

KENDRIYA VIDYALAYA SANGATHAN TINSUKIA REGION
PRE-BOARD EXAMINATION 2025-26
Subject: - BIOLOGY Subject Code: - 044
CLASS XII

QP Code: QP12BIO01PB25

Time Allowed: - 3 hours

Maximum Marks: - 70

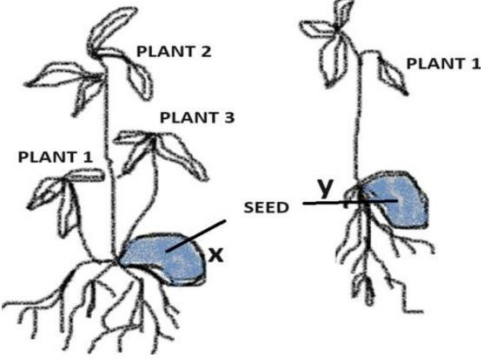
General Instructions:

Read the following instructions carefully and follow them.

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

Section – A																	
Q. 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.																	
Q. No	Question	Marks															
1.	Eco R1 cuts the DNA between bases G and A only when the sequence of GAATTC is present. The number of nucleotides present in the resultant sticky ends that will be formed in each of the two strands of DNA after this enzyme cuts the DNA will be: <table border="1"> <thead> <tr> <th></th><th>Vector DNA</th><th>Foreign DNA</th></tr> </thead> <tbody> <tr> <td>A.</td><td>1 & 5</td><td>5 & 1</td></tr> <tr> <td>B.</td><td>2 & 4</td><td>4 & 2</td></tr> <tr> <td>C.</td><td>2 & 5</td><td>5 & 2</td></tr> <tr> <td>D.</td><td>3 & 4</td><td>4 & 3</td></tr> </tbody> </table>		Vector DNA	Foreign DNA	A.	1 & 5	5 & 1	B.	2 & 4	4 & 2	C.	2 & 5	5 & 2	D.	3 & 4	4 & 3	1
	Vector DNA	Foreign DNA															
A.	1 & 5	5 & 1															
B.	2 & 4	4 & 2															
C.	2 & 5	5 & 2															
D.	3 & 4	4 & 3															
2.	Which hormone stimulates ovulation in females? (a) FSH (b) LH (c) Progesterone (d) Estrogen	1															
3.	A couple with normal vision has a color-blind son. This shows: (a) Autosomal dominant inheritance (b) Autosomal recessive inheritance (c) X-linked recessive inheritance (d) Y-linked inheritance	1															
4.	In a grassland ecosystem, the Gross Primary Productivity (GPP) is 1500 kcal/m²/yr and the Respiration Loss (R) is 600 kcal/m²/yr. What is the Net Primary Productivity (NPP)? (a) 2100 kcal/m²/yr (b) 900 kcal/m²/yr (c) 600 kcal/m²/yr (d) 1500 kcal/m²/yr	1															
5.	The primary endosperm nucleus is formed by fusion of: (a) Male gamete and egg (b) Male gamete and two polar nuclei (c) Two male gametes (d) Female gamete and synergids	1															
6.	Adaptive radiation leads to which of the following? (a) Increased competition among species (b) Decreased speciation rates	1															

	(c) Limited morphological diversity among specie (d) Rapid divergence of traits among populations inhabiting a given geographical area.	
7.	In Hardy–Weinberg equilibrium, if $p = 0.8$, then $q = ?$ (a) 0.2 (b) 0.5 (c) 0.8 (d) 0.4	1
8.	Which of the following is a viral disease? (a) Typhoid (b) Malaria (c) Influenza (d) Amoebiasis	1
9.	Which organism is used in the production of immunosuppressive drug Cyclosporin A? (a) Monascus (b) Trichoderma (c) Penicillium (d) Saccharomyces	1
10.	The pyramid of biomass in the sea is usually: (a) Upright (b) Inverted (c) Spindle-shaped (d) Irregular	1
11.	Which of the following is used to transfer genes into dicot plants? (a) Bacillus thuringiensis (b) Escherichia coli (c) Agrobacterium tumefaciens (d) Salmonella typhi	1
12.	Standing crop in an ecosystem is measured in terms of: (a) Biomass per unit area (b) Energy flow per unit area (c) Number of individuals (d) Productivity per unit area	1
Question No. 13 to 16 consist of two statements – Assertion (A) and 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) D. A is False but R is true.		
13.	Assertion (A): Double fertilization is unique to angiosperms. Reason (R): One male gamete fuse with the egg and the other fuses with two polar nuclei.	1
14.	Assertion (A) : In thalassemia an abnormal myoglobin chain is synthesized due to a gene defect. Reason (R) : α -thalassemia is controlled by genes HBA-1 and HBA-2 on chromosome 16.	1
15.	Assertion (A): ELISA test is used to detect HIV infection. Reason (R): It works on the principle of antigen–antibody interaction.	1
16.	Assertion (A): Pyramids of energy are always upright. Reason (R): Energy decreases at each successive trophic level due to loss as heat.	1
Section – B		
17.	<u>Attempt either option A or B.</u> A. What is meant by monosporic development of female gametophyte?.	2

