes
(d) Inbreeding increases homozygosity

Ans. *(b)*

Statement that inbreeding selects harmful recessive genes that reduce fertility and productivity is incorrect. The correct information regarding the statement is as follows

Inbreeding does not select harmful recessive genes. It exposes harmful recessive genes that are eliminated by selection and thus reduces fertility and productivity. This is called inbreeding depression.

Statements in other options are correct.

31 A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called **[NEET 2016, Phase I]**

(a) contour farming
(b) strip farming
(c) shifting agriculture
(d) ley farming

Ans. *(d)*

Ley farming is a system of rotating crops with legumes or grass pasture in order to improve soil structure and fertility and also to disrupt pest and disease life cycles.

32 In plant breeding programmes, the entire collection (of plants/seeds) having all the diverse alleles for all genes in a given crop is called **[NEET 2013]**

(a) selection of superior recombinants
(b) cross-hybridisation among the selected parents
(c) evaluation and selection of parents
(d) germplasm collection

Ans. *(d)*

It is called germplasm collection. Selection of superior recombinants means selection of the best plant from the whole lot by visual examination and collecting their seeds for growing in field. Cross hybridisation is the method of combining the characters of different plants together. The selection and evaluation are the main steps of hybridisation.

33 Consider the following four statements (I-IV) and select the option which includes all the correct ones only.

I. Single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins, etc.

II. Body weight-wise the microorganism *Methylophilus methylotrophus* may be able to produce several times more proteins than the cows per day.
III. Common button mushrooms are a very rich source of vitamin-C.
IV. A rice variety has been developed which is very rich in calcium. **[CBSE AIPMT 2012]**

(a) Statements III and IV
(b) Statements I, III and IV
(c) Statements II, III and IV
(d) Statements I and II

Ans. ***(d)***

Out of the given statements (I) and (II) are correct as single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins, etc. And body weight-wise the microorganism *Methylophilus methy lotrophus* may be able to produce several times more proteins than cows per day.

34 'Jaya' and 'Ratna' developed for green revolution in India are the varieties of **[CBSE AIPMT 2011]**

(a) maize (b) rice
(c) wheat (d) bajra

Ans. ***(b)***

'Jaya' and 'Ratna' are better yielding semi-dwarf varieties of rice developed in India for green revolution.

35 'Himgiri' developed by hybridisation and selection for disease resistance against rust pathogens is a variety of **[CBSE AIPMT 2011]**

(a) chilli (b) maize
(c) sugarcane (d) wheat

Ans. ***(d)***

'Himgiri' is a variety of wheat. It is resistant to leaf and stripe rust, hill bunt diseases.

36 Consider the following statements (I-IV) about organic farming. **[CBSE AIPMT 2011]**

I. Utilises genetically modified crops like *Bt* cotton.
II. Uses only naturally produced inputs like compost.
III. Does not use pesticides and urea.
IV. Produces vegetables rich in vitamins and minerals.

Which of the above statements are correct?

(a) II, III and IV
(b) III and IV
(c) II and III
(d) I and II

Ans. ***(c)***

Out of the given statements (II) and (III) are correct as organic farming is the form of agriculture that relies on techniques such as crop rotation, green manure, compost and biological pest control to maintain soil productivity and control pest on a farm. Organic farming excludes or strictly limits the use of manufactured fertilisers, pesticides (which include herbicides, insecticides and fungicides), plant growth regulators such as hormones, food additives and genetically modified organisms.

37 Breeding of crops with high levels of minerals, vitamins and proteins is called **[CBSE AIPMT 2010]**

(a) somatic hybridisation
(b) biofortification
(c) biomagnification
(d) micropropagation

Ans. ***(b)***

Breeding of crops with higher levels of vitamins and minerals or higher protein and healthier fats is called biofortification. This is the most practical aspect to improve the health of the people.

38 Which one of the following is linked to the discovery of Bordeaux mixture as a popular fungicide? **[CBSE AIPMT 2008]**

(a) Loose smut of wheat
(b) Black rust of wheat
(c) Bacterial leaf blight of rice
(d) Downy mildew of grapes

Ans. ***(d)***

Bordeaux mixture is the first inorganic fungicide which was developed by RMA Millardet (1882) against downy mildew (*Plasmopara viticola*) of grape-vine at the University of Bordeaux. It consists of copper (II) sulphate $(CuSO_4)$ slaked lime and water.

39 Consider the following four measures (1-4) that could be taken to successfully grow chickpea in an area where bacterial blight disease is common

I. spray with Bordeaux mixture.
II. control of the insect vector of the disease pathogen.
III. use of only disease-free seeds.
IV. use of varieties resistant to the disease.

