

MODEL PRACTICE PAPER

DEMO PAPER

Key features of Model Practice Papers:

- Model Practice Papers are based on the entire syllabus of the subjects covered under CBSE Board Examinations.
- They are prepared exactly as per the papers set in the CBSE Board Examinations.
- The questions are picked/ set in such a way that students get acquainted with each and every concept of the syllabus.
- All the questions provided in the practice papers have detailed and authentic solutions.
- Practice Papers will provide sufficient practice before the actual examination for obtaining high scores.
- It enables the student to use an effective study method and “have a go” before the final examination.

Class XII
BIOLOGY
MODEL PRACTICE PAPER DEMO

Time allowed: 3 hours

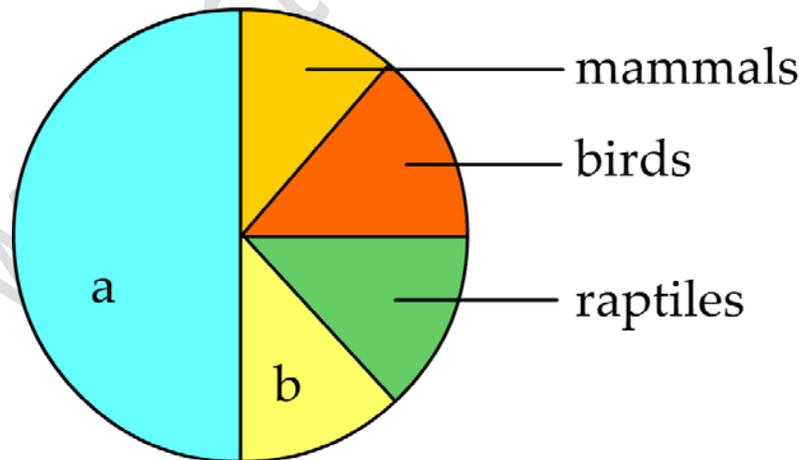
Maximum Marks: 70

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper consists of four sections A, B, C and D. Section A contains 8 questions of one mark each, section B consists of 10 questions of two marks each, section C consists of 9 questions of three marks each, section D consists of 3 questions of five marks each.
- (iii) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all the questions of five marks weightage. A student has to attempt only one of the alternatives in each question.
- (iv) Wherever necessary, the diagrams drawn should be neat and properly labeled.

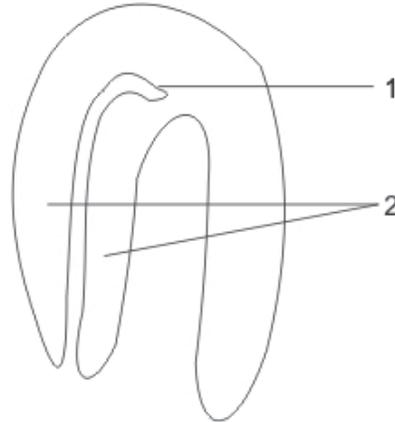
SECTION – A

- Q1. Only females are born generation after generation in the whiptail lizard, give reason?
- Q2. Why do internodal segments of sugarcane fail to propagate vegetatively even when they are in contact with damp soil?
- Q3. Why *h*RNA is required to undergo splicing?
- Q4. Mention the type of evolution that has brought the similarity as seen in potato tuber and sweet potato.
- Q5. Expand (i) ELISA and (ii) SCP
- Q6. Why prawn fisheries are named so, where as prawn is an arthropod?
- Q7. Name the Indian variety of rice patented by an American Company.
- Q8. Name the unlabeled areas 'a' and 'b' of PIE chart representing biodiversity of vertebrates showing proportionate number of species of vertebrates.



SECTION – B

Q 9. In the given figure of dicot embryo label the parts (1) and (2) and give their functions.



Q10. Where are fimbriae present in a human female reproductive system? Give their functions.

Q11. Give the functions of (a) Corpus luteum (b) Endometrium.

Q12. Given below are the two pairs of body organs. Categorise them as homologous and analogous organs.

- Wing of a bat and wing of an insect.
- Human arm and flipper of a whale.
- Eye of octopus and mammals.
- Flippers of penguins and dolphins.

