

# BIOLOGY (Theory)

**Time allowed : 3 hours**

**Maximum Marks : 70**

## **General Instructions:**

- (i) *All questions are compulsory.*
- (ii) *The question paper consists of four sections A, B, C and D. Section A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D is of 3 questions of 5 marks each.*
- (iii) *There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.*
- (iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

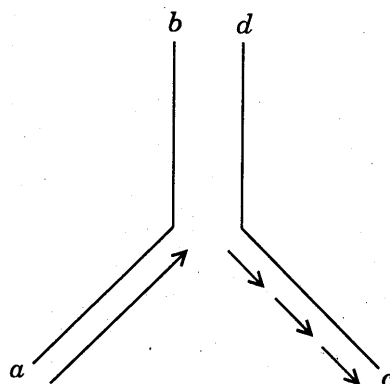
**QUESTION PAPER CODE 57/1**

**SECTION A**

1. Name any two vertebrate body parts that are homologous to human forelimbs. 1
2. When and why do some animals like snails go into aestivation? 1
3. What is the economic value of *Spirulina*?
4. What was the speciality of the milk produced by the transgenic cow Rosie? 1
5. How do neutrophils act as a cellular barrier to pathogens in humans?

6. Mention the polarity of the DNA strands  $a - b$  and  $c - d$  shown in the replicating fork given below.

1



7. Mention any two significant roles predation plays in nature.
8. Why is the polar region not a suitable habitat for tiny humming birds?

1

1

### SECTION B

9. (a) Expand IUD.  
(b) Why is hormone releasing IUD considered a good contraceptive to space children?
10. Name the: interaction in each of the following:
- (a) *Cuscuta* growing on a shoe flower plant  
(b) Mycorrhizae living on the roots of higher plants  
(c) Clown fish living among the tentacles of sea anemone  
(d) Koel laying her eggs in crow's nest
11. A plant of *Antirrhinum majus* with red flowers was crossed with another plant of the same species with white flowers. The plants of the  $F_1$  generation bore pink flowers. Explain the pattern of inheritance with the help of a cross.

2

2

2

OR

A woman, with blood group O married a man with AB group. Show the possible blood groups of the progeny. List the alleles involved in this inheritance.

12. Why do sports persons often fall a victim to cocaine addiction?

2

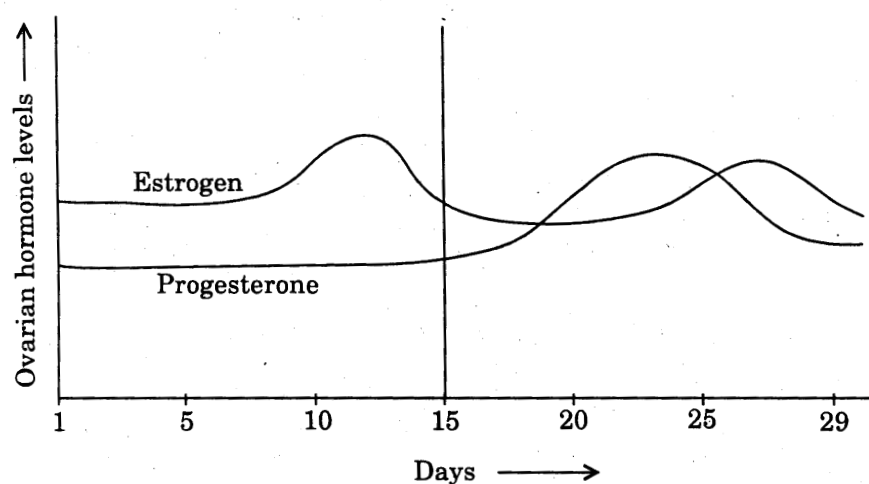
13. State the difference between the first trophic levels of detritus food chain and grazing food chain. 2
14. Coconut palm is monoecious while date palm is dioecious. Why are they called so? 2
15. How can DNA segments, separated by gel electrophoresis, be visualised and isolated? 2
16. How do Darwin's finches illustrate adaptive radiation? 2
17. Name the blank spaces a, b, c and d from the table given below: 2

| Type of Microbe | Scientific name            | Commercial product |
|-----------------|----------------------------|--------------------|
| Bacterium       | a                          | Lactic acid        |
| Fungus          | b                          | Cyclosporin A      |
| c               | <i>Monascus purpureus</i>  | Statin             |
| Fungus          | <i>Penicillium notatum</i> | d                  |

18. DDT content in the water of a lake that supplies drinking water to the nearby villages, is found to be 0.003 ppm. The kingfishers of that area are reported to have 2 ppm of DDT. Why has the concentration increased in these birds? What harm will this cause to the bird population? Name the phenomenon. 2

### SECTION C

19. (a)



Read the graph given above and correlate the uterine events that take place according to the hormonal levels on

- (i) 6 - 15 days
- (ii) 16 - 25 days
- (iii) 26 - 28 days (if the ovum is not fertilised)

(b) Specify the sources of the hormones mentioned in the graph.

3

20. Explain the role of baculoviruses as biological control agents. Mention their importance in organic farming.

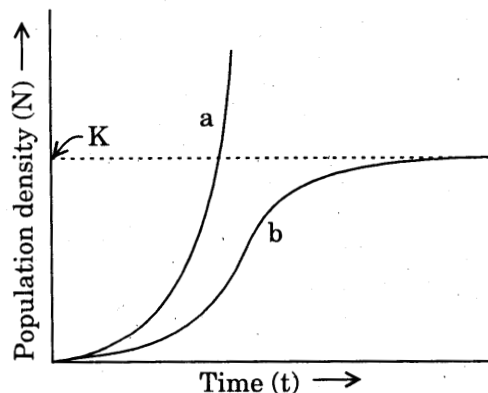
3

22. (a) Draw the structure of the initiator tRNA adaptor molecule.

