

General Instructions:

- i. There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
 - ii. Section A contains question numbers 1 to 5, multiple-choice questions of one mark each. Section B contains question numbers 6 to 12, short answer type I questions of two marks each. Section C contains question numbers 13 to 21, short answer type II questions of three marks each. Section D contains question number 22 to 24, case-based short answer type questions of three marks each. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
 - iii. There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.
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Section A

1. Corpus luteum secretes
 - a. Only progesterone
 - b. LH
 - c. Estrogens and Progesterone
 - d. Progesterone and LH

OR

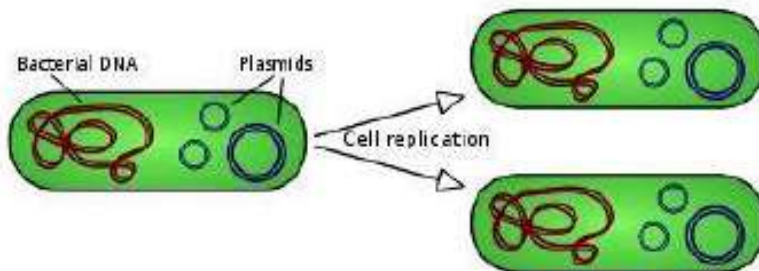
Surgical method of contraception

- a. Prevent insemination and ovulation
 - b. All of the above
 - c. Prevents fertilisation
 - d. Prevents gamete formation
2. Alzheimer disease in humans is associated with the deficiency of
- a. Dopamine
 - b. Gamma-aminobutyric acid (GABA)
 - c. Acetylcholine
 - d. Glutamic acid

OR

The disease-causing microorganisms are called

- a. Fungi
 - b. Microbes
 - c. Pathogen
 - d. Allotropes
3. Which of the following is true for a Plasmid -



- a. It can be replicate independently
- b. It cannot replicate

- c. It lies together with chromosomes
 - d. It shows independent assortment
4. If DNA is digested by EcoRI, it will lead to
- a. Multiple ori
 - b. Sticky ends
 - c. No antibiotic resistance
 - d. Blunt ends
5. UNESCO launched biosphere reserve programme under its MAB in :
- a. 1970
 - b. 1971
 - c. 1960
 - d. 1972

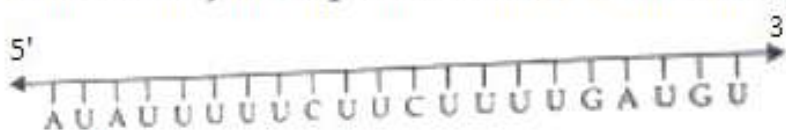
Section B

6. The number of taxa exhibiting asexual reproduction is drastically reduced in the higher plants (angiosperms) and higher animals (vertebrates) as compared with lower groups of plants and animals. Analyze the possible reasons for this situation.

OR

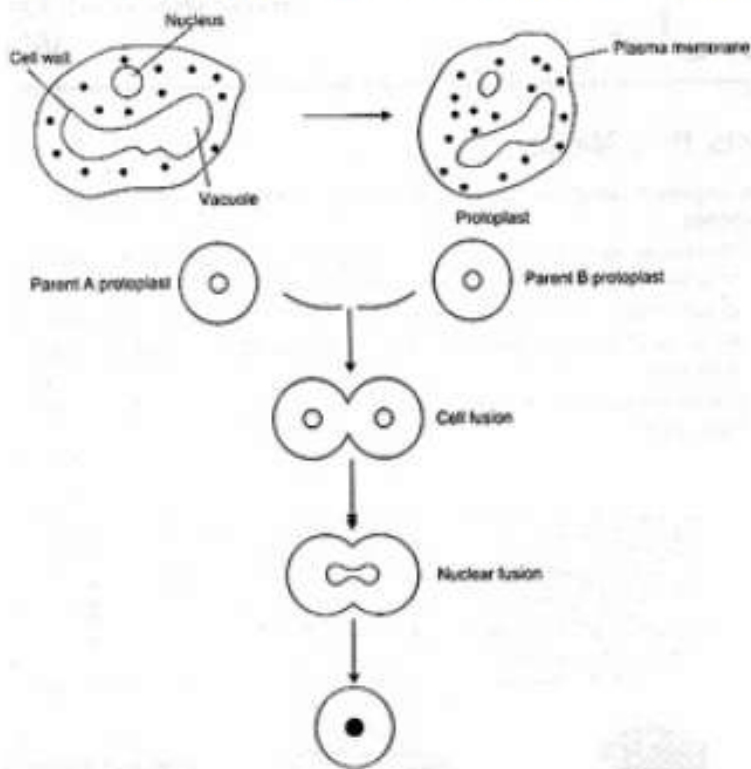
What is pollination? Name the different agencies of pollination.