Q13. Name the Blank Spaces a, b, c, and d in the table given below:

Type of Microbe	Name	Commercial Product
Fungus	a	Penicillin
Bacterium	<i>Acetobacter</i>	b
c	<i>Aspergillus niger</i>	Citric acid
Yeast	d	Ethanol

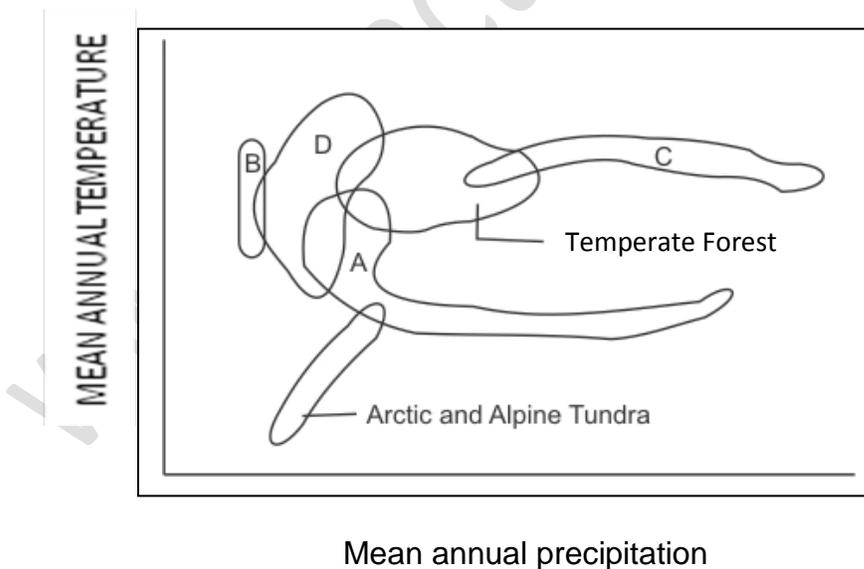
Q14. What is the role of the following against the microbial infection?

- 1) B-cells 2) Histamine 3) Interferon.

OR

What are the main advantages and disadvantages of relying on a physical barrier against infection?

Q15. Fill the blanks noted by A,B,C, and D.



- Q16.** Draw the ideal pyramid of energy.
- Q17.** Give two examples where we find the inverted pyramid.
- Q18.** Mention at least one example from plants and at least one from animals showing their defence mechanism to save from becoming victim of predation.

SECTION – C

- Q19.** Draw a neat and labeled diagram of mature pollen grain. Write the functions of its parts.
- Q20.** Name the techniques which are employed in the following cases.
- Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce ova but can provide suitable environment for fertilisation and development.
 - Embryo is formed in laboratory in which sperm is directly injected into ovum.
 - Semen is collected either from husband or a healthy donor is artificially introduced either into vagina or uterus.
- Q21.** One of the codons on *mRNA* is AUG. Draw the structure of tRNA adaptor molecule for this codon. Explain the uniqueness of this tRNA.
- Q22.** Explain co-dominance with the help of an example.
- Q23.** What is adaptive radiation? Explain with the help of an example.
- Q24.** (i) What is meant by addictive disorder?
(ii) Name any two opiate narcotics.
(iii) Mention any two ways how opiate narcotics affect human body.

OR

What are the different classes of immunoglobulin? Write the function of each.

