Class XII | Session 2026-27
Subject - Biology
Sample Question Paper - Set 6

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. The primary productivity in an ecosystem is expressed as: **[1]**

   a) $gm^{-2}yr^{-1}$ b) $gm^{-2}yr$

   c) K cal $m^{-2}yr^{-1}$ d) K cal m^{-2}

2. In which of the following chromosomal disorders do individuals have short stature, underdeveloped feminine character and sterile ovaries? **[1]**

   a) Patau's syndrome b) Turner's syndrome

   c) Down's syndrome d) Klinefelter's syndrome

3. In which of the following ex-situ conservation is achieved? **[1]**

   a) Zoological garden b) Biosphere reservation

   c) Sanctuary d) National Park

4. Which of the following viruses is not transferred through semen of an infected male? **[1]**

   a) Chikungunya Virus b) Ebola Virus

   c) HlV d) Hepatitis-B virus

5. A company has developed a GM maize plant that produces a high amount of sugar. The right granted to the company because of which others cannot use it is: **[1]**

   a) Biopatent b) Biopiracy

   c) Bioethics d) Eugenics

6. Which one of the following pairs is **not** correctly matched? **[1]**

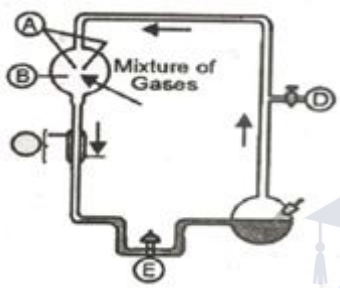
(A) Clostridium butylicum	Butyric acid
(B) Trichoderma polysporum	Cyclosporin A
(C) Monascus purpureus	Citric Acid
(D) Streptococcus	Streptokinase

a) Pair (A) is not correct.
b) Pair (B) is not correct.
c) Pair (D) is not correct.
d) Pair (C) is not correct.

7. The number of autosomes in human sperm are: **[1]**

a) 45
b) 44
c) 22
d) 11

8. What was the resultant found in the place marked E? **[1]**

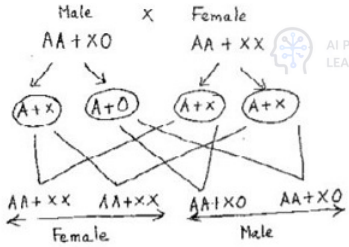


a) Organic esters only
b) Some fatty acids and organic acids
c) Some amino acids as glycine and alanine
d) Glucose, fatty acids and lipids

9. The pyramid of biomass in sea is generally inverted because in sea: **[1]**

a) Large fishes feed on small fishes.
b) Number of phytoplanktons is more.
c) Biomass of fishes exceeds that of phytoplankton.
d) Number of phytoplanktons is less.

10. What does the chart give below represent? **[1]**

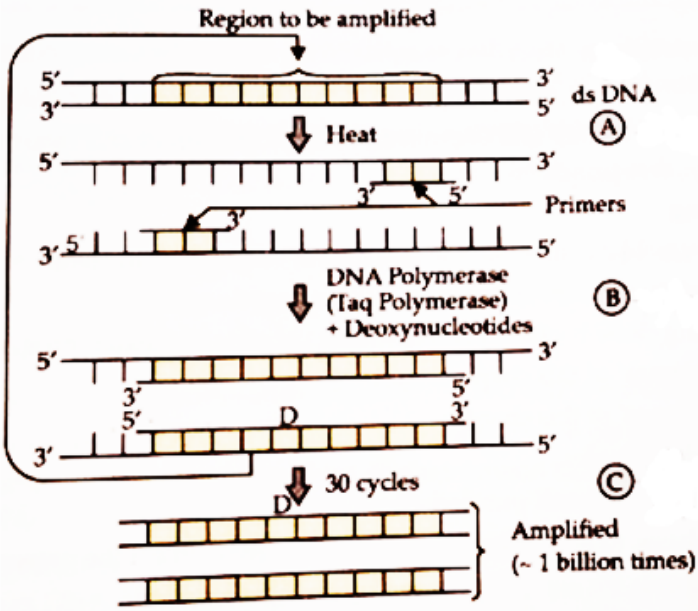


a) XO - XX type of sex determination
b) xy - xx type of sex determination
c) XX - XY type of sex determination
d) XX - XO type of sex determination

