

# Pratap Public School, Karnal

Mid-Term Examination (2023)

Class - XII

Subject - Biology

Time : 3 Hours

M.M : 70

Name ..... Roll No. .... Section .....

## General Instructions :

- All questions are compulsory.
- The question paper has five sections and 33 questions. All questions are compulsory.
- Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each; Section-D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.
- There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions,
- Wherever necessary, neat and properly labelled diagrams should be drawn.

## SECTION-A

- Remnants of nucellus are persistent during seed development in: (1)  
(a) pea (b) groundnut  
(c) wheat (d) black pepper
- The wall layer of microsporangium which nourishes the pollen grain is: (1)  
(a) epidermis (b) endothecium  
(c) middle layers (d) tapetum
- A short piece of DNA, having 20 base pairs, was analyzed to find the number of nucleotide bases in each of the polynucleotide strands. Some of the results are shown in the table.

	Number of nucleotide bases			
	Adenine	Cytosine	Guanine	Thymine
Strand 1	4	4		
Strand 2		5		

- How many nucleotides containing Adenine were present in strand 2? (1)
- 2 (b) 4
  - 5 (d) 7
- In a certain species of insects, some have 13 chromosomes, and the others have 14 chromosomes. The 13 and 14 chromosome bearing organisms are (1)  
(a) males and females, respectively (b) females and males, respectively  
(c) all males (d) all females
  - At a particular locus, the frequency of allele A is 0.8 and that of allele a is 0.2. What would be the frequency of heterozygotes in a random mating population at equilibrium? (1)  
a) 0.32 b) 0.16  
c) 0.24 d) 0.48
  - Variations caused due to mutations are (1)  
a) random and directionless b) random and directional  
c) random and small d) random, small and directional



15. Assertion : Disruptive selection changes the population into or more groups. (1)

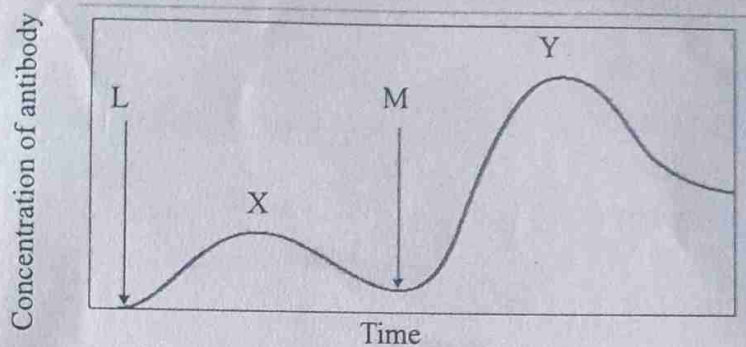
Reason : This type of selection favours average sized individuals.

16. Assertion : Morphine is useful for patients under depression. (1)

Reason : Morphine is very effective sedative painkiller. (1×16=16)

(SECTION-B)

17. The graph given below indicates the administration of the first (L) and second dose (M) of a vaccine. The corresponding response of the body is indicated by X and Y. Interpret the graph and explain the reason for such a response shown by the body.

