2026

BIOLOGY

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

For Question Nos. 1 to 8, select the most appropriate one from the given alternatives A, B, C and D and rewrite the same.

1. The remaining parts of the Graafian follicle after ovulation change into – 1

(A) Corpus luteum (B) Ovum

(C) Oocyte (D) Secondary Oocyte

2. β - Thalassemia is controlled by a single gene HBB on – 1

(A) Chromosome 16 (B) Chromosome 13

(C) Chromosome 11 (D) Chromosome 14

3. Haemozoin is released as a result of – 1

(A) Rupture of liver cells (B) Rupture of red blood cells

(C) Multiplication of sporozoites (D) Replication in macrophages

4. The enzyme required for isolating DNA from fungi is – 1

(A) Cellulase (B) Chitinase

(C) Lysozyme (D) Endonuclease

5. The possible reason for extinction of Steller's sea cow is due to – 1

(A) Alien species invasion (B) Over exploitation

(C) Habitat Loss (D) Co-extinction

6. Which one of the following involves the transfer of genetically different pollen grains to the stigma? 1

(A) Geitonogamy (B) Cleistogamy

(C) Chasmogamy (D) Xenogamy

7. Identify the effect brought about by single step large mutation in evolution from the options given below : 1

(A) Saltational speciation (B) Founder effect

(C) Gene migration (D) Evolution by special creation

8. Which one of the following is commonly found in root ecosystem and control several plant pathogens? 1

(A) *Rhizobium* (B) *Bacillus thuringiensis*

(C) *Trichoderma* (D) *Azospirillum*

Question Nos. 9 and 10 consist of two statements each, printed as Assertion and Reason. While answering these questions, select the most appropriate one from the given alternatives A, B, C and D and rewrite the same.

(A) If both Assertion and Reason are true and Reason is a correct explanation of the Assertion.

(B) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

(C) If Assertion is true but Reason is false.

(D) If both Assertion and Reason are false.

9. Assertion : Ligase enzyme is used to join a foreign gene with a cloning vector.

Reason : Ligase forms phosphodiester bonds between complementary base pairs. 1

10. Assertion : The pyramid of energy is always upright.

Reason : At each trophic level some energy is lost as heat. 1

Question Nos. 11 to 17 are very short answer type questions carrying 1 mark each:

11. State the type of interaction that exists between sea anemone and clown fish. 1

12. Why is mother's milk considered very essential for the new-born infants? 1

13. How does an endoparasite differ from an ectoparasite? 1

14. Give one reason how the condition of a patient suffering from myocardial infarction can be improved by administering the bioactive agent Streptokinase. 1

15. Analyse how trisomy of chromosome 21 occurs in Down's Syndrome. 1

16. "Smoking causes oxygen deficiency in human body". Justify the statement. 1

17. Give reason for moving DNA fragments towards the anode in gel electrophoresis. 1

Question Nos. 18 to 27 are short answer type-II questions carrying 2 marks each:

18. Where are untranslated regions (UTRs) located in m-RNA? State their function. 2

19. What is the name of the first antibiotic and from which organism was it obtained? 2

20. Explain the mechanisms by which copper and hormone releasing IUDs prevent pregnancy. 2

21. What are the differences between Klinefelter's syndrome and Turner's syndrome in terms of their causes and karyotypes? 2

22. Differentiate between Benign and Malignant tumors with reference to their metastatic and severity of damaging tissue. 2

23. "The co-evolution of figs and wasps provides benefits to both through mutualism". Give two benefits for the wasps. 2

24. Suggest the functions of lymphocytes in the immune responses against a specific pathogen. 2

25. Predict how the transfer of a recombinant DNA bearing an antibiotic resistance gene determine the host *E.coli* as a transformant or non-transformant. 2

26. Draw a neat diagram of enlarged view of one microsporangium and label tapetum. 2

27. Draw a neat diagram of a cloning vector pBR322 and label BamH I. 2

Question Nos. 28 to 33 are short answer type-I questions carrying 3 marks each:

28. Describe the process of natural selection in both white winged and melanised winged moths during pre and post industrialisation period in England. 3

29. Explain the process of silencing the m-RNA of nematode *Meloidogyne incognita* to provide protection to the host plant. 3

30. Summarize with three suitable examples how the invasion of alien species causes the decline or extinction of indigenous species. 3

31. "The continuity of pregnancy in a woman's body requires the development of the placenta between maternal body and developing embryo". Give three probable reasons. 3

Or

"The pistil in a flower has the ability to recognise pollen grains to promote post pollination events". Give possible explanation of the phenomenon.

32. In a DNA molecule, adenine makes 30%. How many guanine bases will be present in the DNA containing 3000 nucleotides? 3

Or

A man having blood group B and a woman having blood group O get married and it is observed that 50% of their children have blood group O. Determine the genotypes of the parents. Carry out a cross using Punnett Square and explain how 50% of the offsprings have blood group O.

Question No. 33 is a case study based question carrying three marks :

33. Suresh, 30 years old man was admitted to the hospital with symptoms of fever, chills, cough, headache and difficulty in breathing for the last few days. His chest X-ray shows fluid accumulation in the lungs and was diagnosed pneumonia. He was treated with medicines and advised complete rest.

Questions :

(a) How does pneumonia spread ? 1

(b) Identify two likely causative organisms of pneumonia. 2

Or

Organic wastes such as cattle dung is fed into biogas plant. Inside the plant, the dung is broken down anaerobically by methanogens into biogas. Biogas can be used for cooking and lighting. The leftover slurry from the biogas plant serves as fertiliser for agriculture.

Questions :

(a) What would happen if oxygen gas is present in a biogas plant? 1

(b) Predict the role of the rumen of cattle in biogas production. 2

Question Nos. 34 to 36 are essay type questions carrying five marks each:

34. Explain the neuroendocrine mechanism that induces parturition in humans. 5

Or

Illustrate the development of a functional megaspore into a mature embryo sac in angiosperms.

35. Explain how t-RNA acts as an adapter molecule during translation. 5

Or

How does the study of homologous and analogous organs can established whether common ancestors were shared or not by animals during evolution? Explain with suitable examples.

36. "Ex-situ conservation practices can significantly reduce the very high risk of extinction of threatened animals and plants in the wild". Analyse. 5

Or

Analyse the various factors involved in the decomposition of detritus into inorganic substances.
