

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This question paper contains **27 questions**. All questions are compulsory.
- (ii) Section A: Questions 1 to 5 carry 1 mark each.
- (iii) Section B: Questions 6 to 12 carry 2 marks each.
- (iv) Section C: Questions 13 to 21 carry 3 marks each.
- (v) Section D: Questions 22 to 24 carry 3 marks each.
- (vi) Section E: Questions 25 to 27 carry 5 marks each.
- (vii) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (viii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. The practice of mating unrelated animals within the same breed, but with no common ancestor on either side of the pedigree for 4-6 generation is known as

- (A) out-breeding (B) out-crossing
(C) cross-breeding (D) in-breeding

OR

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

- (A) Polysaccharides (B) Sucrose
(C) Ethanol (D) Methane

2. It is observed that, the species diversity decreases as we

- (A) move away from equator to poles (B) move towards equator from poles
(C) move along the equator (D) move from deserts to rain-forests.

OR

2. CNG is preferred as a fuel over diesel for public transport because

- (i) it is cost effective.
(ii) it burns almost completely.
(iii) it can be recycled.
(iv) it burns only partially.

Choose the correct combination.

- (A) (i) and (ii) (B) (i) and (iii)
(C) (ii) and (iii) (D) (iii) and (iv)

3. The autosomal disorder/disease in humans is

- (A) Colour blindness (B) Thalassemia
(C) Haemophilia (D) Turner's Syndrome

4. Filiform apparatus in the embryo sac of an angiosperm is present at the micropylar tip of

- (A) Central cell (B) Egg cell
(C) Synergids (D) Antipodals

5. Choose the chromosome, in a human, that possesses least number of genes.

- (A) 21st Chromosome (B) Autosome
(C) X-Chromosome (D) Y-Chromosome

Section B

6. Very small animals like humming birds are rarely found in polar regions. Why?

7. (a) How many primary producers do you think would be needed to support six tertiary consumers in a grassland ecosystem?

(b) Draw a grassland pyramid to substantiate your answer.

8. Write the basis of naming the restriction endonuclease EcoR-I.

9. Two children one with blood group 'AB' and other with blood group 'O' are born to parents, where the father has blood group 'A' and the mother has blood group 'B'. Work out a cross to show how is it possible?

10. Name the types of acquired immune responses, and the special types of lymphocytes involved in providing them.

OR

10. Name two organisms belonging to two different kingdoms, that are commonly used as biofertilizers, and how?

11. (a) Name the structure seen on the surface of black pepper and beet seeds, not seen on a bean seed. Mention the part of the ovule its is a remnants of.

(b) Name the outer layer of a maize grain, and state where generally does this layer gets developed in a flowering plant.

12. Why are certain animals called 'transgenic'? Give an example of such an animal that is being used for testing the vaccine safety for a specific human disease. Name the disease.

Section C

13. How would you differentiate between gross primary productivity from net primary productivity, and secondary productivity of an ecosystem.

OR

13. (a) Explain the concept of endemism.
(b) Name four regions in and around our country that are considered hot-spots.

14. 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.

15. Explain the role of pituitary and ovarian hormones in the menstrual cycle of humans females.

16. (a) Write the specific symptoms of pneumonia and amoebiasis.
(b) Mention their mode of spread in a population.

17. Explain the discovery made by Hershey and Chase using radioactive sulphur and phosphorus in their experiment.

OR

17. Describe the experiment where Mathew Meselson and Franklin Stahl used heavy isotope of Nitrogen.

18. Mention and explain the type of evolution the thorns of Bougainvillea and tendrils of Cucurbita are a result of. Write a similar example from animal kingdom.

19. (a) List the four major causes of increasing population in our country that you would like to speak on to your fellow students.
(b) Write any two steps that you would stress upon to control the population explosion.

