

Class XII | Session 2026-27
Subject - Biology
Sample Question Paper - Set 4

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. Biological equilibrium is an equilibrium among the: [1]
 - a) Producers and decomposers
 - b) Producers, consumers and decomposers
 - c) Producers and consumers
 - d) Producers
2. Which one of the following is a barrier method of contraception? [1]
 - a) IUCD
 - b) Contraceptive pill
 - c) Diaphragm
 - d) Spermicidal
3. Which one among the following regions is not a hotspot of biodiversity? [1]
 - a) The Himalayas
 - b) The Western Ghats and Sri Lanka
 - c) Jaintia Hills in Meghalaya
 - d) The Indo-Burma Region
4. _____ involve the transfer of embryo at an 8-celled stage in the fallopian tube of the female. [1]
 - a) ZIFT
 - b) POST
 - c) IVF
 - d) GIFT
5. Enzyme that cuts DNA is [1]
 - a) DNA polymerase
 - b) DNA lyase
 - c) Restriction endonuclease
 - d) DNA ligase
6. Bacillus thuringiensis protein crystals which contain insecticidal protein. [1]

This protein:

 - a) Is activated at acid pH of the foregut of
 - b) Does not kill the carrier bacterium which is

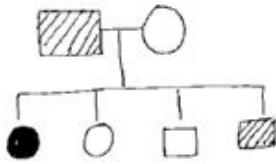
insect pest

itself resistant to this toxin

c) Binds with epithelial cells of midgut of the insect pest ultimately killing it

d) Is coded by several genes including the gene cry

7. Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character [1]



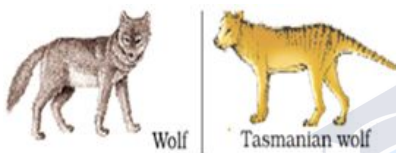
a) The parent could not have had a normal daughter for this character

b) The male parent is homozygous dominant

c) The female parent is heterozygous

d) The trait under study could not be colour blindness

8. Picture shown below is an example of:- [1]



a) Divergent evolution of Australian marsupials and placental mammals

b) Convergent evolution of Australian marsupials and placental mammals

c) Analogous organs of both animals

d) Homologous organs of both animals

9. Which of the following is primary consumer? [1]

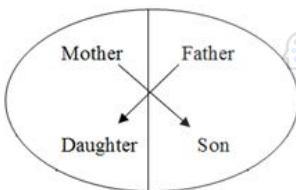
a) Grasshopper

b) Birds

c) Lion

d) Wolf

10. Represented below is the inheritance pattern of a certain type of trait in humans. Which one of the following conditions could be an example of this pattern? [1]



a) Thalassemia

b) Haemophilia

c) Sickle Cell anemia

d) Phenyl ketonuria

11. Bacteria present in rumen of a cattle digest cellulose to produce [1]

a) Sucrose

b) Ethanol

c) Methane

d) Polysaccharides

12. Cohen and Boyer isolated an antibiotic resistance gene, by cutting out a piece of DNA from a plasmid which was responsible for conferring antibiotic resistance, in the year: [1]

a) 1962

b) 1982

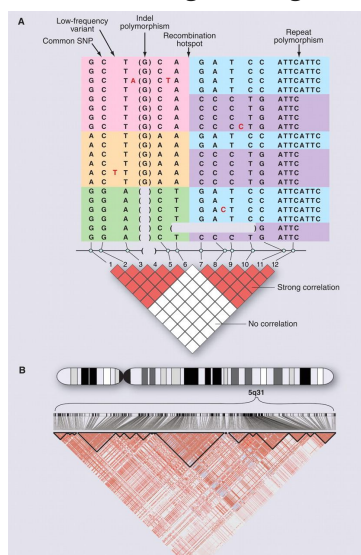
c) 1965

d) 1972

13. **Assertion (A):** PCR, ELISA, DNA hybridisation are confirmatory tests for sexually transmitted diseases. [1]
Reason (R): Incidence of STDs are very high in persons above the age of 30.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.
14. **Assertion:** Baculoviruses have no negative impacts on plants, mammals, birds, fish, or even on non-target insects. [1]
Reason: They are excellent species-specific, narrow spectrum insecticidal applications.
- a) Assertion and reason both are correct statements and reason is correct explanation for assertion. b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
c) Assertion is correct statement but reason is wrong statement. d) Assertion is wrong statement but reason is correct statement.
15. **Assertion (A):** Food web consists of several food chains. [1]
Reason (R): Food web decreases the stability of an ecosystem.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.
16. **Assertion (A):** Polyploidy occurs only in plants. [1]
Reason (R): The additional chromosomes in animals are mostly lethal.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.

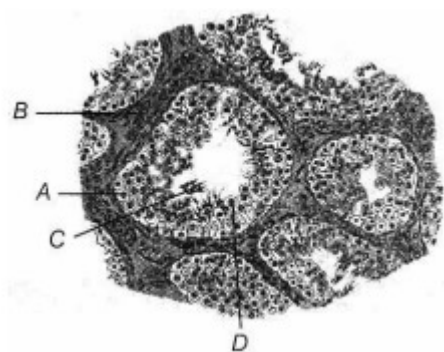
Section B

17. a. Cattle excreta is important source for producing a domestic fuel. Name the fuel and write its main components. [2]
b. Write the biological process that is responsible for the production of this fuel.
18. Observe the diagram for genetic mapping of human DNA and answer the following questions: [2]



- i. Explain DNA polymorphism as the basis of genetic mapping of the human genome.
- ii. State the role of VNTR in DNA fingerprinting.