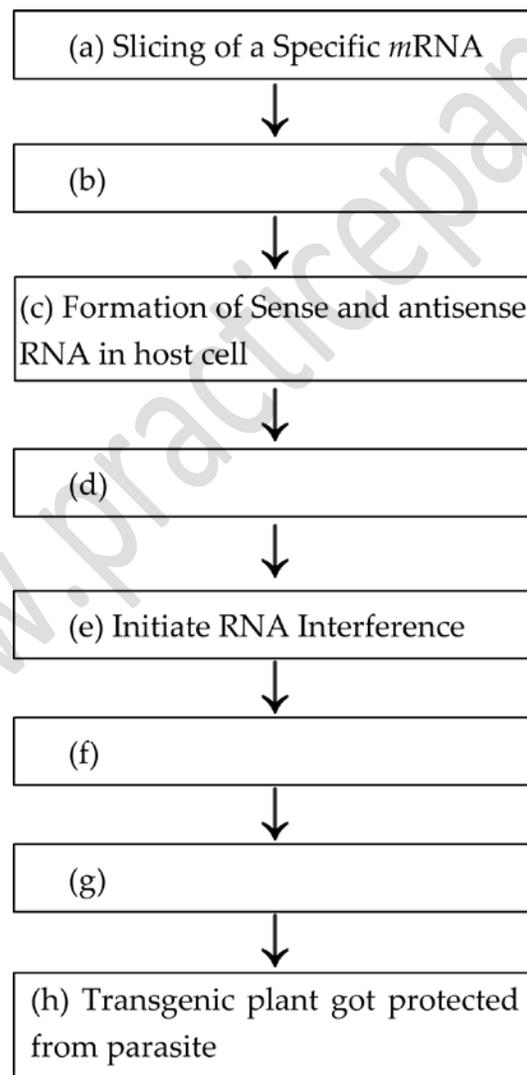
- Q25.** What are the major steps in the process of separation and isolation of DNA fragments?

Q26. The development of bioreactors is required to produce large quantities of products.

- Give optimum growth conditions used in bioreactors
- Draw a well labeled diagram of simple stirred tank bioreactor.

Q27. Given below is an incomplete flow chart showing the process of production of nematode resistant tobacco plants based on RNAi technique?

- Write the missing steps in its proper sequence.
- At which level RNAi silences the gene?



SECTION – D

Q28. How did Hershey and Chase prove that DNA is the hereditary material? Explain the experiment with suitable diagram.

OR

Currently it is possible to correct the defective gene using rDNA technology. Write the name of the technique used for such kind of treatment? Explain the technique giving an example.

Q29. Describe the major steps involved in the process of decomposition of dead remains of plants and animals.

OR

What are two basic strategies of biodiversity conservation? Briefly explain the approaches followed during *in-situ* conservation of biodiversity.

Q30. What is menstruation? What are the specific action of FSH, LH, estrogen and progesterone in menstruation cycle?

OR

Answer the following:

- (1) Why is autogamy discouraged in plants? Mention four adaptations to ensure xenogamy.
- (2) Draw a labeled diagram of a microsporangium showing wall layers.

SOLUTION OF SAMPLE PAPER DEMO**SECTION – A**

- A1.** Only females are produced due to parthenogenesis i.e. the female gamete develops into an adult without fertilization.
- A2.** Buds are present in the nodes, when the nodes come in contact with damp soil; the buds produce roots and shoots.
- A3.** Since *hrRNA* is non-functional it has to be made functional. So removal of introns and joining of exons is required.
- A4.** Convergent evolution.
- A5.** ELISA – Enzyme Linked Immunosorbent Assay SCP-Single Cell Protein.
- A6.** As prawns are cultured like fish and can be sold like fish to grow the economy of the country.
- A7.** Basmati.
- A8.** A-Fishes B-Amphibians.

SECTION – B

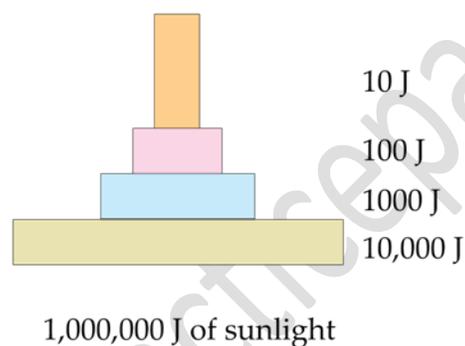
- A9.** 1. Plumule – it forms the shoot system.
2. Cotyledons – It stores the food for developing embryo.
- A10.** Fimbriae are present at the edge of infundilulum of the fallopian tube. It collects the ovum.
- A11.** Coropus luteum-It secretes progesterone which prepares endometrium of uterus for implantation and normal development of foetus.
Endometrium – It undergoes cyclic changes during menstrual cycle and prepares itself for implantation of blastocyst
- A12.** (i) Analogous organs
(ii) Homologous organs
(iii) Analogous organs
(iv) Analogous organs
- A13.** a) *Penicillium notatum*
b) Acetic acid
c) Fungus
d) *Saccharomyces crevisiae*
- A14.** 1) B-cells produce antibodies during infection.
2) Histamines are produced during allergy.
3) Interferon is the glycoprotein which is produced by our body cells in response to a viral infection.

