

Question Paper Code 57/3

SECTION A

Q.Nos. 1 - 8 are of one mark each.

1. What was the speciality of the milk produced by the transgenic cow Rosie ?

Ans. 57/1 - 4

2. What is the economic value of *Spirulina* ?

Ans. 57/1 - 3

3. Suggest any two techniques which can help in early detection of bacterial/viral infections much before the symptoms appear in the body.

Ans. Recombinant DNA Technology , Polymerase Chain Reaction , ELISA (any two)

[$\frac{1}{2} + \frac{1}{2} = 1$ mark]

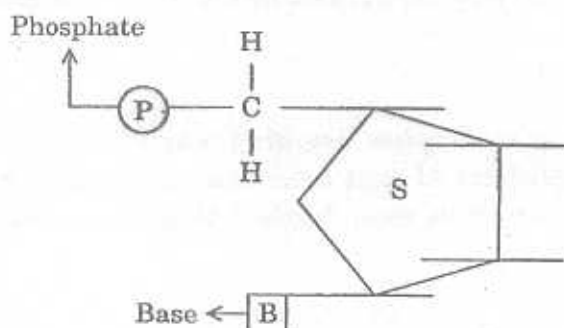
4. When and why do some animals like snails go into aestivation ?

Ans. 57/1 - 2

5. Why is the polar region not a suitable habitat for tiny humming birds ?

Ans. 57/1 - 8

6. Mention the carbon positions to which the nitrogenous base and the phosphate molecule are respectively linked in the nucleotide given below :



Ans. Base - 1st carbon

Phosphate - 5th carbon

[$\frac{1}{2} + \frac{1}{2} = 1$ mark]

7. Given below are some human organs. Identify one primary and one secondary lymphoid organs :

Liver, Thymus, Stomach, Thyroid, Tonsils.

Ans. Primary lymphoid organ - Thymus

Secondary lymphoid organ - Tonsils

[$\frac{1}{2} + \frac{1}{2} = 1$]

8. Name any two vertebrate body parts that are homologous to human forelimbs.

Ans. 57/1 - 1

SECTION B

Q.Nos. 9 - 18 are of 2 marks each.

9. Why do sportspersons often fall a victim to cocaine addiction ?

Ans. 57/1 -12

10. The 'clown' fish lives among the tentacles of sea anemone. What is this interaction between them called and why ?

Ans. Commensalism = 1

Clown fish gets protection = $\frac{1}{2}$

Sea anemone is not benefitted = $\frac{1}{2}$

[$1+\frac{1}{2}+\frac{1}{2}=2$ marks]

11. Coconut palm is monoecious while date palm is dioecious. Why are they called so ?

Ans. 57/1 - 14

12. How can DNA segments, separated by gel electrophoresis, be visualised and isolated ?

Ans. 57/1 - 15

13. 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.

Ans. 57/1 - 18

14. (a) Expand IUD.

(b) Why is hormone releasing IUD considered a good contraceptive to space children ?

Ans. 57/1 - 9

15. How do Darwin's finches illustrate adaptive radiation ?

Ans. 57/1 -16

16. 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.

Ans. 57/1 - 11

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.

Ans. 57/1 - 11

17. Name the blank spaces a, b, c and d from the table given below :

Type of microbe	Scientific name	Product	Medical application
(i) Fungus	a	Cyclosporin	b
(ii) c	<i>Monascus purpureus</i>	Statin	d

Ans. a - *Trichoderma polysporum*

b - Immunosuppressive agent in organ transplant patients.

c - Yeast

d - Blood cholesterol lowering agent.

[½ x 4 = 2 marks]

18. State the difference between the first trophic levels of detritus food chain and grazing food chain.

Ans. 57/1 - 13

SECTION C

Q.Nos. 19 - 27 are of 3 marks each.

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

(b) Why is tRNA called an adaptor molecule ?

Ans. 57/1 - 21

20.



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 ?

Ans. 57/1 - 24

21. Name the type of immunity that is present at the time of birth in humans. Explain any two ways by which it is accomplished.

Ans. Innate immunity = 1

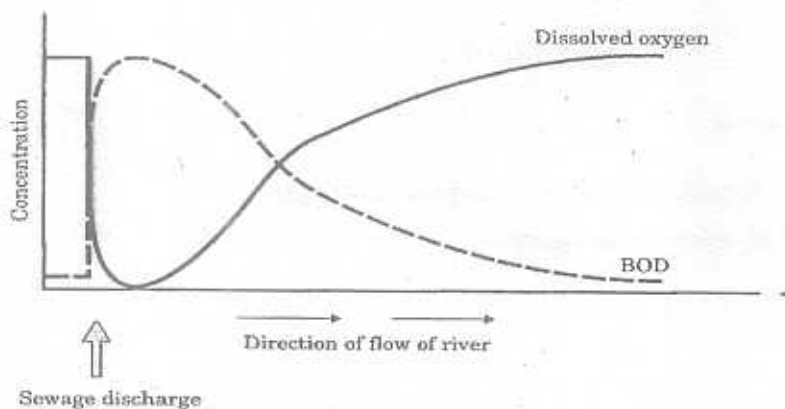
- PHYSICAL BARRIER - Skin preventing entry of germs / mucous coating of internal organs traps germs.
- PHYSIOLOGICAL BARRIER - Acid in stomach / saliva in the mouth / tear in eyes - prevent growth of microbes.
- CELLULAR BARRIER - Any named WBC / macrophages - phagocytose / kill microbes.
- CYTOKINE BARRIER - Interferons protect non infected cells from viral infection.

