

SAMPLE QUESTION PAPER – 1

Time: 3 Hours and 15 minutes

Max Marks: 70

GENERAL INSTRUCTIONS:

- (i) This question paper consists of four parts – A, B, C and D. Part D consists of two parts, Section-I and Section-II.
- (ii) All the Parts are compulsory.
- (iii) Draw diagrams wherever necessary. Unlabelled diagrams or illustrations do not attract any marks.

PART – A

Answer the following questions in one word or one sentence each:

10 x 1 = 10

1. Name the type of pollination that brings genetically different types of pollen to the stigma.
2. Mention the role of LH during spermatogenesis.
3. What is foetal ejection reflex?
4. With reference to the Mendelian laws of inheritance define the term “dominance”.
5. Which genetic disease is characterized by the reduced synthesis of haemoglobin?
6. ‘Evolution can also occur by anthropogenic action’. Give an example for this.
7. Mention the role of *Azospirillum* as biofertilizer.
8. “Gel electrophoresis is considered as a very important technique in recombinant DNA technology”. Why?
9. Define ‘standing state’.
10. How cryopreservation helps in the conservation of biodiversity?

PART – B

Answer FIVE of the following questions in 3 – 5 sentences each, wherever applicable:

5 x 2 = 10

11. Give reasons for the following:
 - (a) Compared to internal fertilization, external fertilization is disadvantageous to the animal.
 - (b) Chances of survival of young ones are more in viviparous animals than in oviparous animals.
12. Write a note on double fertilization.
13. Sketch and label a nucleosome.
14. Mention any two physiological barriers that provide non-specific type of defense to our body.
15. List any two bioactive molecules of fungal origin and explain how those molecules help in restoring good health in humans.
16. Explain the method of introduction of alien DNA into bacterial cells.
17. “Alien species are highly invasive and are a threat to local species”. Substantiate this with any two examples.
18. Mention any two effects of Ozone depletion on humans.

PART – C

Answer FIVE of the following questions in 40 – 80 words each, wherever applicable:

5 x 3 = 15

19. Name the following:
 - (a) The organism in which cell division itself is a mode of reproduction
 - (b) The type of reproductive cycle in non-primate mammals
 - (c) The plant that flowers only once in its life time
20. List any six features of genetic code.
21. Explain sex determination in birds.
22. Mention the important points needed for successful beekeeping.

23. Sketch and label a typical biogas plant.
24. What is gene therapy? Explain the steps involved in curing ADA deficiency by gene therapy.
25. Describe rivet popper hypothesis.
26. "Ecosystems should carry a hefty price tag for its various services". Enlist any three of them.

PART-D

Section-I

Answer FOUR of the following questions in 200 – 250 words each, wherever applicable: 4 x 5 = 20

27. Answer the following:
 - (a) Write a note on Pollination in *Vallisneria*. (2)
 - (b) List the differences between microsporogenesis and megasporogenesis. (2)
 - (c) What is the number of chromosomes in each of the endosperm cells of a plant that has 36 chromosomes in its meiocytes? (1)
28. Draw a neat labeled diagrammatic view of human male reproductive system.
29. (a) Comment on the essential features required for an ideal contraceptive. (2)
(b) Write a note on the steps involved in the creation of "test tube baby". (2)
(c) Name a hormone releasing IUD. (1)
30. State the law of Independent assortment. Explain it with an example.
31. With the help of suitable diagrams, explain the process of transcription in bacteria.
32. What were the views of Charles Darwin about the evolution of life forms?

Section-II

Answer THREE of the following questions in 200 – 250 words each, wherever applicable: 3 x 5 = 15

33. (a) Explain how different techniques help in cancer detection and diagnosis. (4)
(b) How does smoking cause oxygen deficiency in the body? (1)
34. Describe briefly the steps involved in the breeding of new genetic variety of crops.
35. (a) Explain how DNA is isolated from cells. (3)
(b) Differentiate between exonuclease and endonuclease. (1)
(c) What is the uniqueness of *Taq polymerase*? (1)
36. Name the type of interactions seen in each of the following examples:
 - (a) *Ascaris* worms living in the intestine of humans.
 - (b) Wasp pollinating an inflorescence.
 - (c) Clown fish living among the tentacles of sea anemone.
 - (d) Disappearance of smaller barnacles when *Balanus* dominated the coast of Scotland.
 - (e) Five closely related species of warblers living on the same tree.
37. Draw a neat labeled diagram of electrostatic precipitator and explain. Mention the importance of electrostatic precipitator.

SAMPLE QUESTION PAPER – 2

Time: 3 Hours and 15 minutes

Max Marks: 70

GENERAL INSTRUCTIONS:

- (iv) This question paper consists of four parts – A, B, C and D. Part D consists of two parts, Section-I and Section-II.
- (v) All the Parts are compulsory.
- (vi) Draw diagrams wherever necessary. Unlabelled diagrams or illustrations do not attract any marks.

PART – A

Answer the following questions in one word or one sentence each:

10 x 1 = 10

1. What is Perisperm?
2. Name the oral contraceptive for the females developed by CDRI.
3. Who disproved the theory of spontaneous generation?
4. Name the diagnostic test which confirms typhoid.
5. Name the pathogen which causes malignant malaria.
6. What is the medical use of cyclosporin A?
7. A restriction enzyme digests DNA into fragments. Name the technique used to check the progression of this enzyme and to separate the DNA fragments.
8. State Allen's rule.
9. Define standing crop.
10. How cryopreservation is useful in conserving biodiversity?