Which two of the above measures can control the disease? **[CBSE AIPMT 2008]**

(a) III and IV (b) I and IV
(c) II and III (d) I and II

Ans. ***(b)***

Bacterial blight of chickpea is caused by bacterium *Xanthomonas campestris*. The stems and the leaves of infected plant give blighted or burnt up appearance.

Control measures includes roguing, 3-year crop rotation, disease-free seeds, spray of copper fungicides (Bordeaux mixture) and antibiotics besides sowing disease resistant varieties.

40 Farmers in a particular region were concerned that pre-mature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield? **[CBSE AIPMT 2006]**

(a) Frequent irrigation of the crop
(b) Treatment of the plants with cytokinins along with a small dose of nitrogenous fertiliser
(c) Removal of all yellow leaves and spraying the remaining green leaves with 2,4,5-trichlorophenoxy acetic acid
(d) Application of iron and magnesium to promote synthesis of chlorophyll

Ans. ***(d)***

If a pulse crop possesses premature yellowing of leaves and decrease in yield an application of magnesium and iron to promote synthesis of chlorophyll may become most beneficial to overcome the problem and to obtain maximum seed yield.

Magnesium is an important part of ring structure of chlorophyll molecule and its deficiency causes chlorosis and premature leaf abscission.

In iron deficiency also, the leaves become chlorotic because iron is required for the synthesis of some of the chlorophyll protein complexes in the chloroplast.

41 In maize, hybrid vigour is exploited by **[CBSE AIPMT 2006]**

(a) inducing mutations
(b) bombarding the protoplast with DNA
(c) crossing of two inbred parental lines
(d) harvesting seeds from the most productive plants

Ans. *(c)*

Hybrid vigour has been commercially exploited in different commercial crops like maize, sorghum, bajra, tomato, sugarbeet. Hybridisation or crossing of two unrelated individuals or parental lines leads to hybrid vigour or heterosis. It refers to the superiority of the hybrid over its parents. The changes in the progeny or hybrid can be seen with naked eyes. The main steps include, i.e. selection of parents, selfing of parents, emasculation, bagging, crossing of desired and selected parents and finally seed setting and harvesting.

42 Golden rice is a transgenic crop of the future with the following improved trait **[CBSE AIPMT 2006, 05]**

(a) high lysine (essential amino acid) content
(b) insect resistance
(c) high protein content
(d) high vitamin-A content

Ans. *(d)*

Generally seeds of rice do not have vitamin-A, but golden rice which is developed through genetic engineering has the high vitamin-A content.

43 Crop plants grown in monoculture are **[CBSE AIPMT 2006]**

(a) low in yield
(b) free from intraspecific competition
(c) characterised by poor root system
(d) highly prone to pests

Ans. *(d)*

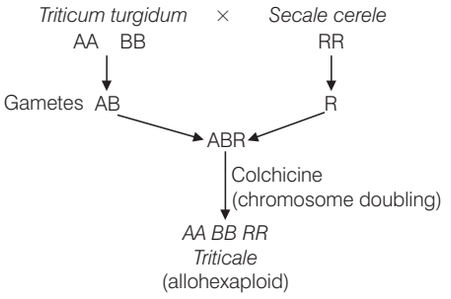
The crop plants grown in monoculture are highly prone to pests and thus, it carries the risk of an entire crop being destroyed with the appearance of a single pest species or disease.

44 *Triticale,* the first man-made cereal crop, has been obtained by crossing wheat with **[CBSE AIPMT 2006]**

(a) rye (b) pearl millet
(c) sugarcane (d) barley

Ans. *(a)*

Triticale is the first man-made cereal crop. It has been obtained by crossing wheat (*Triticum* sp.) with rye *(Secale cerele).*



45 Three crops that contribute maximum to global food grain production are **[CBSE AIPMT 2005]**

(a) wheat, rice and maize
(b) wheat, maize and sorghum
(c) rice, maize and sorghum
(d) wheat, rice and barley

Ans. *(a)*

Wheat, rice and maize belong to family–Poaceae or Gramineae. The main fruit type of these crops is caryopsis in which fruit wall is fused with seed coat. These crops are cultivated in all over the world and are contributed maximum in global food grain production.

46 The name of Norman Borlaug is associated with **[CBSE AIPMT 2005]**

(a) Green revolution
(b) Yellow revolution
(c) White revolution
(d) Blue revolution

Ans. *(a)*

Norman Borlaug is associated with green revolution. The green revolution means an increase in the production of crops particularly cereals, such as wheat, rice and maize.