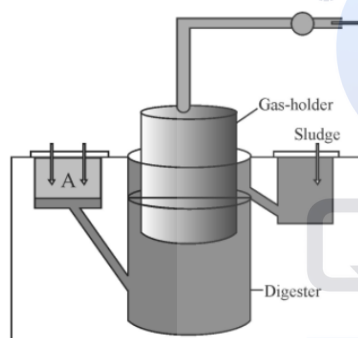
19. State two advantages of an apomictic seed to a farmer. [2]
20. Study the sectional view of human testis showing seminiferous tubules given below. [2]



- i. Identify A, B and C.
 - ii. Write the function of A and D.
21. It is strongly felt, the way integrated waste water including sewage water, treatment was carried in the town of Arcata (California) can be effectively used for waste water treatment in our country. Describe the different steps that were carried to get clean water from waste water. [2]

OR

Study the picture of biogas plant given below and answer the questions that follow:

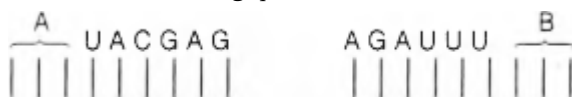


- a. Name the components giving entry from A into the chamber.
- b. Mention the group of bacteria and the condition in which they act on the component that entered from A in the digester.
- c. Name the components that get collected in gas holder.

Section C

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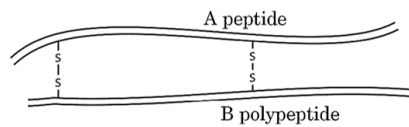
22. Study the mRNA segment given below, which is complete and to be translated into a polypeptide chain and answer the following questions: [3]



- i. Write codons 'A' and 'B'.
 - ii. What do they code for?
 - iii. How is the peptide bond formed between two amino acids in the ribosome?
23. i. Compare the mechanism of sex determination in humans with that of honey bees, with respect to chromosome number. [3]
 - ii. How is the gamete formation comparable in the above two cases?
 24. Explain the difference between commensalism and mutualism types of interactions, with the help of a suitable [3]

example of each.

25. A schematic diagram of matured human insulin is given below: [3]



How is the process of its formation naturally in the human body different from that of its formation by rDNA technology? Explain.

26. How did Dr. David Tilman relate experimentally, the stability of a community and its species richness? Explain. [3]

OR

Alien species invasion has been a threat to biodiversity. Justify with the help of a suitable example. List any other three causes responsible for such a loss.

27. Describe the cosmozoic theory of origin of life. What are its drawbacks? [3]

28. Name and explain the two types of immune responses in humans. [3]

Section D

29. Read the following text carefully and answer the questions that follow: [4]

The following is the illustration of the sequence of ovarian events (a-i) in a human female.



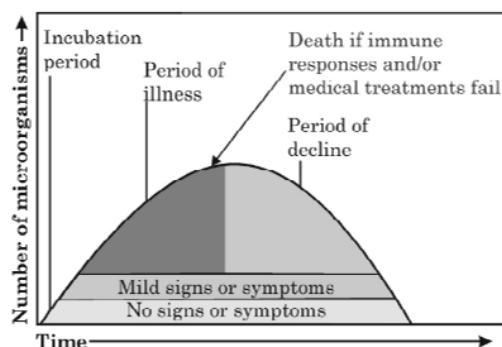
- Identify the figure that illustrates ovulation and mentions the stage of oogenesis it represents. (1)
- Name the ovarian hormone and the pituitary hormone that have caused the above-mentioned event. (1)
- Explain changes that occur in the uterus simultaneously in anticipation. (2)

OR

Draw a labelled sketch of the structure of a human ovum prior to fertilization. (2)

30. Read the following text carefully and answer the questions that follow: [4]

When a microorganism invades a host, a definite sequence of events usually occur leading to infection and disease, causing suffering to the host. This process is called pathogenesis. Once a microorganism overcomes the defense system of the host, development of the disease follows a certain sequence of events as shown in the graph. Study the graph given below for the sequence of events leading to appearance of a disease and answer the questions that follow:



- In which period, according to the graph there are maximum chances of a person transmitting a disease/infection and why? (1)
- Study the graph and write what is an incubation period. Name a sexually transmitted disease that can be easily transmitted during this period. Name the specific type of lymphocytes that are attacked by the pathogen of this disease. (1)

iii. Draw a schematic labelled diagram of an antibody. (2)

OR

In which period, the number of immune cells forming antibodies will be the highest in a person suffering from pneumonia?

Name the immune cells that produce antibodies. (2)

Section E

31. i. How are the characteristic features of pollen, anther and stigma of a maize plant suited for pollination by wind? [5]
- ii. How do you justify that:
1. Pollen grains are recovered from fossils?
 2. Micropyle remains as a small pore in the seed coat of a fully developed seed?

OR

- a. Where does microsporogenesis occur in an angiosperm? Describe the process of microsporogenesis.
- b. Draw a labelled diagram of the two-celled male gametophyte of an angiosperm. How is the three-celled male gametophyte different from it?
32. Explain Griffith's experiment conducted in search of genetic material and write the conclusion he arrived at. [5]
- How did Avery, MacLeod and McCarty establish the biochemical nature of the "Genetic Material" identified by Griffith?

OR

- i. Construct a transcription unit with a coding strand given below with proper labelling:



- ii. When does a coding strand become a template strand?
- iii. Why does a double-helix DNA molecule transcribe into a single-stranded RNA molecule?
33. If a desired gene is identified in an organism for some experiments, explain the process of the following: [5]
- i. Cutting this desired gene at specific location.
 - ii. Synthesis of multiple copies of this desired gene.



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Answer the following questions with respect to recombinant DNA technology:

- i. Why is plasmid considered to be an important tool in rDNA technology? From where can plasmids be isolated? (Any two sources)
- ii. Explain the role of **ori** and selectable marker in a cloning vector.
- iii. r-DNA technology cannot proceed without restriction endonuclease. Justify.