PART-B

Answer FIVE of the following in 3 – 5 sentences each, wherever applicable:

5 x 2 = 10

11. What are meiocytes? Mention the chromosome number in meiocyte of human beings.
12. Differentiate chasmogamous flowers and cleistogamous flowers.
13. How are non medicated IUDs different from hormone releasing IUDS?
14. Mention any four objectives of RCH.
15. Mention the number of chromosomes found in the following cells of humans:
(a) Primary oocyte (b) Secondary oocyte (c) Ootid (d) Follicle.
16. What is modified allele? How the modified allele affects the phenotype of an organism?
17. Distinguish between the template and coding strands of DNA.
18. Mention two classes of nucleases. Suggest their respective roles.

PART-C

Answer FIVE of the following in 40 – 80 words each, wherever applicable:

5 x 3 = 15

19. Name any three units of vegetative propagation in plants with the names of plants in which they are present.
20. What is pedigree analysis? Draw schematic representation of Autosomal dominant trait (Myotonic dystrophy).
21. State any three criteria which a molecule must fulfill to act as a genetic material.
22. Explain mutation breeding with note on plants developed through mutation breeding.
23. Mention any three features of vectors that are most suitable for the purpose for recombinant DNA technology.
24. What do you mean by biodiversity? What are the different types of Biodiversity?
25. Explain how solid wastes can be disposed in different ways.

26. Draw a neat labeled diagram of electrostatic precipitator.

PART-D

Section I

Answer FOUR of the following in 200 – 250 words each, wherever applicable: 4 x 5 = 20

27. Explain the structure of mature female gametophyte with the help of a neat labelled diagram.
28. What is menstrual cycle? Explain the phases of menstrual cycle.
29. State the law of independent assortment. Explain hybrid cross experiment with reference to seed colour and seed shape.
30. Describe the experiment conducted by Hershey and Chase which proves that DNA is the genetic material?
31. Describe Miller's experiment with neat labeled diagram.
32. Explain the components of a biogas plant with a neat labeled diagram

Section II

Answer THREE of the following in 200 – 250 words each, wherever applicable: 3 x 5 = 15

33. Explain the life cycle of plasmodium with reference to malaria disease.
34. Briefly describe the steps involved in plant breeding technology.
35. What are genetically modified organisms? How are GM plants useful?
36. Define the following terms and give one example for each:
(a) Amensalism (b) Parasitism (c) Commensalism (d) Resource partitioning (e) Competitive release
37. Represent schematically & describe the phosphorus cycle in an ecosystem.

SAMPLE QUESTION PAPER – 3

Time: 3 Hours and 15 minutes

Max Marks: 70

GENERAL INSTRUCTIONS:

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- (ii) All the Parts are compulsory.
- (iii) Draw diagrams wherever necessary. Unlabelled diagrams or illustrations do not attract any marks.

PART – A

Answer the following questions in one word or one sentence each:

10 x 1 = 10

1. Why pollen grains are very well preserved as fossils?
2. Replication in the region of euchromatin would be faster. Justify.
3. With reference to Human Genome Project, what do SNPs refer to?
4. Define genetic equilibrium.
5. How does the administration of α -interferons help cancer patients?
6. Write the scientific name of the microbe which is used in the manufacture of citric acid.
7. Mention the principle on which ELISA is based.
8. Logistic growth model is more realistic than exponential growth model. Why?
9. Why is the pyramid of biomass in sea generally inverted?
10. What is the disadvantage of lead in petrol which is used as a fuel in modern automobiles?

PART – B

Answer the following questions in 3 – 5 sentences each, wherever applicable:

5 x 2 = 10

11. Why is water hyacinth called “the terror of Bengal”?
12. What do you understand by pericarp and perisperm?
13. Differentiate spermiogenesis and spermiation.
14. How is ZIFT different from ICSI?
15. Define pleiotropy. Mention an example.
16. Write the scientific name of the plant from which cocaine is obtained. What is the effect of cocaine in humans?
17. Why is the introduction of genetically engineered lymphocytes into a ADA deficiency patient not a permanent cure? Suggest a possible permanent cure.
18. Justify with the help of two examples where a deliberate attempt by humans has led to the extinction of a particular species on earth.

PART – C

Answer FIVE of the following in 40 – 80 words each, wherever applicable:

5 x 3 = 15

19. What is asexual reproduction? Explain encystation and sporulation in *Amoeba*.
20. Name the hormonal composition of the oral contraceptive used by human females. How does it help in contraception?
21. Explain sex determination mechanism in honey bees.
22. Explain why DNA is a better genetic material than RNA.
23. What is divergent evolution? Explain this with reference to the forelimbs of Cheetah and whales.
24. What is biofortification? Mention four examples for biofortified crops.
25. What is Bt toxin? How does it toxin kill cotton boll worms?

26. Biodiversity plays a major role in providing many ecosystem services. Explain.

PART-D

Section I

Answer FOUR of the following in 200 – 250 words each, wherever applicable: 4 x 5 = 20

27. Describe the structure of megasporangium of angiosperms with a diagram.
28. Draw a labelled diagram of human sperm.
29. With the help of a diagram, explain the structure of transcriptional unit.
30. Write the schematic diagram of the life cycle of *Plasmodium*.
31. What is polymerase chain reaction? Name the bacterium from which the polymerase enzyme used in this technique is obtained. Write the schematic representation of this technique.
32. What is cultural eutrophication? Explain the stages involved in eutrophication.

Section II

Answer THREE of the following in 200 – 250 words each, wherever applicable: 3 x 5 = 15

33. Explain thalassemia as an example for Mendelian disorder.
34. (a) How is the herd size increased by Multiple Ovulation and Embryo Transfer (MOET) technology?
(3)
(b) Differentiate out-crossing and cross breeding. (2)
35. Explain the various stages in the secondary treatment of sewage.
36. 'Parasitic mode of life ensures free lodging and free meals'. Justify listing the special adaptations developed by parasites.
37. Describe the various steps involved in the process of decomposition of detritus.