OR

A physical barrier often provides a very effective defense against infection. This is an advantage; however, animals need openings in their bodies for exchange with the environment through which microbes get entry in to the body.

- A15.** A) Coniferous forest
B) Desert
C) Tropical forest
D) Grassland

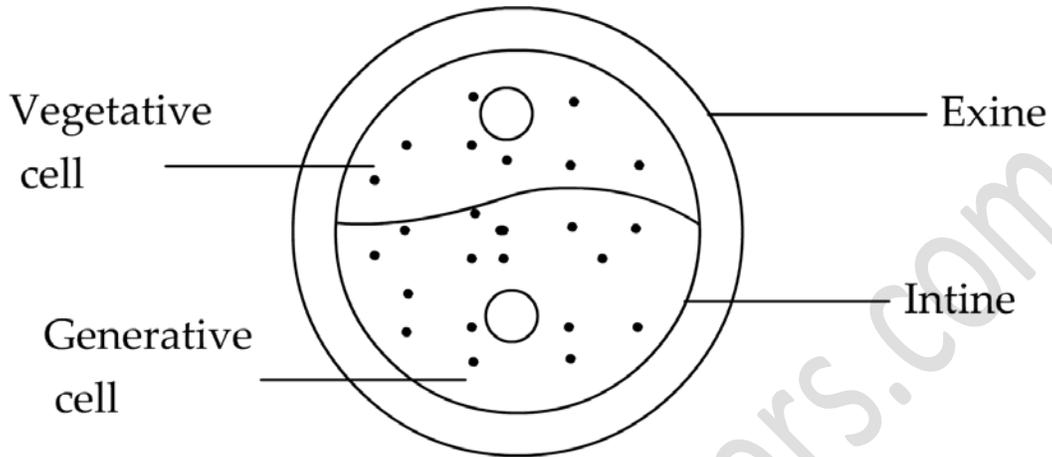
A16. A diagram of a typical pyramid of energy is given below:



- A17.** 1. Insects feeding on a big tree.
2. Standing crop of phytoplanktons supports a large standing crop of zooplanktons.
- A18.** a) *Acacia* develops thorns and escape from predating animals.
b) Camouflage to avoid easy detection by predators as in chameleon. Monarch butterfly is distasteful because it acquires a chemical by feeding on poisonous weeds.

SECTION – C

A19. A labeled diagram of mature pollen grain is given below:



Exine- it protects pollen grains from high temperature and strong acids.

Intine- it forms the pollen tube.

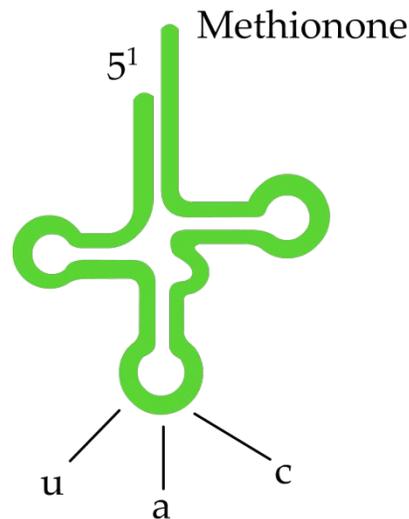
Vegetative cell- it has abundant food reserve.

Generative Cell – it forms the two male nucleus.

A20. The techniques are:

- a) GIFT – Gamete Intra Fallopian Transfer
- b) ICSI – Intra Cytoplasmic Sperm Injection
- c) IUI- Intra Uterine Insemination.

A21. The tRNA is Clover leaf-shaped



This tRNA is specific for methionine. It acts as an initiator tRNA.

A22. When the F_1 resembled either of the two parents is dominance and when F_1 is in-between two parents is incomplete dominance. But, if F_1 generation resembles both parents is co-dominance.

The simple example of co-dominance is ABO blood groups in human beings.

ABO blood groups are controlled by the gene *I*. The gene (*I*) has three alleles *IA*, *IB* and *i*. The alleles *IA* and *IB* are co-dominance and *i* is recessive. Since humans are diploid organisms, each person possesses any two of the three *I* gene alleles. *IA* and *IB* are completely dominant over *i*, in other words when *IA* and *i* are present only *IA* expresses and when *IB* and *i* are present *IB* expresses.

