COMMON PRE-BOARD EXAMINATION

BIOLOGY–Code No. 044

CLASS-XII-(2025-26)

SET:2

Time allowed: 3 Hrs. **Maximum Marks: 70**

General Instructions:

Read the following instructions very carefully and follow them:

General Instructions:

(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions. All questions are compulsory.
(iii) 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.
(iv) 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.
(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

Q. No.	Questions	Marks
1	A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for this situation is: A. The plant is dioecious and bears only staminate flowers B. The plant is dioecious and bears only pistillate flowers C. The plant is dioecious and bears both staminate and pistillate flowers D. The plant is monoecious	1
2	Evolution of life shows that life forms had a trend of moving from: A. land to water B. dryland to wetland C. freshwater to seawater D. water to land	1
3	The bones of the forelimbs of whale, bat, cheetah and man are similar in structure, because: A. one organism has given rise to another B. they share a common ancestor C. they perform the same function D. the have biochemical similarities	1
4	While planning for an artificial hybridization programme involving dioecious plants, which of the following steps would not be relevant:	1

A. Bagging of female flower
B. Dusting of pollen on stigma
C. Emasculation
D. Collection of pollen

5 The theory of spontaneous generation states that: 1
A. life arose from living forms only
B. life can arise from both living and non-living
C. life can arise from non-living things only
D. life arises spontaneously, neither from living nor from the non-living

6 The phenomenon wherein, the ovary develops into a fruit without fertilisation is called: 1
A. Parthenocarpy
B. Apomixis
C. Asexual reproduction
D. Sexual reproduction

7 Antibodies present in colostrum which protect the newborn from certain diseases are of; 1
A. IgG type
B. IgA type
C. IgD type
D. IgE type

8 Match the following parts of the sperm with their functions and choose the correct option. 1

Column-I	Column-II
A. Head	i. Enzymes
B. Middle piece	ii. Sperm motility
C. Acrosome	iii. Energy
D. Tail	iv. Genetic material

A. A-ii, B-iv, C-i, D-iii
B. A-iv, B-iii, C-i, D-ii
C. A-iv, B-i, C-ii, D-iii
D. A-ii, B-i, C-iii, D-iv

9 Tobacco consumption is known to stimulate the secretion of adrenaline and nor-adrenaline. The component causing this could be: 1
A. Nicotine
B. Tannic acid
C. Curcumin
D. Catechin

10 Discontinuous synthesis of DNA occurs in one of the strands during DNA replication, because: 1
A. DNA molecule being synthesised is very long
B. DNA dependent DNA polymerase catalyses polymerisation only in one direction (5’ → 3’)
C. It is a more efficient process
D. DNA ligase joins the short stretches of DNA

11 The trigger for activation of the protoxin of *Bacillus thuringiensis* is: 1
A. Acidic pH of stomach
B. High-temperature
C. Alkaline pH of gut
D. Mechanical action in the insect gut

12 If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is 5′ – A T G A A T G – 3′, the sequence of bases in its RNA transcript would be; 1

A. 5′ – A U G A A U G – 3′
B. 5′ – U A C U U A C – 3′
C. 5′ – C A U U C A U – 3′
D. 5′ – G U A A G U A – 3′

Question Nos. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

(A) Assertion and Reason are true and Reason is the correct explanation of Assertion.
(B) Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false but Reason is true.

13 **Assertion:** Biopiracy is being resorted to by the countries of North. 1
Reason: Countries of South are incapable of Biopiracy.

14 **Assertion:** Genetic engineering overcomes the drawbacks of traditional hybridisation. 1
Reason: Genetic engineering involves creation of a recombinant DNA and introduction of the desirable genes into the target organisms.

15 **Assertion:** In four o'clock plant or Snap dragon, a cross between homozygous white flowered individual and a homozygous red flowered one, produces pink flowered plants. 1
Reason: In these plants, the flower colour is determined by three alleles.

16 **Assertion:** The person heterozygous for sickle-cell trait produces both normal (HbA) and abnormal haemoglobin (Hbs). 1
Reason: The normal allele and sickle allele are codominant.

SECTION-B

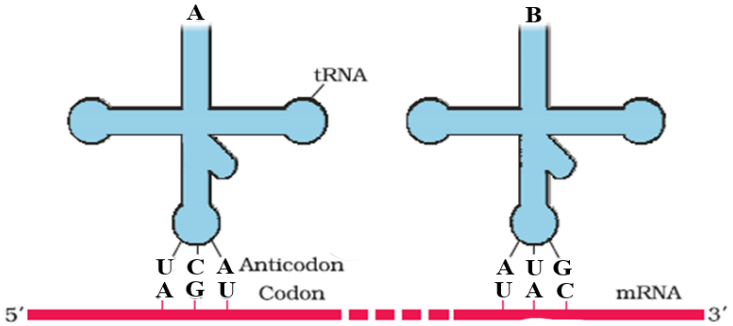
This section contains 5 very short answer questions, each carrying 2 marks. One question includes an internal choice.