(b) Why is tRNA called an adaptor molecule ?

3

22.



Study the population growth curves shown above.

- (i) Identify curves 'a' and 'b'.
- (ii) Mention the conditions responsible for the curves 'a' and 'b' respectively.
- (iii) Give the necessary equation for the curve 'b'.

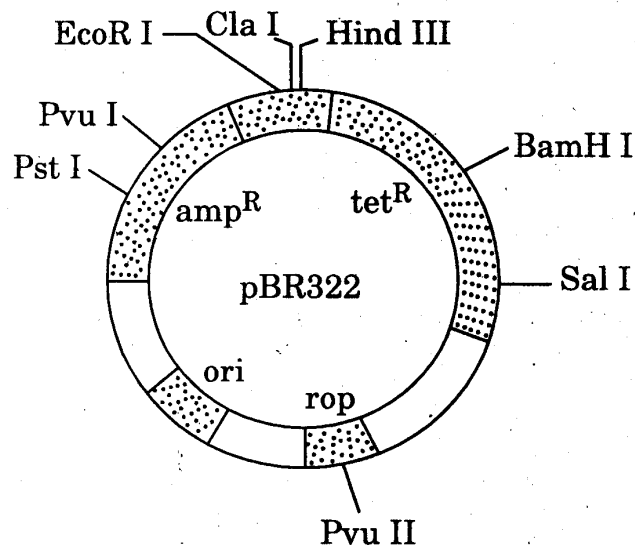
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23. Why is *Agrobacterium tumefaciens* a good cloning vector? Explain.

3

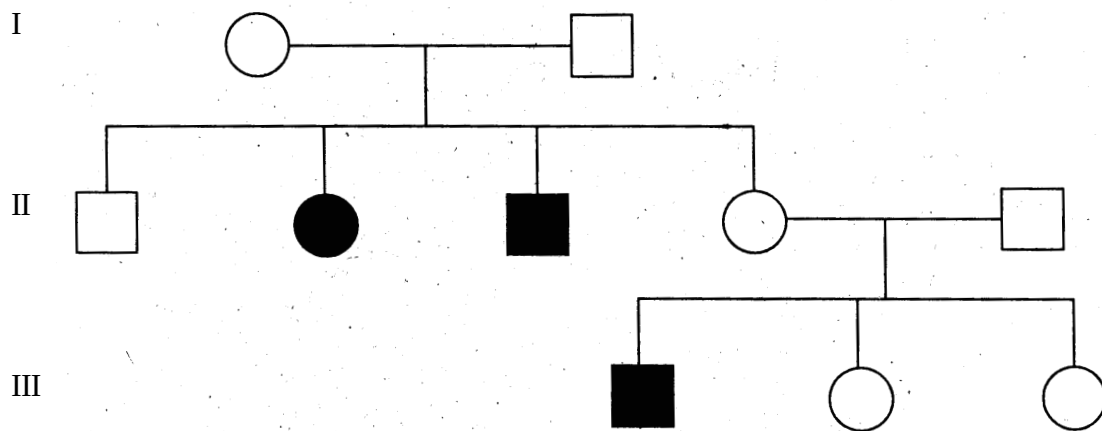
**OR**

Explain the importance of (a) ori, (b)  $\text{amp}^R$  and (c) rop In the *E. coli* vector shown below:



Study the mRNA segment given above which is complete to be translated into a polypeptide chain.

- (i) Write the codons 'a' and 'b'.
  - (ii) What do they code for?
  - (iii) How is peptide bond formed between two amino acids in the ribosome? 3
25. (a) Name the infective stage of *Plasmodium* which *Anopheles* mosquito takes in along with the blood meal from an infected human.
- (b) Why does the infection cause fever in humans?
- (c) Give a flow chart of the part of the life-cycle of this parasite passed in the insect. 3
26. A factory drains its waste water into the nearby lake. It has caused algal bloom.
- (a) How was the algal bloom caused?
- (b) What would be the consequences?
- (c) Name the phenomenon that caused it. 3
27. Study the given pedigree chart and answer the questions that follow.



- (a) Is the trait recessive or dominant?
- (b) Is the trait sex-linked or autosomal?
- (c) Give the genotypes of the parents in generation I and of their third and fourth child in generation II.

3

#### SECTION D

28. (a) Draw a schematic labelled diagram of a fertilised embryo sac of an Angiosperm.
- (b) Describe the stages in embryo development in a dicot plant.

5

#### OR

- (a) Draw a labelled diagram of a sectional view of human seminiferous tubule.
  - (b) Differentiate between gametogenesis in human males and females on the basis of
    - (i) time of initiation of the process.
    - (ii) products formed at the end of the process.
29. Explain the steps involved in the production of genetically engineered insulin.

5

#### OR

- (a) Name the nematode that infests and damages tobacco roots.
  - (b) How are transgenic tobacco plants produced to solve this problem?
30. What is 'semi-conservative' DNA replication? How was it experimentally proved and by whom?

5

#### OR

A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds.

- (i) What would be the phenotype and genotype of  $F_1$  ?
- (ii) Work out the phenotypic ratio of  $F_2$  generation with the help of a Punnett square.