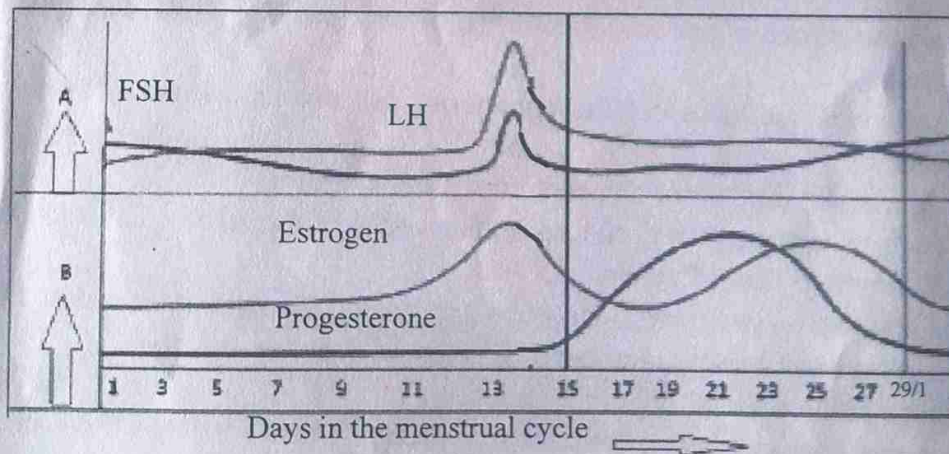


18. How do mycorrhizal fungi help the plants harbouring them?

OR

State the medicinal value and the bioactive molecules produced by streptococcus and monascus.

19. In the given figure, parts A and B show the level of hormones which influence the menstrual cycle. Study the figure and answer the questions that follow:



(a) Name the organs which secrete the hormones represented in parts A and B.

(b) State the impact of the hormones in part B on the uterus of the human female during 6 to 15 days of menstrual cycle?

20. Define :

(a) Pleiotropy

(b) Multiple allelism

21. State the conditions when 'genetic code' is said to be

a) degenerate

b) unambiguous and specific

(2×5=10)

(SECTION-C)

22. State the agents which helps in pollination in the following plants. Explain the adaptations in these plants to ensure pollination:

a) corn

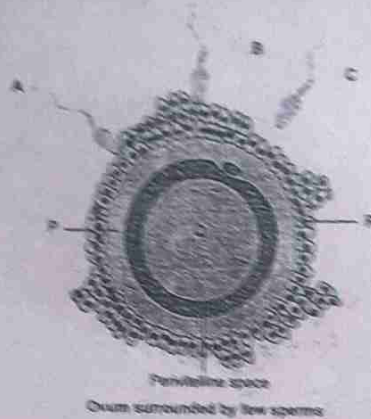
b) water hyacinth

c) Vallisneria

23. The figure given below shows 3 sperms A, B and C.

(a) Which one of the three sperms will gain entry into the ovum?

(b) Describe the associated changes induced by it on P and Q.



24. Highlight the structural importance of an antibody molecule with a diagram. Name the four types of antibodies found to give a humoral immune response, mentioning the function of two of them you have studied.

OR

a) Explain the life cycle of Plasmodium starting from its entry in the body of female Anopheles till the completion of its life cycle in humans.

b) Explain the cause of periodic recurrence of chill and high fever during malarial attack in humans.

25. a) All human beings have cellular oncogenes but only a few suffer from cancer. Give reasons.

b) How is a malignant tumor different from a benign tumor?

26. a) Absence of lactose in the culture medium affects the expression of a lac operon in E.coli, why and how? Explain.

b) Write any two ways in which the gene expression is regulated in eukaryotes.

27. a) Rearrange the following in ascending order of evolutionary tree:

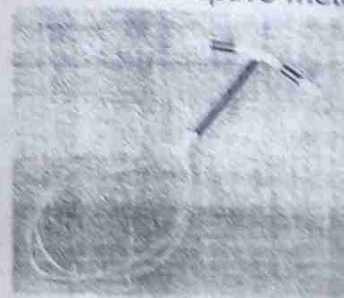
reptiles, salamanders, lobefins, frogs

b) Name two reproductive characters that probably make reptiles more successful than amphibians.