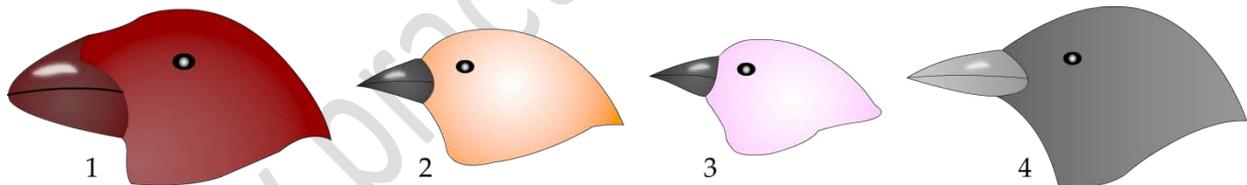
But when *IA* and *IB* are present together they express both. This is because of co-dominance. Since there are three different alleles, there are six different combinations of these three alleles that are possible a total of six different genotypes of the human ABO blood types.

Genotype	Blood Group
$I^A I^A$ or $I^A i$.	A
$I^B I^B$ or $I^B i$.	B
$I^A I^B$	AB
ii .	O

A23. The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography is called adaptive radiation. Adaptive radiation results into new species from a common ancestor.

Darwin's finches in the Galapagos Island represent one of the best examples of adaptive radiation.

Darwin found a number of varieties of finches in the same island. All the varieties have evolved on the island itself from the original seed-eating features; many other forms with altered beaks arose, enabling them to become insectivorous and vegetarian finches.



Variety of beaks of finches that Darwin found in Galapagos Island

- A24.** (i) Addictive disorder is the state when the body requires a continuous presence of a psychotropic substance within it.
- (ii) Morphine, heroin, pethidine.
- (iii) Opiate narcotics – Suppress brain function and reduce anxiety and tension, relieve intense pain, produce feeling of well being.

OR

IgA, IgD, IgE, IgG, and IgM are the different classes of immunoglobulins. Their functions are given below:

IgA - It protects from inhaled and ingested pathogens.

IgD - Present on lymphocyte surface as receptors and it activates B-cells.

IgE - It is concerned with allergic reactions; it binds to mast cells and can trigger inflammatory responses.

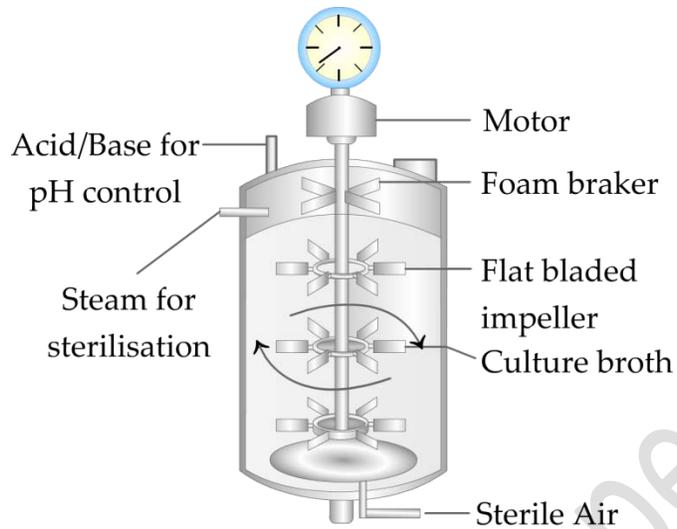
IgG- It is the most abundant antibody. It stimulates phagocytes and can cross the placenta from mother to foetus and protects the offspring during the first few weeks after birth.

IgM- It helps in the activation of B-cells.

A25. The major steps in the process of separation and isolation of DNA fragments are:

- a. Cutting of DNA by Restriction endonuclease results in DNA fragments.
- b. Agarose gel electrophoresis.
- c. Staining of DNA fragments with ethidium bromide.
- d. Visualization in UV light.
- e. Elution.
- f. Purification of DNA fragments.