47 Why is vivipary an undesirable character for annual crop plants? **[CBSE AIPMT 2005]**

(a) It reduces the vigour of plant
(b) The seeds cannot be stored under normal conditions for the next season
(c) The seeds exhibit long dormancy
(d) It adversely affects the fertility of the plant

Ans. *(b)*

Vivipary is the condition when seeds are germinated on the plant. It is an undesirable character for annual crop plants because germinated seeds cannot be stored under normal conditions for the next season.

48 Which of the following is generally used for induced mutagenesis in crop plants? **[CBSE AIPMT 2005]**

(a) X-rays
(b) UV (260 nm)
(c) Gamma rays (from cobalt 60)
(d) Alpha particles

Ans. *(c)*

Cobalt 60 is the synthetic radioactive isotope of cobalt. Gamma rays are produced when an unstable atomic nucleus like cobalt-60 releases energy to gain stability. Sharbati Sonora and Pusa Lerma are the two important varieties of wheat that are produced by gamma rays treatment of Sonora-64 and Lerma Rojo-64 which are Mexican dwarf wheat varieties.

49 India's wheat yield revolution in the 1960s was possible primarily due to **[CBSE AIPMT 2004]**

(a) hybrid seeds
(b) increased chlorophyll content
(c) mutations resulting in plant height reduction
(d) quantitative trait mutations

Ans. *(c)*

India's wheat yield revolution in 1960s was possible primarily due to the mutations resulting in plant height reduction. In 1963, ICAR introduced many dwarf selections from CIMMYT, including those developed by Norman Borlaug using Norin-10 as the source of dwarfing genes.

50 Which of the following crops have been brought to India from New world? **[CBSE AIPMT 2002]**

(a) Cashewnut, potato, rubber
(b) Mango, tea
(c) Tea, rubber, mango
(d) Coffee

Ans. *(a)*

Cashewnut, potato, rubber are crops that have been brought to India from New World.

51 What is the best pH of the soil for cultivation of plants? **[CBSE AIPMT 2001]**

(a) 3.4–5.4 (b) 6.5–7.5
(c) 4.5–8.5 (d) 5.5–6.5

Ans. *(c)*

Most cultivated soils have pH ranges between 4.5-8.5. However most plants grow best in soils with a neutral or slightly acidic pH.

52 Before the European invaders which vegetable was/were absent in India? **[CBSE AIPMT 2001]**

(a) Potato and tomato
(b) Simla mirch and brinjal
(c) Maize and chichinda
(d) Bitter gourd

Ans. *(a)*

Potato and tomato originated in the New World. They were absent in India previously.

53 Which statement is correct about centre of origin of plants? **[CBSE AIPMT 2001]**

(a) More diversity in varieties
(b) Frequency of dominant gene is more
(c) Climatic conditions more favourable
(d) None of the above

Ans. *(a)*

The centres of origin of plants are more appropriately called the centres of diversity. These are the areas of maximum diversity of these species.

54 One of the most important reason why wild plants should thrive is that these are good sources of **[CBSE AIPMT 2000]**

(a) unsaturated edible oils
(b) highly nutritive animals feed
(c) genes for resistance to diseases and pests
(d) rare and highly sought after fruits of medical importance

Ans. *(c)*

Wild plants have to survive without getting any protection and for this, they evolve various strategies/characters which are exploited by plant breeders like diseases resistance.

55 The new varieties of plants are produced by **[CBSE AIPMT 1999]**

(a) selection and hybridisation
(b) selection and introduction
(c) mutation and selection
(d) introduction and mutation

Ans. *(a)*

The new varieties of plants are produced by selection and hybridisation. In hybridisation, two or more plants of unlike genotype are crossed together to get offsprings with new desirable combinations of characters, as a result of genetic recombination.

56 The reason why vegetatively reproducing crop plants are best suited for maintaining hybrid vigour is that **[CBSE AIPMT 1998]**

(a) they can be easily propagated
(b) they have a longer life span
(c) they are more resistant to disease
(d) once a desired hybrid is produced, there are no chances of losing it

Ans. *(d)*

Vegetative reproduction is the process of multiplication in a small part or portion of the plant body which functions as a propagule and develops into a new individual.

Thus, vegetative reproduction does not involve meiosis; hence, recombination and no loss of heterozygosity.