28. Diagrammatically represent the experimental set up that proved Oparin-Haldane hypothesis. (3×7=21)

(SECTION-D)

29. Given below is the diagram of CuT, a commonly used contraceptive method. Based on the information answer the following questions:



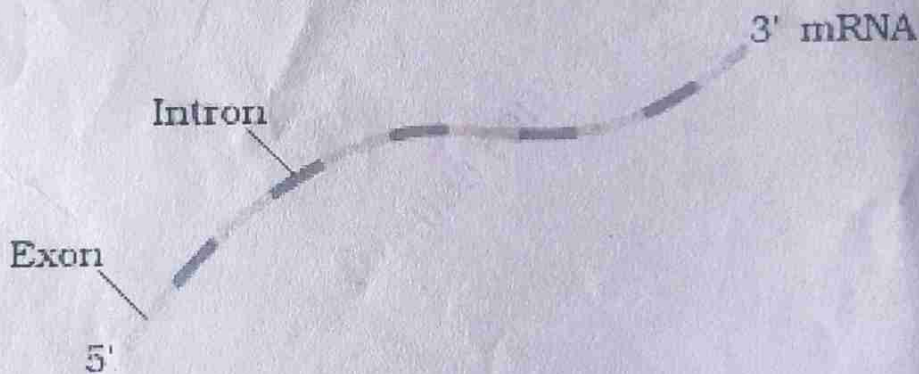
- (i) A mother of one year old daughter wanted to space her second child. Her doctor suggested CuT. Explain its contraceptive actions.  
 (ii) Bring out one main difference between CuT and LNG-20.

OR

- (ii) Write the names of Intra Uterine Devices along with their action?  
 (iii) A newly married couple does not want to produce children at least for one year and also not to use any contraceptives. Suggest a method to prevent pregnancy.
30. Given below is a stretch of DNA showing the coding strand of a structural gene of a transcription unit?  
 5'--ATG ACC GTA TTT TCT GTA GTG CCC GTA CTT CAG GCA TAA-3'
- (a) Write the corresponding template strand and the mRNA strand that will be transcript along with its polarity.  
 (b) If GUA of the transcribed mRNA is an intron, depict the sequence involved in the form of mRNA /the mature processed hnRNA strand.  
 (i) In a bacterium  
 (ii) In humans  
 (c) Upon translation, how many amino acids will the resulting polypeptide have? Justify

(SECTION-E)

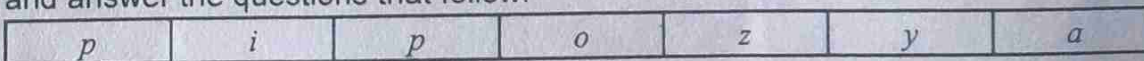
31. Observe the segment of mRNA given below.



- (a) Explain and illustrate the steps involved to make fully processed hnRNA? (b) Gene encoding RNA Polymerase I and III have been affected by mutation in a cell. Explain its impact on the synthesis of polypeptide, stating reasons.

OR

Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follow:



- (a) The active site of enzyme permease present in the cell membrane of a bacterium has been blocked by an inhibitor, how will it affect the lac operon?  
 (b) The protein produced by the *i* gene has become abnormal due to unknown reasons. Explain its impact on lactose metabolism stating the reason.  
 (c) If the nutrient medium for the bacteria contains only galactose; will operon be expressed? Justify your answer.

32. Thalassaemia and haemophilia are both Mendelian disorders related to blood. Write the symptoms of the diseases. Explain with the help of crosses the differences in the inheritance pattern of the two diseases.

OR

a) Why is colorblindness generally observed in human males? Explain the conditions under which a human female can be hemophilic.

b) A pregnant human female was advised to undergo M.T.P. It was diagnosed by her doctor that the foetus she is carrying has developed from a zygote formed by an XX egg fertilised by y-carrying sperms. Why was she advised to undergo M.T.P?

33. a) Name the primates that lived about 15 million years ago. List their characteristic features.

b) i) Where was the first man-like animals found?

ii) Write the order in which Neanderthals, Homo habilis and Homo erectus appeared on earth. State the brain capacity of each one of them.

iii) When did modern Homo sapiens appear on earth?

OR

a) Describe the observations made on collection of white winged moths and dark-winged moths in England b/w the years 1850 and 1920. What did these observations lead for?

b) How is the use of herbicides, pesticides and antibiotics by humans for various purposes, comparable with the observations made on moths in the above question? What is this type of phenomenon called?

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