- A26.** a) Temperature, pH, substrates, salts, vitamins and oxygen.
b) A labeled diagram of simple stirred tank bioreactor is given below:



Simple stirred-tank bioreactor

- A27.** (i) b) Using *Agrobacterium* as a vector, introduces it in to tobacco.
d) dsRNA (double stranded RNA).
f) Silenced Specific mRNA of the nematode
g) Parasite could not survive
(ii) RNAi silences the gene at translational level.

SECTION – D

A28. The proof that DNA is the genetic material also came from the experiments of Alfred Hershey and Martha Chase (1952). They worked with viruses that infect bacteria called bacteriophages.

They grew some viruses separately on a medium that containing radioactive phosphorus and radioactive sulfur.

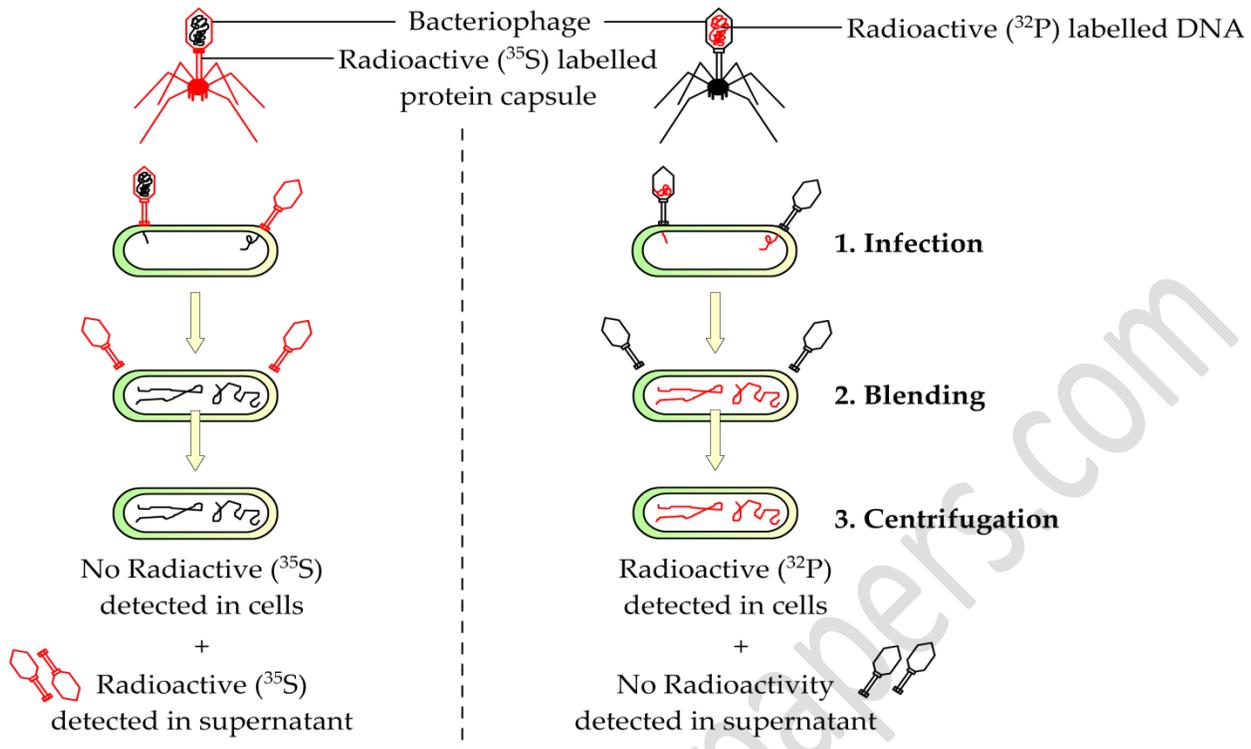
Viruses grown in radioactive phosphorus contained radioactive DNA but not radioactive protein.

Similarly, viruses grown on radioactive sulfur contained radioactive protein but not radioactive DNA.

Radioactive phages were allowed to infect to *E.coli*. Then, as the infection proceeded, the viral coats were removed from the bacteria by agitating them in a blender. The virus particles were separated from the bacteria by spinning them in a centrifuge. Bacteria which were infected with viruses that had radioactive DNA were radioactive, indicating that DNA was the material that passed from the virus to the bacteria.

Bacteria that were infected with viruses that had radioactive proteins were not radioactive. This indicates that proteins did not enter the bacteria from the viruses.