11. Mycorrhiza does not help the host plant in: **[1]**

a) Enhancing its phosphorus uptake capacity
b) Increasing its resistance to insects
c) Enhancing its resistance to root pathogens
d) Increasing its tolerance to drought

12. Figure given below represents the reactions associated with Polymer Chain Reaction (PCR). Name the steps A, B, C in the process. **[1]**



a) A - Annealing, B - Primer Extension, C - Denaturation

b) A - Annealing, B - Denaturation, C - Primer Extension

c) A - Primer Extension, B - Annealing, C - Denaturation

d) A - Denaturation, B - Annealing, C - Primer Extension

13. **Assertion (A):** Natality increases both population density and population size. **[1]**

Reason (R): Natality increases the number of individuals in an area by births.

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:** Sewage treatment plans allow treated water to accumulate in large tanks. **[1]**

Reason: Treated water when gets exposed to UV rays of the sun, gradually becomes fit for reuse.

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):** Length of food chains in an ecosystem is generally limited to three - four trophic levels. **[1]**

Reason (R): The energy flow always occur in one direction through successive trophic levels, in a food chain.

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):** Most **evolutionary trees** place information about pattern of relationship on horizontal axis and time on vertical axis. **[1]**

Reason (R): An **evolutionary tree** depicts pattern of relationship among parents and offsprings.

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.

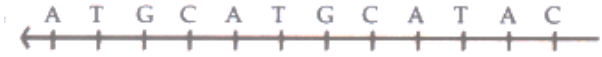
c) A is true but R is false.

d) A is false but R is true.

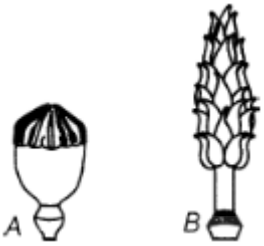
Section B

17. Name the disease and its cause for which the first gene therapy was given. Write the steps carried out for the gene therapy given to the patients suffering from such a disease. **[2]**

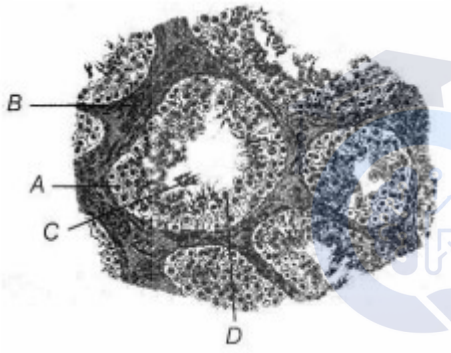
18. Write the RNA strand transcribed from the given transcription unit along with its polarity. **[2]**



19. These pictures show the gynoecium of (A) Papaver and (B) Michelia flowers. Write the difference in the structure of their ovaries. **[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.

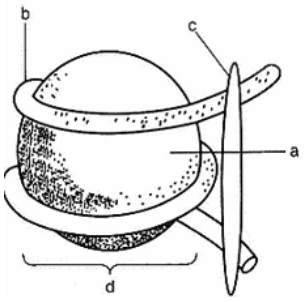
21. Microbes can be used to decrease the use of chemical fertilisers and pesticides. Explain how this can be accomplished. **[2]**

OR

Bottled fruit juices are clearer as compared to those made at home. Explain.

Section C

22. **[3]**



i. What is this diagram representing?

ii. Name the parts a, b and c.

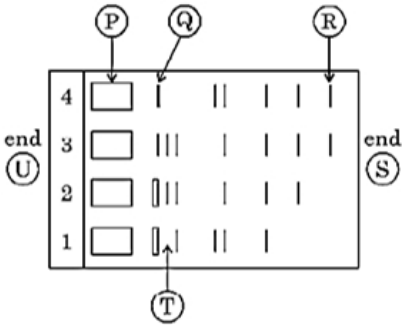
iii. In the eukaryotes, the DNA molecules are organized within the nucleus. How is the DNA molecule organized in a bacterial cell in the absence of a nucleus?

23. In a Mendelian monohybrid cross, the F_2 generation shows identical genotypic and phenotypic ratios. What does it tell us about the nature of alleles involved? Justify your answer. **[3]**

24. i. List any three ways of measuring population density of a habitat. **[3]**

ii. Mention the essential information that can be obtained by studying the population density of an organism.