57 Which one among the following chemicals is used for causing defoliation of forest trees? **[CBSE AIPMT 1998]**

(a) Amo-1618
(b) Phosphon-D
(c) Malic hydrazide
(d) 2, 4-D

Ans. *(d)*

2, 4-D (2, 4 dichlorophenoxy acetic acid) is an auxin hormone. It over stimulates the growth activities of the cells of the root due to which roots get destroyed and thus plants finally destroyed. 2, 4-D is used as a defoliant for broad leaves dicots (mainly weeds).

58 Which plant will loss its economic value, if its fruits are produced by induced parthenocarpy? **[CBSE AIPMT 1997]**

(a) Grape
(b) Pomegranate
(c) Orange
(d) Banana

Ans. *(b)*

Testa is the edible part in pomegranate. It is not formed if fruits are produced by parthenocarpy (no seeds will be formed).

59 Of the world's top five crops (in terms of annual production) **[CBSE AIPMT 1997]**

(a) three belong to Poaceae (Gramineae), one to Leguminosae, one to Solanaceae
(b) four belong to Poaceae, one to Leguminosae
(c) four belong to Poaceae, one to Solanaceae
(d) All five belong to Poaceae

Ans. *(c)*

Top five crops of today are wheat-*Triticum aestivum* (Poaceae), corn-*Zea mays* (Poaceae), rice-*Oryza sativa* (Poaceae), potato-*Solanum tuberosum* (Solanaceae) and barley-*Hordeum vulgare* (Poaceae).

60 Most of our crop plants are **[CBSE AIPMT 1994]**

(a) autopolyploid in origin
(b) allopolyploid in origin
(c) mixed genotypic in origin
(d) heterozygous in origin

Ans. *(a)*

Most of our crop plants are autopolyploid in origin.

61 Haploid plants are preferred over diploids for mutation study because in haploids **[CBSE AIPMT 1993]**

(a) recessive mutation express immediately
(b) induction of mutations is easier
(c) culturing is easier
(d) dominant mutation express immediately

Ans. *(a)*

Haploid plants are preferred over diploids for mutation study because of their clear/obvious expression. In nature mutations are generally recessive. In case of a diploid it is difficult to trace out the recessive mutation as its dominant gene is present on other chromosome.

62 In crop improvement programme, haploids are important because they **[CBSE AIPMT 1989]**

(a) require one half of nutrients
(b) are helpful in study of meiosis
(c) grow better under adverse conditions
(d) form perfect homozygous

Ans. *(d)*

Haploids are important in crop improvement programme because they produce a pureline and form perfect homozygous.

TOPIC 3
Plant Tissue Culture

63 To obtain virus-free healthy plants from a diseased one by tissue culture technique, which part/parts of the diseased plant will be taken? **[CBSE AIPMT 2014]**

(a) Apical meristem only
(b) Palisade parenchyma
(c) Both apical and axillary meristems
(d) Epidermis only

Ans. *(c)*

Both apical and axillary meristems are free of virus for the healthy plant cultivation because of strong interferon activity in this region.

These tissues form a protective impermeable covering around themselves, which is non-penetrable by any pathogen. Hence, these tissue are used in the production of disease free plants by tissue culture.

64 Somaclones are obtained by **[CBSE AIPMT 2009]**

(a) plant breeding
(b) irradiation
(c) genetic engineering
(d) tissue culture

Ans. *(d)*

Somaclones are obtained by tissue culture. The plant regenerated from cell and tissue cultures shows heritable variation for both qualitative and quantitative traits. Plant breeding is the branch of biology, which is concerned with developing varieties superior to existing ones.

Irradiation means exposure to any form of radiation.

Genetic engineering is defined as the manipulation of genes by man.

65 In order to obtain virus-free plants through tissue culture the best method is **[CBSE AIPMT 2006]**

(a) meristem culture
(b) protoplast culture
(c) embryo rescue
(d) anther culture

Ans. *(a)*

Virus free plants can be developed by using meristem as explant in tissue culture. In infected plants, virus concentration decreases as they approach the apical meristem.

It is because the cells of apical meristem undergo rapid mitotic divisions and virus cannot divide so fast and thus it cannot keep pace with the fast dividing meristematic cells.

So, apical meristems are generally virus free or they contain very low concentration of virus. Before meristem culture, viruses associated with meristem are eliminated by *in vitro* heat treatment (thermotherapy). Morel and Maetin (1952) successfully obtained virus free *Dahlia* plants through meristem culture of infected plants.

66 Haploid plant cultures are got from **[CBSE AIPMT 1994]**

(a) leaves
(b) root tip
(c) pollen grain
(d) buds

Ans. *(c)*

Haploid plant cultures are obtained from pollen grains as they are haploid while leaves, root tip and buds are diploid.