Series P/PB2/1

SET 1

CLASS XII PRE-BOARD EXAMINATION – 2025-26

Q.P. Code: 044/2/1

Roll No. | | | | | | | | |

Candidate must write the Q.P. Code on the title page of the answer-book.

- Please check that this question paper contains **7** printed pages.
- Please check that this question paper contains **33** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

BIOLOGY (Theory)

Time allowed : 3 hours *Maximum Marks : 70*

General Instructions:

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **33** questions. All questions are **compulsory**.*

(ii) *Question paper is divided into **five** sections Sections **A, B, C, D** and **E**.*

(iii) ***Section A** questions number **1 to 16** are multiple choice type questions. Each question carries **1** mark.*

(iv) ***Section B** questions number **17 to 21** are very short answer type questions. Each question carries **2** marks.*

(v) ***Section C** questions number **22 to 28** are short answer type questions. Each question carries **3** marks.*

(vi) ***Section D** questions number **29 and 30** are case-based questions. Each question carries **4** marks. Each question has subparts with internal choice in one of the subparts.*

(vii) ***Section E** questions number **31 to 33** are long answer type questions. Each question carries **5** marks.*

(viii) *There is no overall choice. Answer all **33** questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*

(ix) *Wherever necessary, neat and properly labelled diagrams should be drawn.*

SECTION – A

QUESTIONS No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

1. In angiosperms, double fertilisation results in the formation of: 1

A. Two embryos B. One embryo and one endosperm C. Two endosperms D. One embryo only

2. Match the columns. 1

	Column I		Column II
A.	End of first month	I	Limbs and genital organs become well developed
B.	End of second month	II	develop Body hair develops, eyelids separate and eye lashes are formed
C.	End of first trimester	III	Heart is formed
D.	End of second trimester	IV	Limbs and digits

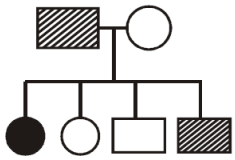
Choose the correct answer from the options given below:

a) A – I, B – IV, C – II, D – III
b) A – III, B – IV, C – II, D – I
c) A – III, B – IV, C – I, D – II
d) A – II, B – I, C – III, D - IV

3. Which of the following is a sexually transmitted infection caused by a virus? 1

A. Gonorrhea B. Syphilis C. AIDS D. Chlamydia

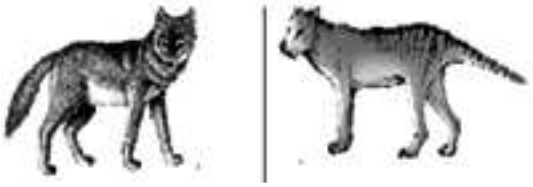
4. Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character: 1

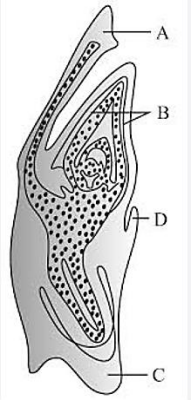


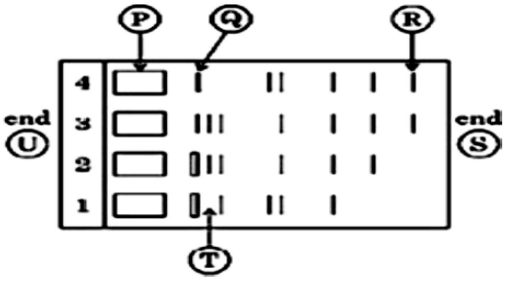
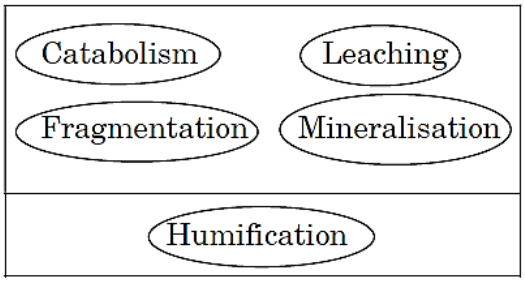
(a) The trait under study could not be colour blindness
(b) The female parent is heterozygous
(c) The male parent is homozygous dominant
d) The parent could not have had a normal daughter for this character

5. Match the scientists in Column I with their respective contributions / discoveries in Column II. 1

	Column I (Scientists)		Column II (Contributions)
A.	Hershey and Chase	(i)	Semi-conservative mode of DNA replication
B.	Avery, MacLeod, and McCarty	(ii)	Transforming principle is DNA
C.	Meselson and Stahl	(iii)	DNA is the genetic material in bacteriophage
D.	Watson and Crick	(iv)	Double helical model of DNA