(Any two terms = $\frac{1}{2} + \frac{1}{2}$,

Explanation = $\frac{1}{2} + \frac{1}{2}$)

[1+2=3 marks]

22. Study the graph given below and answer the questions that follow :



- (i) What is the relationship between dissolved oxygen and biochemical oxygen demand (BOD)?
- (ii) Mention their effect on aquatic life in the river.

Ans. (i) When BOD is high dissolved oxygen is less // inversely proportionate = 1

(ii) If dissolved oxygen is less and BOD is high aquatic organisms die. = 1

If dissolved oxygen is more and BOD is low clear water organisms reappear. = 1

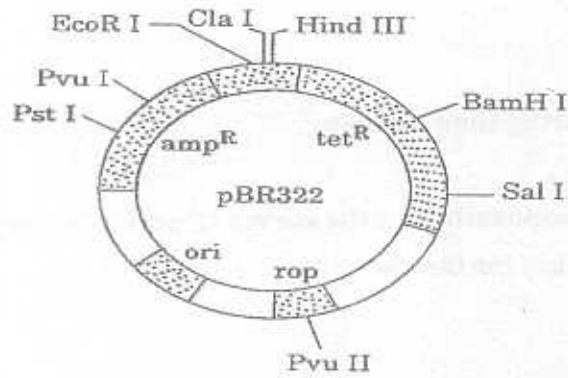
[1 x3 = 3 marks]

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

Ans. 57/1 - 23

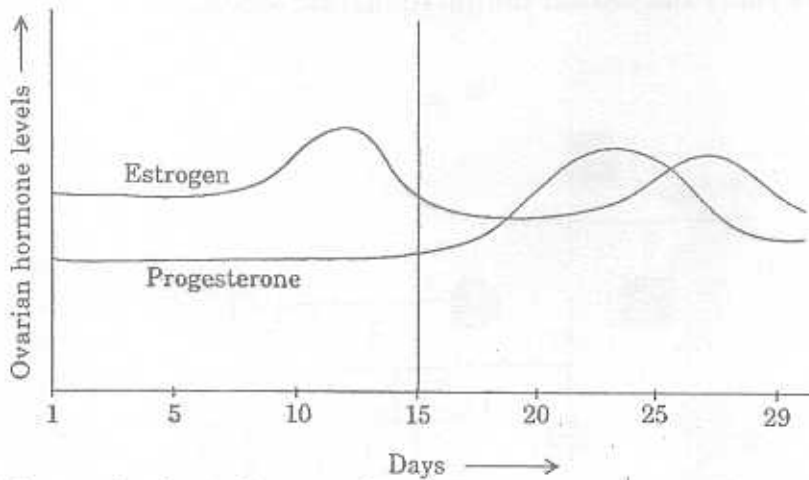
OR

Explain the importance of (a) ori, (b) amp^R and (c) rop in the E. coli vector shown below :



Ans. 57/1 - 23

24. (a)



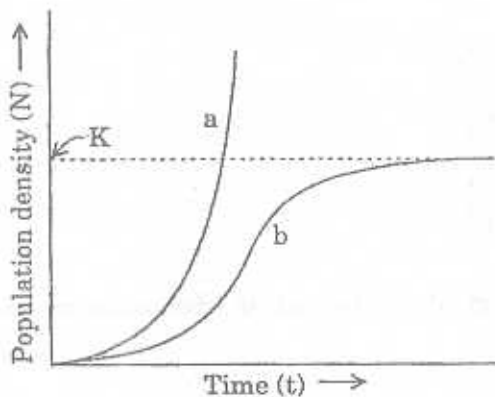
Read the graph given above and correlate the uterine events that take place according to the hormonal levels on

- (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.

Ans. 57/1 - 19

25.