It is therefore, DNA is the genetic material that is passed from virus to bacteria.



OR

Name of the technique to correct defective gene is - Gene Therapy

The process involves the delivery of a normal gene into individual or embryo to replace the defective mutant allele of the gene.

Viruses which attack the host and introduce their genetic material into the host are used as vectors.

The first clinical gene therapy was given in 1990 to a four year old girl with adenosine deaminase (ADA) deficiency. ADA deficiency can be cured by bone marrow transplantation in some children but it is not completely curative.

For the gene therapy, lymphocytes from the patient are grown in a culture medium. A functional ADA cDNA is then introduced into lymphocytes using retroviral vector.

These lymphocytes are then transferred into the body of patients. The patient requires periodic infusion of such genetically engineered lymphocytes.

If a gene is isolated from the bone marrow cells producing ADA is introduced into a cell at early embryonic stages it would be cured permanently.

A29. Decomposition is an aerobic process that requires oxygen and detritus serves as the raw material for decomposition:

The following steps are involved in the process of decomposition:

- (i) Fragmentation: The process of breaking of the detritus into smaller particles by detritivores.
- (ii) Leaching: The process in which water-soluble inorganic substances percolates into soil and get precipitated as unavailable salts.
- (iii) Catabolism: It is the enzymatic conversion of the detritus into simple organic compounds and then into inorganic compounds. The enzymes are secreted by the decomposers like bacteria and fungi.
- (iv) Humification: The accumulation of humus (a dark coloured amorphous substance). Humus is resistant to microbial action and it decomposes very slowly.
- (v) Mineralisation: It is the process in which the humus is degraded by certain microbes and inorganic nutrients are released.

OR

The two basic strategies of biodiversity conservation are *in-situ* (on site) conservation and *ex-situ* (off site) conservation.

In-situ conservation emphasized on protection of total ecosystem by forming protected areas, biosphere reserves and sacred forests and lakes.

- I. **Protected Areas:** Dedicated to the protection and maintenance of biodiversity under natural condition. Examples are National parks and Wildlife sanctuaries. In India there are 581 protected areas (90 National parks and 448 Wildlife sanctuaries) covering 4.7 % of the land surface.
 - II. **Biosphere Reserves:** Biosphere Reserve is a part of an international network of preserved area as vital centers of biodiversity where research and monitoring is done with the help of local communities. There are 14 biosphere reserves in India. A Biosphere Reserve consists of core, buffer and transition zone.
 - III. **Sacred forests and lakes:** Sacred forests are the patches of forest protected by tribal due to religious reasons. They represent the most undisturbed forests without human interference. Examples – sacred forests are located in the many parts of Maharashtra, Meghalaya, Kerala etc, similarly several water bodies recognized as sacred lakes that protect aquatic life.
- A30. Menstruation:** It is a process by which the disintegrate uterine mucosa (endometrium) are sloughed off and discharged from uterus along with the unfertilized egg and some blood through the vaginal opening.

Roles of Hormones:

1. FSH- stimulates the growth of Graafian follicle and maturation of an ovum in it, during proliferating. It induces the formation of corpus luteum from the ruptured Graafian follicle and stimulates secretion of estrogens from follicle cells.
2. LH-stimulates ovulation and induces formation of corpus luteum. It also induces secretion of progesterone from corpus luteum.
3. Estrogen-control the growth, maturation and functioning of female secondary organs, thickens endometrium.

4. Progesterone- brings pregnancy changes, prevents maturation of any other Graafian follicle and ovulation. It controls growth of secretory alveoli in the mammary glands.

OR

1. Autogamy or self pollination results in homozygosity and inbreeding depression.

Four adaptations for xenogamy:

- (a) Flowers are unisexual and the plants are dioceous.
- (b) Pollen release and stigma receptivity are not synchronized either the anthers mature first (protandry) or the pistil/ gynoecium matures first (protogyny) before anthers.
- (c) The anthers and stigma of a flower are placed in such a way that the pollen of the same flower cannot fall on the stigma.
- (d) Self-incompatibility is a genetic mechanism that prevents the germination of pollen from the same flower on the stigma.

2. A labeled diagram showing wall layers of a microsporangium.