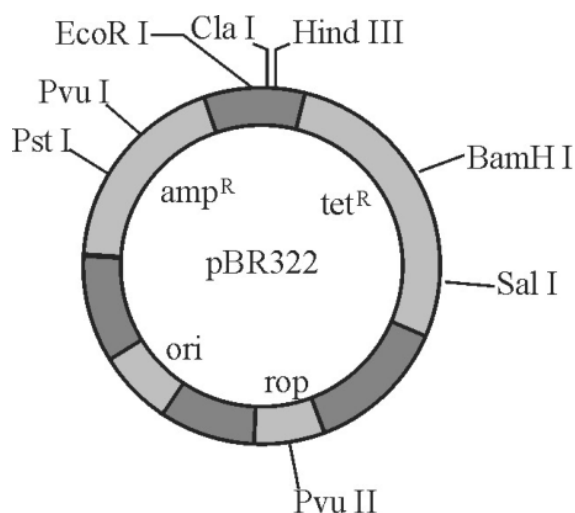
20. (a) Write the difference between the pro insulin and mature insulin.
(b) How did American company Eli Lilly produce human insulin using rDNA technique?

21. Study the table showing the population interaction between species 'Z' and 'Y' respectively. Assign the appropriate '+'/'-' signs for 'A', 'B', 'D', 'E' and respective interactions for 'C' and 'F'.

Species 'Z'	Species 'Y'	Name of Interaction
A	B	Mutualism
-	-	C
D	E	Parasitism
+	0	F

Section D

22. Observe the diagram shown below of pBR 322. Answer the questions that follow:

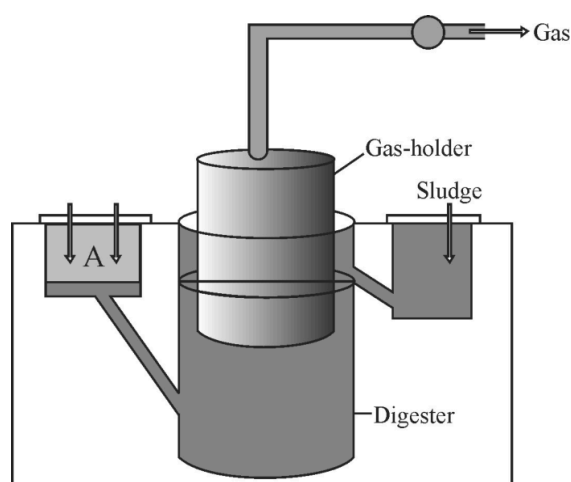


- (a) What is pBR322?
- (b) Write the role of 'rop'.
- (c) State the significance of ' amp^R ' and ' tet^R '.

23. Hardy-Weinberg Principle is stated in the following algebraic equation: $P^2 + 2Pq + q^2 = 1$.

- (a) State what do 'P' and 'q' denote in the equation.
- (b) State Hardy-Weinberg principle as indicated in the equation.
- (c) What would you interpret if the value of '1' in the equation gets deviated?

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



- (a) Name the components gaining 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 E

25. (a) How do normal cells become cancerous?
(b) Cancer can be treated successfully only if detected at an early stage. How do the following help in detecting cancer?

- (i) Biopsy
 - (ii) Histopathology
 - (iii) MRI
- (c) Name any two methods that can possibly cure cancer.

OR

25. (a) State what is hidden hunger.
(b) Name the crop breeding phenomenon and state its objective that has helped in overcoming hidden hunger.
(c) IARI has helped in improving some vegetable crops in this respect. Explain with the help of two examples.

26. Trace the development of a 2-celled pollen grain of an angiosperm within an anther. Draw a labelled diagram to substantiate your answer.

OR

26. Where does fertilisation occur in the oviduct of a human female? Explain the embryonic development from fertilised ovum upto its implantation.

27. Explain the two complexities that are observed in the process of transcription in eukaryotes and not in prokaryotes.

OR

27. How do certain phenotypes appear in F_2 populations when none of the parents originally exhibited them in a dihybrid cross conducted by G. Mendel in pea plants. Explain. Prepare Punnett's square to substantiate your answer.

- End of Question Paper -