(18)

Pre-Board – January 2025

Class- 12

Subject – Biology

Time: - 3 Hours | Maximum Marks: - 70

General Instructions:

1. **All questions are compulsory.**
2. **Question numbers 1 to 18 carry 1 mark each.**
3. **Question numbers 19 to 25 carry 2 marks each.**
4. **Question numbers 26 to 30 carry 3 marks each.**
5. **Question numbers 31 to 32 carry 4 marks each.**
6. **Question numbers 33 to 35 carry 5 marks each.**

Section – A

All the questions in this section carry 1 mark each. Total questions in this section are 18

1. In a bisexual flower, when the gynoecium matures earlier than anther it is called as
   (a) Protandry
   (b) Protogyny
   (c) Herkogamy
   (d) None of the above
2. What is the correct about a test tube baby?
   (a) Fertilization in female genital tract and growth in test tube
   (b) Rearing of premature born baby in an incubator
   (c) Fertilization outside and gestation inside mother's Womb
   (d) Both fertilization and development are done outside the female genital tract
3. The membranous cover of the ovum at ovulation is
   (a) Corona radiata
   (b) Zona radiata
   (c) Zona pellucida
   (d) Chorion
4. Flower colour character in *Mirabilis jalapa* shows
   (a) Incomplete dominance
   (b) Pleiotropy
   (c) Co-dominance
   (d) Dominance
5. Human ancestors who left cave paintings were
   (a) Neanderthal man
   (b) Cro-Magnon man
   (c) Java ape man
   (d) Peking man

6. Cirrhosis of liver is caused by chronic intake of
   (a) Opium
   (b) Alcohol
   (c) Tobacco
   (d) Cocaine
7. Acetic acid is produced by
   (a) Aspergillus niger
   (b) Clostridium botulinum
   (c) Acetobacter aceti
   (d) Lactobacillus
8. First restriction endonuclease enzyme was isolated from
   (a) E.coli
   (b) Azotobacter
   (c) Haemophilus
   (d) Clostridium
9. Second most important trophic level in a lake is
   (a) Phytoplankton
   (b) Zooplankton
   (c) Benthos
   (d) Fishes
10. The program started by India in 1951 at National level to attend to achieve a total productive health.
11. At what level the regulations of gene expression in eukaryotes can be done?
12. What is hemozoin and what is its effect?
13. _____ is the hormone releasing intrauterine device.
14. _____ were the biggest land dinosaurs about 65 mya.
15. _____ and _____ are primary lymphoid organs.

(16-18) Directions: In the following questions, a statement of assertion is followed by a statement of reason.
Mark the correct choice as:
   (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) If Assertion is true but Reason is false.
   (d) If both Assertion and Reason are false.

16. **Assertion**: If an endosperm cell of angiosperm contains 24 chromosomes. The number of chromosomes in each cell of root will be 16.
   Reason: The endosperm surrounding embryo is triploid in nature and the cells of root are diploid, therefore number of chromosomes in root cells will be 16.

17. **Assertion**: Innate immunity has first and second defence line.

Reason: This immunity present since birth and obtained in inheritance.

18. **Assertion**: The design of biogas plants has been in stated by IARI and KVIC.

Reason: Ganga action plan and Yamuna action plan have been initiated to save these major rivers from pollution.

Section – B

(19-25) All the questions in this section carry 2 marks each.

19. What is amniocentesis? The process is banned in our country. Is this ban necessary? Comment.

OR

Suggest some methods to assist infertile couples to have children.

OR

A couple is considering birth control methods and wants to avoid hormonal side effects. They also wants to avoid hormonal side effects. They also want this method to provide protection against sexually transmitted infections (STIs).
Which birth control method can be recommended to this couple, and why?

20. How is sex determined in birds?

21. Which five factors are known to affect Hardy-Weinburg equilibrium?

OR

Define Hugo De Vries theory of evolution? How does it differ from Darwin's view.

22. Differentiate between active and passive immunity.

OR

List the symptoms of amoebiasis. Name the causal organism.

23. What are methanogens? How do they help to generate biogas?

24. What is EcoRI? Write the palindromic nucleotide sequence recognized by it. State the role of EcoRI in biotechnology.

25. Describe the phenomenon of commensalism with an example of commensal between an orchid growing as an epiphyte on a mango branch.

Section – C

All the questions in this section carry 3 marks each. Total questions in this section are 5.

26. Write a note on the development of endosperm in a typical angiosperm. Mention the types with example.

27. What is co-dominance? Explain with the example.

OR

What is aneuploidy? Write any two examples of it.

28. With the help of a suitable example explain the role of microbes as agents of biological control.

29. Explain any three methods of vector less gene transfer.

30. What is primary productivity? Give a brief description of factors that affect primary productivity.

Section – D

(31-32) All the questions in this section carry 4 marks each.

31. The Human Genome Project was a 13 years project co-ordinated by US Department of Energy and the National Institute of Health. During the early years of the HGP, the Wellcome Trust (UK) became a major partner; additional contributions came from Japan, France, Germany, China and others. The project was completed in 2003. Knowledge about the effects of DNA variations among individuals can lead to revolutionary new ways to diagnose, treat and someday prevent thousands of disorders that affect human beings.

(a) What is the objective of human genome project?

(b) How much gene found in human DNA.

(c) What are the two major approaches involved in human genome project?

(d) Which one is the largest human gene found in body?

OR

What percentage of genetic human genome code for protein?

32. When we conserve and protect the whole ecosystem, its biodiversity at all levels is protected we save the entire forest to save the tiger. This approach is called *in situ* (on site) conservation. However, when there are situations where an animal or plant is endangered or threatened (organisms facing a very high risk of extinction in the wild in the near future) and needs urgent measures to save it from extinction, ex situ (off site) conservation is the desirable approach.

(a) What is in situ conservation?

(b) What do you mean by hotspot?

(c) How much hotspots are identified in world?

(d) What are sacred grooves?

Section – E

(33-35) All the questions in this section carry 5 marks each. Total questions in this section are 3.

33. Briefly describe the stages of spermatogenesis in humans.

OR

Describe the changes that occur in ovaries and uterus in human female during the menstrual cycle.

34. Give the experimental support to prove that DNA replication is semi conservative.

OR

What is a genetic code? What are its properties?

35. Describe the structure of pro-insulin and mature insulin. How is genetically engineered insulin developed?

OR

(a) Briefly explain, why are transgenic animals produced?

(b) Explain the terms: (i) Single cell proteins (ii) Biopiracy (iii) Bioethics

OR

a) A group of scientists is trying to clone a gene of interest into a plasmid vector to express the gene in *Escherichia coli*. They are using a plasmid vector, which contains two antibiotic resistance genes: one for kanamycin and one for tetracycline. The scientists insert the gene of interest at the restriction site within the tetracycline resistance gene. Some cells, however, would have the plasmid inserted without the gene of interest.

After performing the transformation procedure, the scientists plate the transformed cells onto two plates one containing only kanamycin and another containing only tetracycline.

(i) On which plate will the following cells grow cells with the plasmid containing the gene of interest, cells with the plasmid but no gene of interest, and cells without the plasmid

(ii) This plasmid has two ori sequences one for a bacterial cell and another for a plant cell. Would this be beneficial in any situation? Justify.

(b) Why is it important for a vector to have a few, preferably single, recognition sites for restriction enzymes? Explain how this feature helps in the cloning process.