17 Many secondary metabolites of plants have medicinal properties. Tabulate the medicinal use of the drugs- Atropine, Belladona, Morphine and Barbiturates. 2

18 What would happen when one grows a recombinant bacterium in a bioreactor but forgets to add an antibiotic to the medium in which the recombinant is growing? 2

19 Give two examples of artificial or man-made ecosystems. How do they differ from natural ecosystems? 2

20 Observe the given figure carefully and answer the following questions. 2
(a) Identify the aminoacids transported by the tRNAs labelled as 'A' and 'B' based on the codons on the mRNA and the anticodons found on the tRNAs.
(b) Which codons act as chain initiating codon and chain terminating codons.



tRNA - Adapter Molecule

21 What are the functions of the two male gametes produced by each pollen grain in angiosperms? 2

SECTION-C

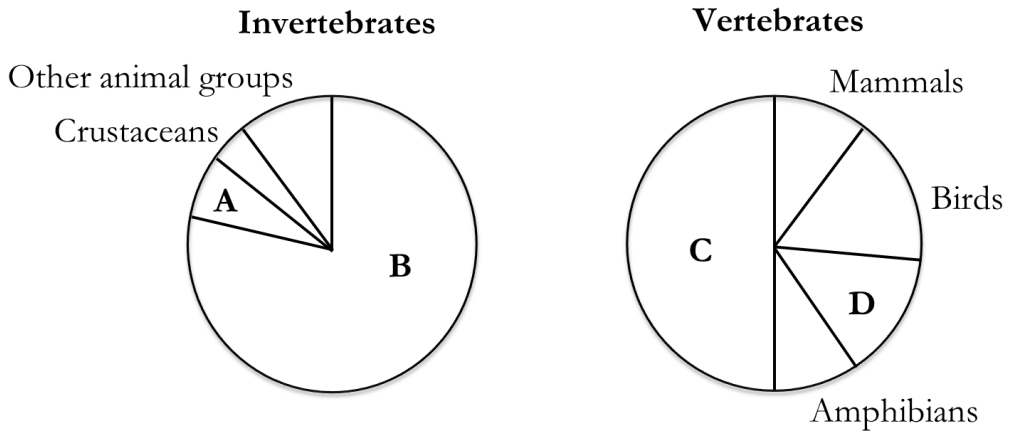
This section includes 7 short-answer questions, each carrying 3 marks. One question consists of an internal choice.

22 Draw a neat and labelled diagram of sectional view of female reproductive system. 3

23 (a) What is an age-pyramid? 3
(b) How does an age pyramid for human population at a given point of time helps the policy makers in planning for the future?
(c) Represent diagrammatically the expanding age-pyramid of human population.

OR

What do the following pie-charts represent? Identify the species A, B, C and D in the pie-charts of invertebrates and vertebrates.

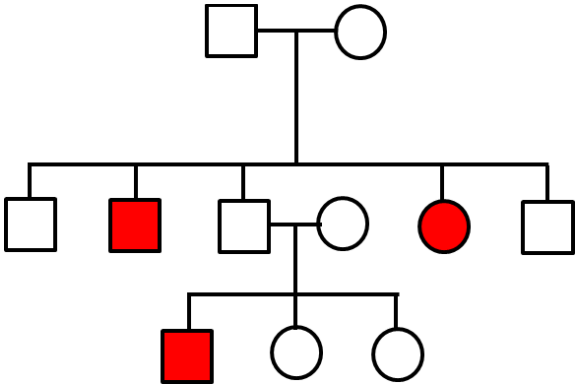


24 Three patients with the following complaints consult a doctor for their treatments; one has undergone kidney transplantation recently, the other is suffering from high blood pressure due to cholesterol accumulation and the third one is suffering from myocardial infarction. 3
Suggest the drugs and their role in the treatment of diseases in a tabular format.