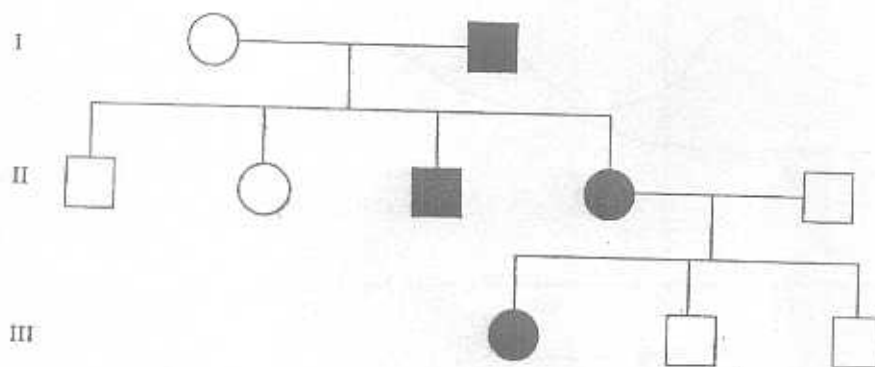


Study the population growth curves shown above.

- Identify curves 'a' and 'b'.
- Mention the conditions responsible for the curves 'a' and 'b' respectively.
- Give the necessary equation for the curve 'b'.

Ans. 57/1 - 22

26. Study the given pedigree chart and answer the questions that follow.



- Is the trait recessive or dominant ?
- Is the trait sex-linked or autosomal ?
- Give the genotypes of the parents shown in generation I and their third child shown in generation II and the first grandchild shown in generation III.

Ans. (a) Dominant = $\frac{1}{2}$

(b) Autosomal = $\frac{1}{2}$

(c) Parents - Mother - aa = $\frac{1}{2}$

Father - Aa = $\frac{1}{2}$

Third child - Aa = $\frac{1}{2}$

First Grand child - Aa = $\frac{1}{2}$

[$\frac{1}{2} \times 6 = 3$ marks]

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

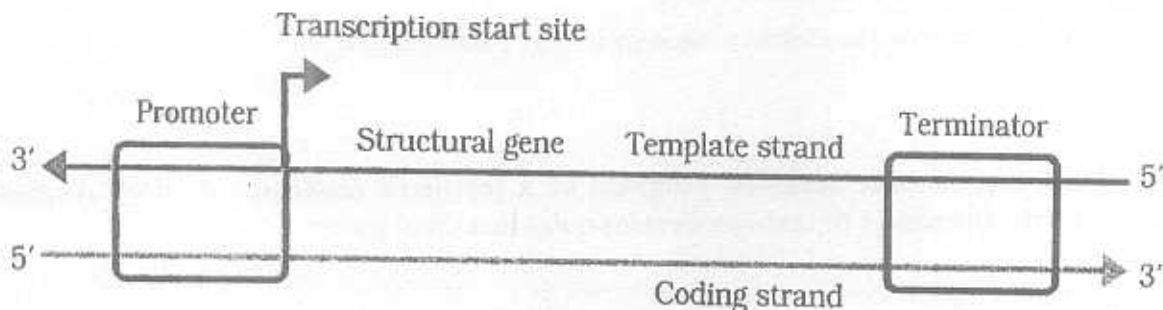
Ans. 57/1 - 20

SECTION D

Q.Nos. 28 - 30 are of 5 marks each.

28. Draw a labelled schematic structure of a transcription unit. Explain the function of each component of the unit in the process of transcription.

Ans.



Labelling - Polarity, promoter, structural gene, template strand, coding strand, terminator

(6 labels x 1/2 = 3)

Promoter - provides binding site for RNA polymerase / initiates transcription process = 1/2

Structural gene - codes for the enzymes. = 1/2

Template strand - codes for mRNA. = 1/2

Terminator - ends the transcription process = 1/2

(1/2 x 4 = 2)

[3+2=5 marks]

OR

A snapdragon plant homozygous for red flower when crossed with a white flowered plant of the same species produced pink flowers in F_1 generation.

- What is this phenotypic expression called?
- Work out the cross to show the F_2 generation when F_1 was self-pollinated. Give the phenotypic and genotypic ratios of F_2 generation.
- How do you compare the F_2 phenotypic and genotypic ratios with those of Mendelian monohybrid F_2 ratios?

Ans. (a) Incomplete dominance = 1

(b)

	Rr	x	Rr	
F_2	R		r	
	RR		Rr	
R	Red		Pink	
	Rr		rr	
r	Pink		White	= 1

Genotype ratio - $1 : 2 : 1 = \frac{1}{2}$

Phenotype ratio - $1 : 2 : 1 = \frac{1}{2}$

(c) Genotype ratios are the same in both = 1

Phenotype ratio of Mendelian monohybrid is $3 : 1$ while here it is $1 : 2 : 1 = 1$

[$1+1+\frac{1}{2} + \frac{1}{2} + 1 + 1 = 5$ marks]

29. (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.

Ans. 57/1 - 28

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.

Ans. 57/1 - 28

30. Explain the steps involved in the production of genetically engineered insulin.

Ans. 57/1 - 29

OR

- (a) Name the nematode that infests and damages tobacco roots.
(b) How are transgenic tobacco plants produced to solve this problem ?

Ans. 57/1 - 29