- 7. What way the advent of the birth control pill have resulted in an increase in STDs?
- 8. What is a test cross? How does it differ from a reciprocal cross?
- 9. Read carefully the sequence of codons in the mRNA unit and answer the question:



- a. What change is needed in the first codon to start the translation process?
- b. If translation starts by that change, till which codon it can continuous? Why?

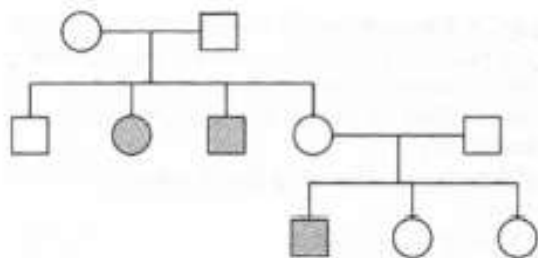
10. Figure given below represents a certain technique of tissue culture.



- i. Name the technique, as shown in the diagram.
 - ii. What are the enzymes used to digest plant cell wall?
 - iii. Name the fusinogen.
 - iv. What is the product of the fusion of protoplasts?
11. Write the functions of
- i. cry IAc gene
 - ii. RNA interference (RNAi)
12. Construct a pyramid of biomass starting with phytoplankton. Label 3 trophic levels. Is the pyramid upright or inverted? Why?

Section C

13. i. Why does endosperm development precede embryo development in angiosperm seeds? State the role of endosperm in mature albuminous seeds.
 - ii. Describe with the help of three labelled diagrams the different embryonic stages that include mature embryo of dicot plants.
14. i. Draw a labelled longitudinal view of an albuminous seed.
- ii. How are seeds advantageous to flowering plants?
15. Study the given pedigree chart and answer the questions that follow:



- i. Is the trait recessive or dominant?
- ii. Is the trait sex linked or autosomal?
- iii. Give the genotypes of the parents in generation I and of their third and fourth child in generation II.

OR

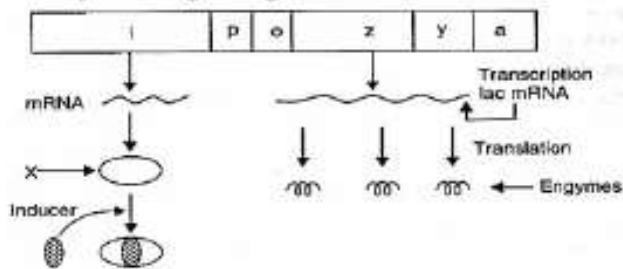
What do you understand by phenotype and genotype? Explain by giving an example.

16. Refer to the figure given below and answer the following questions



- i. Identify the process by which Tasmanian wolf came into evolution.
- ii. Define the process identify in (i).
- iii. Apart from marsupials, this process was also observed in which other organism?

17. Study the figure given below and answer the following questions:



- i. Name the molecule 'X' synthesized by 'i' gene. How does this molecule gets inactivated?
 - ii. Which one of the structural genes codes for β -galactosidase?
 - iii. When will the transcription of this gene stop?
18. Samir planned to introduce MOET in his farm. He purchased one high milk yielding exotic breed of cow. Within a few years he earned lot of money by selling calves but the mother cow met with a premature death. Raghavan objected to Samir earning money by this way.