	Choose the correct option: (a) A–(iii), B–(ii), C–(i), D–(iv) (b) A–(ii), B–(iii), C–(iv), D–(i) (c) A–(i), B–(iv), C–(ii), D–(iii) (d) A–(iv), B–(i), C–(iii), D–(ii)	
6.	Picture shown below is an example of :  Wolf Tasmanian wolf (a) Convergent evolution of Australian marsupials and placental mammals (b) Divergent evolution of Australian marsupials and placental mammals (c) Homologous organs of both animals (d) Analogous organs of both animals.	1
7.	On what basic principle the 'Enzyme-Linked Immunosorbent Assay' works? a. Mechanism of enzyme action b. Role of chemicals in body c. Antigen-antibody interaction d. Neutralising the chemicals	1
8.	The bacteria *Azotobacter* and *Azospirillum* are examples of: A. Symbiotic nitrogen-fixing bacteria B. Free-living nitrogen-fixing bacteria C. Pathogenic bacteria D. All of the above	1
9.	Arrange the following steps of the recombinant DNA technology in the sequential order: 1. The plasmid is taken up into a bacterial cell which makes protein directed by human DNA 2. DNA segment incorporated into the bacterial plasmid 3. The segment of DNA removed from human cell 4. In Genetic engineering (Recombinant DNA technology) a) 1, 4, 3, 2 b) 4, 3, 2, 1 c) 1, 2, 3, 4 d) 2, 3, 4, 1	1
10.	Which of the following is not a desirable feature of a cloning vector? a) Presence of origin of replication b) Presence of marker gene c) Presence of a single restriction enzyme site d) Presence of two or more recognition site for the same restriction enzyme	1
11.	Besides Basmati rice, unauthorised attempts were made for patent of: a) Garlic b) Neem c) Wheat d) Corn	1

12.	Which among the following is placed in the second trophic level? a) Fishes and phytoplanktons b) Cow and grass hopper c) Man and lion d) Birds and Fox	1
For Question number. 13 to 16 two statements are given – one labelled as Assertion (A) and the other as Reason (R). Answer these questions selecting the appropriate option given below: (A) Both A and R are true and R is the correct explanation of A. (B) Both A and R are true and R is not the correct explanation of A. (C) A is true but R is false. (D) A is False but R is true.		
13.	**Assertion (A):** In tobacco plants, RNA interference helps to resist nematode infection. **Reason (R):** RNA interference involves the synthesis of double-stranded RNA that silences specific mRNA, preventing the production of the protein required for nematode survival.	1
14.	**Assertion (A):** A probe is a single stranded radioactive DNA or RNA. **Reason (R):** Probe is used to locate specific sequences in a mixture of DNA or RNA.	1
15.	**Assertion (A):** *Agrobacterium tumefaciens* is a pathogen associated with the rootr of several monocot plants. **Reason (R):** It is able to transform normal plant cells into tumor cells.	1
16.	**Assertion (A):** RNA was the first genetic material. **Reason (R):** RNA can act both as genetic material and as a catalyst.	1
	SECTION B	
17.	Refer to the given diagram of the embryo an angiosperm plant and answer the questions that follow.  (a) Identify the parts A and D. (b) Mention the structural difference between B and C.	2
18.	In sex determination the female heterogamety is also observed. Mention one example and method of sex determination of female heterogamety.	2
19.	Attempt either option A or B. A. 'Intra Cytoplasmic Sperm Injection (ICSI)' and 'Gamete Intra Fallopian Transfer (GIFT)' are two assisted reproductive technologies. How is one different from the other? OR B. List any four characteristics of an ideal contraceptive.	2

20.	A patient who had organ transplant was given Cyclosporin. a) Mention the microbial source and state the reason for administration of this bioactive molecule. b) What would happen if this drug is not administered?	2
21.	Compare the features of pyramid of biomass in a forest and in a sea ecosystem with the help of diagrams.	2
	SECTION C	
22.	(a) Define apomixis. (b) How does it differ from parthenocarpy? (c) Mention one advantage of apomixis to farmers.	3
23.	During the process of replication, DNA follows the semiconservative pattern. Describe the process of replication with a diagram of replication fork along with the role of Ori, DNA polymerase, DNA ligase, Deoxyribonucleoside triphosphates.	3
24.	With the help of an algebraic equation, how did Hardy- Weinberg explain that in a given population the frequency of occurrence of alles of a gene is supposed to remain the same through generations?	3
25.	(a) How do normal cells get transformed into cancerous cells? Elaborate by giving two examples of inducing agents. (b) Explain the terms 'Metastasis' and 'Contact inhibition' with reference to cancer cells.	3
26.	(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  b. What is elution? State the importance of elution in this process. c. State the significance of ethidium bromide in the above process.	3
27.	(a) Arrange the given important steps of decomposition in their correct order of occurrence in the breakdown of complex organic matter and explain the fourth step in the process.  (b)The rate of decomposition depends on the chemical composition of the organic matter. Justify the statement.	3

