

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

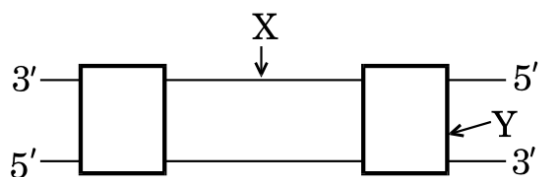
Maximum Marks: 70

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 24 carry 3 marks each.
- (v) Section D: Questions 25 to 27 carry 5 marks each.
- (vi) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (vii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. What do 'X' and 'Y' represent in the transcription unit of the DNA molecule shown?



2. How are the members of genus *Glomus* useful to organic farmers?

3. The diploid number of chromosomes in an angiospermic plant is 16. What will be the number of chromosomes in its endosperm and antipodal cells?

OR

3. State the reason why pollen grains lose their viability when the tapetum in the anther is malfunctioning.

4. Biotechnological techniques can help to diagnose the pathogen much before the symptoms of the disease appear in the patient. Suggest any two such techniques.

OR

4. Mention the form in which inactive protein toxin is produced by *Bacillus thuringiensis*. How does it get activated in the pest body to kill it?

5. Name the disorder in humans with the following karyotype:

(a) 22 pairs of autosomes + XO

(b) 22 pairs of autosomes + 21st chromosome + XY

Section B

6. Humans are categorised as 'regulators'. Explain how they maintain a constant normal body temperature.

7. You are given a tall pea plant and asked to find its genotype. How would you find its genotype? Explain.

8. Scientists are trying to solve the issues of malnutrition and hunger by using microbes. By taking one suitable example, explain how they have been able to help.

9. MOET is a programme for herd improvement. Write the steps in correct sequence that are carried in the programme.

OR

9. Why is tobacco smoking associated with rise in blood pressure and emphysema? Explain.

10. (a) How will you measure population density of fish in a lake?

(b) In a pond there are 100 frogs. 20 more were born in a year. Calculate the birth rate of this population.

OR

10. Draw a 'stable' human age pyramid. Comment on the population growth rate that is depicted by it.

11. What is cryopreservation? Mention how it is used in conservation of biodiversity.

12. How can childless couples be helped by the following assisted reproductive technologies:

(a) GIFT

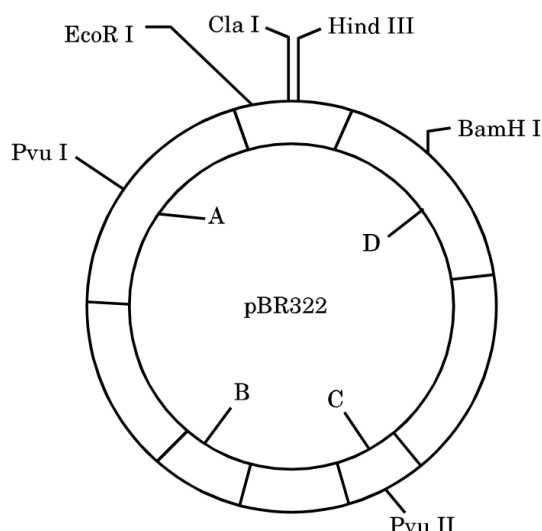
(b) Cytoplasmic Sperm Injection

Section C

13. Draw a diagram of LS of Maize grain and label its any six parts.

14. Study the figure of vector pBR322 given below.

Identify A, B and C and explain their roles in cloning a vector.



OR

14. Many people are apprehensive of accepting GM crops. Give three reasons so as to convince them to use these crops.

15. Compare the mechanism of evolution as put forth by Charles Darwin and de Vries.

16. (a) A patient had suffered myocardial infarction and clots were found in his blood vessels. Name a 'clot buster' that can be used to dissolve the clots and the micro-organism from which it is obtained.

(b) A woman had just undergone a kidney transplant. A bioactive molecular drug is administered to oppose kidney rejection by the body. What is the bioactive molecule? Name the microbe from which this is extracted.

(c) What do doctors prescribe to lower the blood cholesterol level in patients with high blood cholesterol? Name the source organism from which this drug can be obtained.

17. Give reasons for the following:

(a) Antibody mediated immunity is called humoral immunity.

(b) How is a child protected from a disease for which he/she is vaccinated?

(c) Name the type of cells the AIDS virus enters after getting into the human body.

OR

17. (a) Identify the nos. (i) to (iv) in the following table:

	Name of Disease	Causative Organism	Symptoms
w	Pneumonia	<i>Streptococcus</i>	(i)
x	Typhoid	(ii)	High fever, weakness, headache, stomach pain
y	(iii)	Rhinoviruses	Nasal congestion and discharge, sore throat, cough, headache
z	Ascariasis	<i>Ascaris</i>	(iv)

(b) Which ones of the above mentioned diseases are transmitted through mechanical carriers?

18. Draw a diagram of the sectional view of a human seminiferous tubule and label any six of its parts.

19. A woman with 'O blood group' marries a man with 'AB blood group'. Work out the cross to show all the possible phenotypes and genotypes of the progeny with respect to blood groups. Explain the pattern of inheritance observed in this cross.

20. (a) What is the breeding of crops for enhancing their nutritional value called? Why is the need felt for enhancing the nutritional value of the crops?

(b) Rice, wheat and maize are the most commonly used food grains the world over. How have these grains improved in their nutritional value in comparison to their conventional varieties?

OR

20. (a) Write the scientific names of the source plants from where opioids and cannabinoids are extracted.

(b) Write their receptor sites in the human body. How do these drugs affect the human beings?

21. Write by taking a suitable example, the convention followed for naming the restriction enzymes.

22. Hershey and Chase carried out their experiment under three steps: (a) Infection, (b) Blending, and (c) Centrifugation. Explain each one of these steps that helped them to prove that DNA is the hereditary material.

OR

22. (a) Why does DNA replication occur within a replication fork and not in its entire length simultaneously?

(b) 'DNA replication is continuous and discontinuous on the two strands within the replication fork.' Give reasons.

23. Restriction endonucleases have played a very significant role in rDNA technology. Explain the roles of EcoRI and DNA ligase in formation of recombinant DNA.

24. Describe the phosphorus cycle in an ecosystem.

Section D

25. (a) Describe the experiment conducted by F. Griffith in 1928 with *Streptococcus pneumoniae* and write the conclusions he arrived at.

(b) State the contribution of Avery, MacLeod and McCarty in providing biochemical nature to the results as obtained by Griffith.

OR

25. (a) Differentiate between convergent and divergent evolution by taking one suitable example of each.

(b) Explain adaptive radiation with the help of suitable examples.

26. (a) State what is an ecological succession.

(b) Write one similarity and one difference between hydrarch and xerarch successions.

(c) Explain the mechanism of co-evolution as seen in orchid *Ophrys* and bee.

OR

26. (a) List any two ways the biodiversity loss affects any region.

(b) Explain any two causes of biodiversity loss, with the help of suitable examples.

27. (a) Draw the embryo sac of a flowering plant and label the following:

(i) Central cell

(ii) Chalazal end

(iii) Synergids

(b) Name the cell and explain the process it undergoes to develop into an embryo sac.

(c) Explain the development of endosperm in coconut.

OR

27. Write the duration and the events that occur in the ovary and the uterus during follicular and luteal phases of the menstrual cycle in humans. How do pituitary and ovarian hormones influence these two phases?

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