- i. What values in life did Raghavan possess?
 - ii. Expand MOET.
 - iii. Briefly describe the process.
19. i. Give the scientific name of the soil bacterium which produces crystal (Cry) proteins.
- ii. How are these proteins useful in agriculture?
 - iii. What do the different written terms **Cry** and **cry** represent respectively?
20. You find that a lake in your neighbouring area has been covered by Water hyacinth. You have contacted your friends to remove this weed. Nobody agrees to support you. How will you explain the necessity of this?

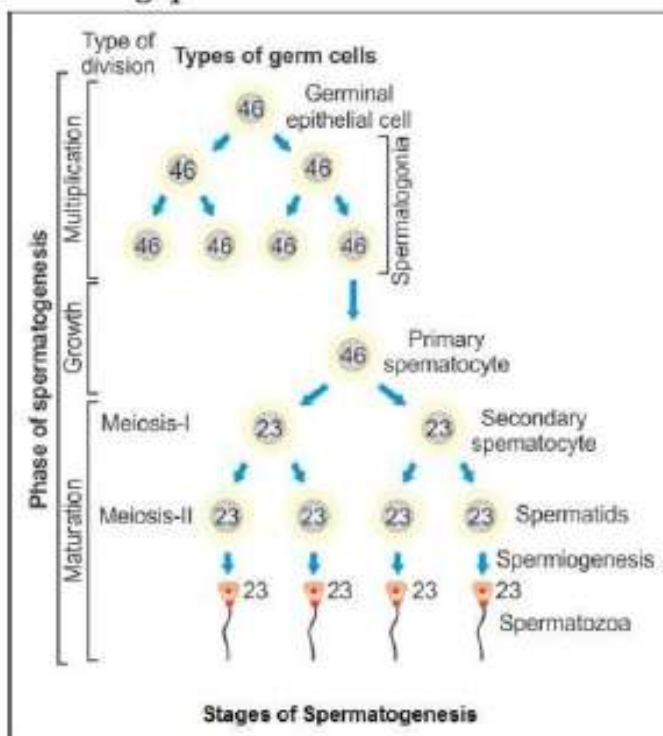
OR

Among the ecosystem services are control of floods and soil erosion. How is this achieved by the biotic components of the ecosystem?

21. Write the full form of PCR. What are the three basic steps involved in a single PCR amplification cycle?

Section D

22. Observe the diagram showing the process of spermatogenesis and answer the following questions:



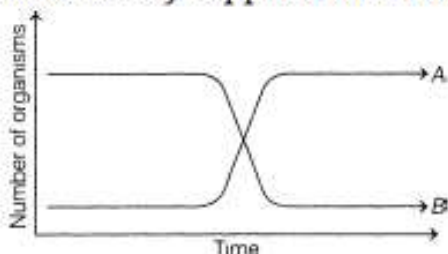
- i. Spermatids possess haploid chromosome number. Explain.

- ii. On the basis of the functions mentioned below, identify each one correctly.
 - a. It helps in the movement of spermatozoan in a fluid medium.
 - b. It contains hydrolytic enzymes and is used to contact and penetrate the egg during fertilisation.

23. Observe the following diagram for biological pest control and answer the following



- i. How do organic farmers control pests? Give two examples.
 - ii. State the difference in their approach from that of conventional pest control methods.
24. Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilisers.



Answer the questions based on the facts given above.

- i. Name the organisms depicting the patterns A and B.
- ii. State the reason for the growth pattern seen in A.
- iii. Write the effects of the growth patterns seen above.

Section E

25. In pea plants, the colour of the flower is either violet or white whereas human skin colour shows gradations. Explain giving reasons how is Possible?

OR

How are the structural genes activated in the lac operon in *E. coli*?

26. Give me a living cell of any plant and I will give you thousand plants of the same type. Is this only a slogan or is it scientifically possible? Write your comments and justify them.

OR

- a. What are autoimmune diseases?
 - b. Why are autoimmune diseases called degenerative diseases?
 - c. Name the autoimmune disease of body muscles.
 - d. Which types of immunity is provided by T-lymphocytes?
 - e. Which immune cells form humoral immune system?
27. How does an algal bloom cause eutrophication of a water body?

OR

How does the dead organic matter get decomposed in Nature? Explain.