28	F1 progeny of a pea plant bearing violet flowers and snap dragon plant bearing red flowers were selfed to produce their respective F2 progeny. Compare the phenotypes, the genotypes and the pattern of inheritance of their respective F2 progeny.	3
	SECTION D	
29	Read the following passage and answer the questions that follow: Bt cotton is a genetically modified plant that contains a gene from the bacterium *Bacillus thuringiensis* (Bt). This gene codes for a protein that is toxic to certain insect pests, especially bollworms. When the insect larva feeds on Bt cotton leaves, the toxin gets activated in its alkaline gut and kills the pest by damaging its intestinal lining. The use of Bt cotton has led to reduced pesticide usage and increased crop yield. **(i)** What is the source of the Bt gene, and what does it code for? **(ii)** How does the Bt toxin become active inside the insect body? **(iii)** Mention one advantage and one possible concern related to the cultivation of Bt cotton. **(iv)** Why is it important to develop pest-resistant plants through genetic engineering? **OR** Explain how Bt cotton is an example of the application of biotechnology in agriculture.	4
30.	Read the following passage and answer the questions that follow: A group of ecologists studied two adjacent forest ecosystems — *Forest A*, a natural undisturbed forest, and *Forest B*, a secondary forest recovering from deforestation. They found that *Forest A* had a dense canopy, multilayered vegetation, and a variety of decomposers, while *Forest B* had sparse vegetation, poor humus content, and lower species diversity. Energy flow studies revealed that *Forest A* had a gross primary productivity (GPP) of 2500 kcal/m²/yr and respiration losses of 1500 kcal/m²/yr, whereas *Forest B* had a GPP of 1500 kcal/m²/yr and respiration losses of 900 kcal/m²/yr. **(a)** Calculate the net primary productivity (NPP) of both forests. **(b)** Which forest is likely to have a more stable food web? Give a reason. **(c)** Explain how the difference in decomposer activity affects nutrient cycling in these forests. **(d)** If deforestation continues, which ecological pyramid (number, biomass, or energy) will show the maximum impact first? Justify your answer. **OR** (e) Describe how reduced producer biomass can influence the energy transfer efficiency across trophic levels.	4
	SECTION E	
31.	A. Write the answers of the following- i. During the menstrual cycle various events takes place. It is controlled by pituitary hormones and ovarian hormones. Write the role of following hormones during menstrual cycle. a. FSH b. LH c. Estrogen d. Progesterone ii. Why the corpus luteum degenerates during the menstrual cycle? **OR** B. Write the answers of the following- i. Where is microsporangium located in an angiosperm? State the function of tapetum and the other three layers of microsporangium? ii. Describe the structure of male gametophyte produce as a result of microsporangium. iii. State the function of each part of the male gametophyte	5

32. A	Attempt A or B (a) State the reasons for which Hershey and Chase carried out their experiments. (b) Answer the following questions based on the experiment: (i) Name the different radioactive isotopes they used for the experiment and mention the reason for the choosing these isotopes. (ii) Why did they blend and centrifuge their culture? (iii) Write the observations and conclusions they arrived at. **OR** **(a)** Industrial melanism observed in peppered moths is a classical example of natural selection in action. Explain the phenomenon with suitable reasoning.	5
B	**(b)** Distinguish between convergent and divergent evolution. Support your answer with one example each. **(c)** How do analogous organs provide evidence in support of organic evolution?	
33. A	Attempt A or B **(a)** Differentiate between *Mendelian* and *chromosomal* disorders, giving one example of each. **(b)** A child suffering from Turner's syndrome has 45 chromosomes with XO sex chromosome composition. Explain the cause, symptoms, and type of this chromosomal abnormality. **(c)** Why are sex-linked recessive disorders more common in males than in females? Illustrate your answer with the help of an example.	5
B	**OR** (a) Describe the process of transcription in *prokaryotes*, highlighting the role of RNA polymerase and promoter sequences. (b) How does transcription in *eukaryotes* differ from that in prokaryotes? (c) Why is the primary transcript in eukaryotes called *hnRNA*?	