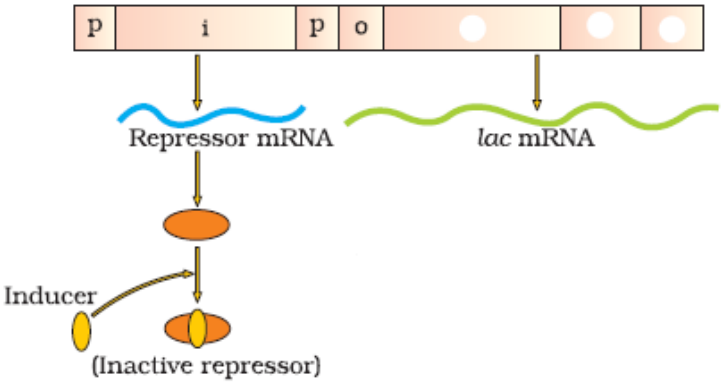
25 Explain Hardy-Weinberg's principle with the help of an algebraic equation. 3

26 Contraception is the use of methods or devices to prevent pregnancy. Choosing the right method depends on factors such as effectiveness, health considerations, ease of use, side effects, and whether it protects against sexually transmitted infections. 3
Suggest a suitable contraceptive device for the following cases with justification.
(i) Catherine does not want to take the risk of conception and sexually transmitted infections (STIs).
(ii) Florence has two children and does not want any more children.
(iii) Violet wants a contraceptive that she can take till she wants to avoid conception and can resume back to her fertile life without the intervention of the doctor. Also, it should have a lower failure rate.

27 Given below is the pedigree chart of a family for a trait. 3
Identify the trait. Give reasons to support your answer.
Name the diseases that follow this pattern of inheritance.



28 Observe the given figure carefully and answer the following questions. 3



(a) Identify the figure shown above.
(b) What regulates switching on and switching off of the operon.
(c) At what site RNA polymerase binds in order to initiate transcription?
(d) Name the structural genes and the enzymes secreted by them.

SECTION-D

The following two questions are case-based. Each question carries 4 marks. Read the passage carefully and attempt the questions that follow.

29 Observe the given illustration and answer the following questions. 4

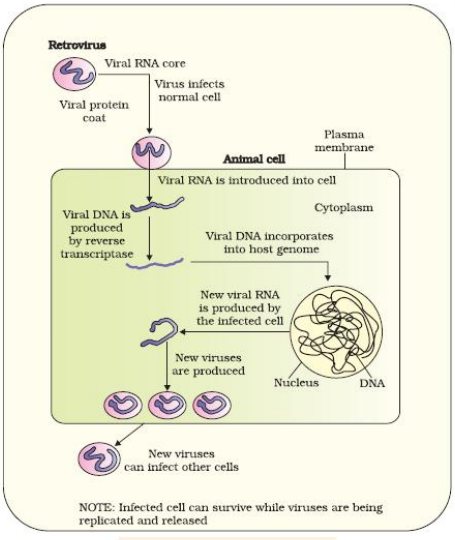


Figure 8.6 Replication of retrovirus

(a) What are retroviruses? Name a retrovirus.
(b) What is reverse transcription?
(c) How are the new viruses formed? Name the cells which act as HIV factory.

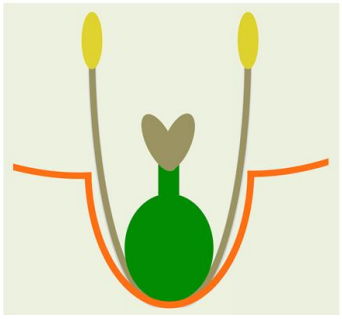
OR

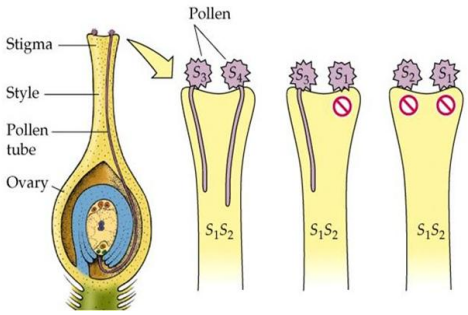
Why is the immunity reduced progressively in HIV patients? Name a widely used diagnostic test for AIDS.

30 Continued self-pollination results in inbreeding depression. Outbreeding devices are the adaptations to prevent self-pollination. Flowering plants have developed many devices to discourage self-pollination and to encourage cross-pollination. Some plants prevent only autogamy, but some plants prevent both autogamy and geitonogamy and encourage only xenogamy. 4

Observe the following figures and answer the questions that follow.

(A) Stamen & Pistil (B) Unisexual Plant (C) Pollen-Pistil Interaction





(a) What kind of pollination is prevented by the flower shown in figure-(A)?
(b) What kind of pollination occurs in the plants shown in figure-(B)? How is the plant benefited by the type of pollination, it performs?
(c) What is pollen-pistil-interaction shown in figure-(C)?