25. a. Given below is the stepwise schematic representation of the process of electrophoresis. Identify the **alphabets** representing (i) Anode end (ii) smallest/lightest DNA strand in the matrix (iii) Agarose gel **[3]**



b. What is elution? State the importance of elution in this process.

26. You find that a lake in your neighboring area has been covered by Water hyacinth. You have contacted your friends to remove this weed. Nobody agrees to support you. How will you explain the necessity of this? **[3]**

OR

Differentiate between in situ and ex situ approaches of conserving biodiversity.

27. How would the gene flow or genetic drift affect the population? Do the population in which gene flow and genetic drift are operated obey Hardy Weinberg principle? **[3]**

28. a. Explain the property of contact inhibition and its effect on normal human cells and cancerous cells. **[3]**

b. Why are biological modifiers like α-interferon required for cancer treatment? How do they act to treat the disease?

Section D

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

The first menstruation is called menarche that usually occurs between 12 and 15 years. In human females, menstruation is repeated at an average interval of about 28/29 days and is called menstrual cycle. It is regulated by certain hormones; as pituitary gland is stimulated by releasing factors produced in hypothalamus. The hormones produced by pituitary gland influence the ovaries. The hormones secreted by the ovaries affect the walls of uterus.

i. At which phase the breakdown of endometrium occurs? (1)

ii. Which days of the menstrual cycle marks the proliferative phase? (1)

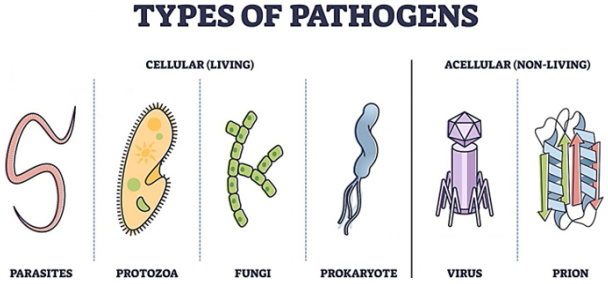
iii. List the events that occur during secretory phase? (2)

OR

What are the two cells that are formed after ovulation and write their fate. (2)

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

The pathogen of a disease depends on RBCs of human for growth and reproduction. The person with this pathogen suffers with chill and high fever.



i. Identify the disease. (1)

ii. Name the pathogen. (1)

iii. What is the cause of fever? (2)

OR

Represent the life cycle of the pathogen diagrammatically. (2)

Section E

31. a. Draw a diagram of a fully developed embryo sac of an angiosperm. Label its chalazal end and any other five parts within the embryo sac. **[5]**

b. Why does the development of an endosperm precede that of the embryo in angiosperm?

c. Number of chromosomes in an onion plant cell is 16. Name the cells of the embryo sac having 16 and 24 chromosomes formed after fertilisation.

OR

Embryo sacs of some apomictic species appear normal but contain diploid cells. Suggest a suitable explanation for the condition.

32. i. Explain the process of aminoacylation of tRNA and its role in the process of translation. **[5]**

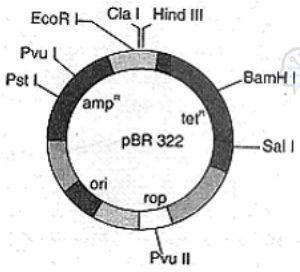
ii. How does initiation of the translation process occur in prokaryotes? Explain.

iii. Where are the untranslated regions located on mRNA and why?

OR

Explain Meselson and Stahl's experiment and write the conclusion they arrived at.

33. The plasmid pBR322 was one of the first EK2 multipurpose cloning vectors to be designed and constructed (ten years ago) for the efficient cloning and selection of recombinant DNA molecules in Escherichia coli. This 4363-bp DNA molecule has been extensively used as a cloning vehicle because of its simplicity and the availability of its nucleotide sequence. The widespread use of pBR322 has prompted numerous studies into its molecular structure and function. These studies revealed two features that detract from the plasmid's effectiveness as a cloning vector: plasmid instability in the absence of selection and, the lack of a direct selection scheme for recombinant DNA molecules. **[5]**



i. Name the organism in which the vector shown is inserted to get the copies of the desired gene.

ii. Mention the area labelled in the vector responsible for controlling the copy number of the inserted gene.

iii. Name and explain the role of a selectable marker in the vector shown.

OR

Explain how does an antibiotic resistance gene in a cloning vector (plasmid pBR 322) help in selecting the recombinants from the non-recombinants.