	OR B. The image below shows two germinated seeds X and Y which belong to the same species. Seed X is produced by apomixis whereas seed Y is a product of sexual reproduction.  (i) Write the number of embryo(s), embryo sac(s) and ovules in the ovary of seed X. (ii) How multiples embryos are formed in citrus fruits?	
18.	How crystal protein acts in Bt Cotton? Explain.	2
19.	State two differences between active immunity and passive immunity. Give one example each.	2
20.	<u>Attempt either option A or B.</u> A. (i) A blood test reported negative for hCG. What does negative hCG imply? Name the tissue which produces hCG. (ii) If a blood test reported positive for hCG in a person, then which other hormones would also be secreted by the tissue secreting hCG? OR B. (i) The human male ejaculates about 200 to 300 million sperm during a coitus, however the ovum is fertilized by only one sperm. How does the ovum block the entry of additional sperms? (ii) All copulations will not lead to fertilization. Why?	2
21.	<u>Attempt either option A or B.</u> A. What is the significance of the slope of regression in a species – area relationship? OR B. What are sacred groves? What is their role in conservation?	2
Section – C		
22.	In a population, allele frequency of A = 0.6 and a = 0.4. Calculate the frequency of AA, Aa, and aa using Hardy–Weinberg law. What does constancy of these frequencies indicate?	3
23.	Explain the stages of spermatogenesis with a neat diagram.	3
24.	When a cross is made between a tall plant with yellow seeds (TtYy) and a tall plant with green seeds (Tt yy), what proportions of phenotype in the offspring could be expected to be (a) tall and green. (b) dwarf and green.	3
25.	Suggest a suitable contraceptive device for the following cases with justification. (i) Mohini does not want to take the risk of conception and sexually transmitted infections (STIs). (ii) Lalita has two children and does not want any more children. (iii) Geeta 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.	3
26.	(a) Name two enzymes used in rDNA technology. (b) Explain the principle of insertional inactivation.	3

27.	Describe the role of microbes in sewage treatment. Why is BOD reduction important?	3
28.	What factors cause fluctuation in the density of population within a given period, in a given habitat? Explain each of them.	3
Section – D		
29.	Lactic acid bacteria are a kind of microorganisms that can ferment carbohydrates to produce lactic acid, and are currently widely used in the fermented food industry. They are used to improve the flavour of fermented foods, increase the nutrition of foods, reduce harmful substances, increases shelf life, and so on. They can also be used as probiotics to promote health in the body. a) Give the full form of LAB. (1) b) Which type of food would have lactic acid bacteria? Give 2 example. (1) and (0.5 + 0.5 marks for examples) <u>Attempt either sub part (c) or (d).</u> c) How is curd formed? (1 mark) OR (d). What happens to the milk protein during formation of the curd (1 mark)	4
30.	During the Industrial Revolution in England, the population of dark-winged moths increased in polluted areas while light-winged moths were more in clean areas. Answer the following: (a) Identify the evolutionary force operating here. (1) (b) How does this example support Darwin's theory of natural selection? (2) <u>Attempt either sub part (c) or (d).</u> (c) If the pollution level decreases again, predict the change in moth population. Explain. (1) OR (d) Name one other example from nature that shows natural selection in action. (1)	4
Section – E		
31.	<u>Attempt either option A or B.</u> A. (i) Explain double fertilisation in angiosperms with a neat diagram. (ii) State its significance. OR B. (i) Explain the process of oogenesis with a neat diagram. (ii) Mention two differences between oogenesis and spermatogenesis.	5
32.	<u>Attempt either option A or B.</u> A. (i) How has biotechnology helped in producing the <i>Meloidogyne incognita</i> resistant tobacco plant? (ii) Why does this nematode die on eating such a GM plant? OR B. Explain the principle of PCR. Draw a flowchart showing the steps of PCR. State two applications.	5
33.	<u>Attempt either option A or B.</u> A. Given below is a stretch of DNA showing the coding strand of a structural gene of a transcription unit? 5'--ATG ACC GTA TTT TCT GTA GTG CCC GTA CTT CAG GCA TAA—3' a) Write the corresponding template strand and the mRNA strand that will be transcribed, along with its polarity. b) If GUA of the transcribed mRNA is an intron, depict the sequence involved in the formation of mRNA /the mature processed hnRNA strand. i. In a bacterium ii. In humans c) Upon translation, how many amino acids will the resulting polypeptide have? Justify. OR	5

	B. In shorthorn cattle, the coat colours red or white are controlled by a single pair of alleles. A calf which receives the allele for red coat from its mother and the allele for white coat from its father is called a 'roan'. It has an equal number of red and white hairs in its coat. a) Is this an example of codominance or of incomplete dominance? b) Give a reason for your answer. c) With the help of genetic cross explain what will be the consequent phenotype of the calf when i. red is dominant over white ii. red is incompletely dominant.	
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