OR

What are chasmogamous flowers? Differentiate between autogamy and geitonogamy.

SECTION-E

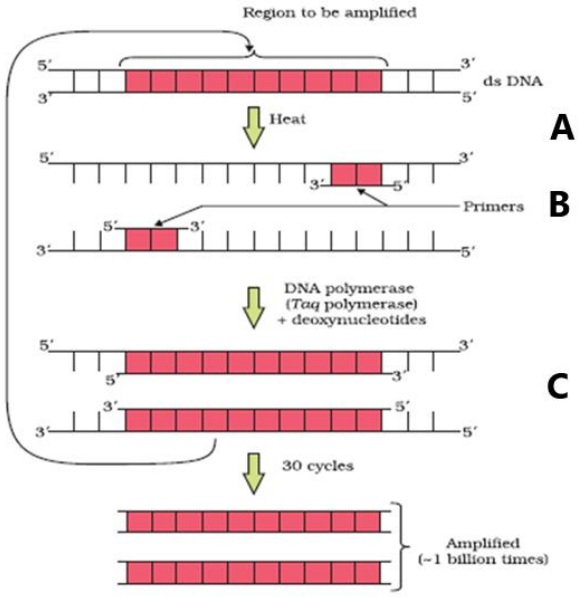
The following three questions are long-answer type, each carrying 5 marks with internal choice.

31 Define the following terms and give one example for each kind of interaction: 5
(a) Commensalism
(b) Parasitism
(c) Camouflage
(d) Mutualism
(e) Interspecific competition

OR

Decomposition is the breakdown of complex organic matter into inorganic substances like carbon dioxide, water and nutrients. Describe the five main stages of decomposition of organic matter.

32 Observe the figure showing PCR and answer the following questions. 5

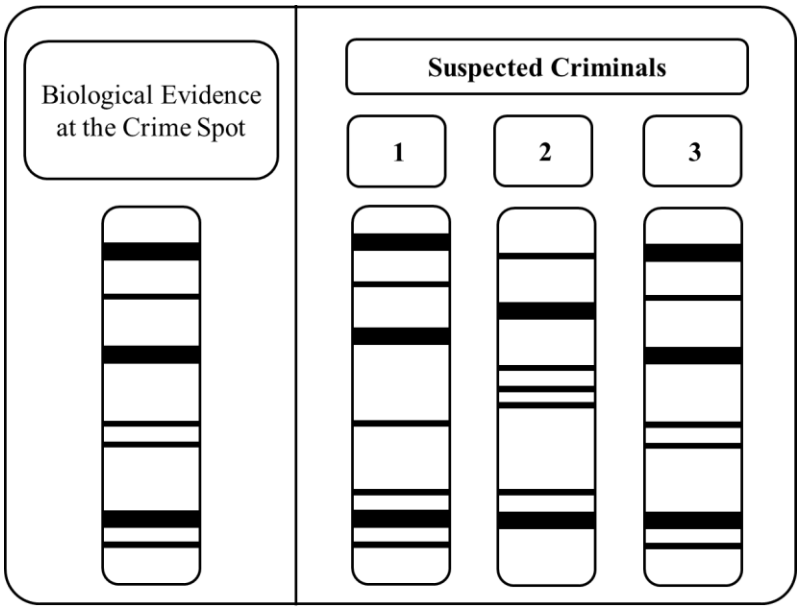


(a) What is the significance of PCR?
(b) What is the source of thermostable DNA polymerase enzyme which is used in PCR?
(c) Identify and explain the steps ‘A’, ‘B’ and ‘C’ in the PCR diagram.

OR

Recombinant DNA (rDNA) technology is a cornerstone of biotechnology, enabling scientists to combine DNA from different sources to create novel genetic combinations with broad applications in medicine, agriculture, and research.
List the steps involved in Recombinant DNA technology.
Draw a neat and labelled diagram of a simple stirred-tank bioreactor.

33 During night patrol, the police came to know a crime occurred at a park. Police investigated the case, collected blood and other samples from the crime spot and sent them to the forensic department. The report of the forensic department was as follows. 5



(a) Who invented DNA Fingerprinting technology?
(b) Identify the culprit who involved in the crime from the above suspected criminal list.
(c) List the major steps involved in DNA fingerprinting technology.

OR

(a) A DNA segment has a total of 2,000 nucleotides, out of which 520 are adenine containing nucleotides. How many purine bases this DNA segment possesses?
(b) Draw a neat and labelled diagram of DNA double helix.