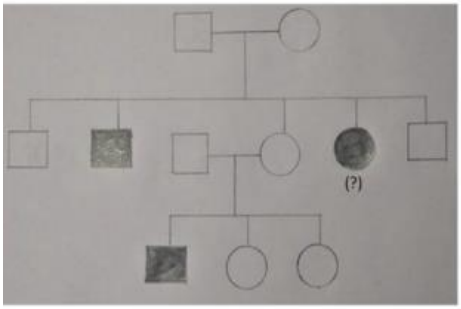
DELHI PUBLIC SCHOOL JAMMU
SESSION: 2024-2025
SAMPLE PAPER

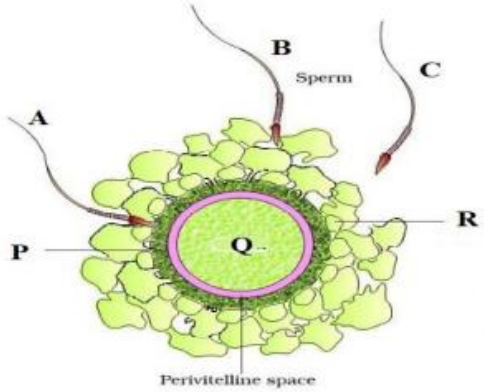
Class XII | Biology (044)
Maximum Marks: 70 | Time: 3 hours

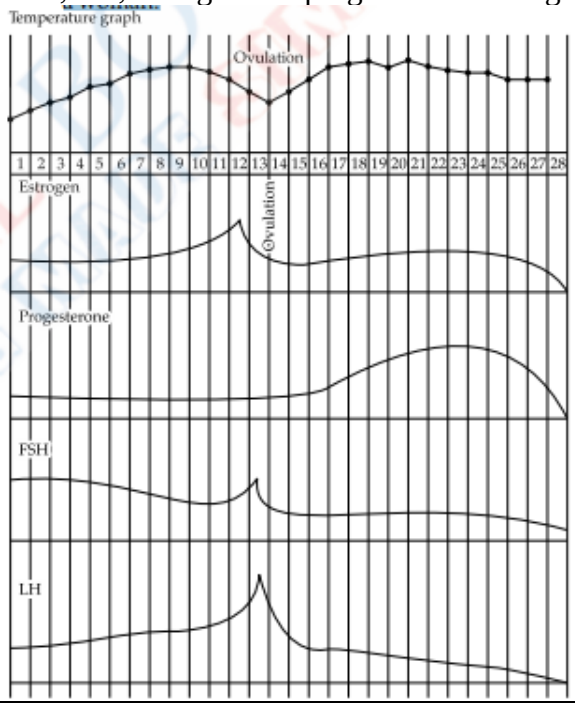
General Instructions:

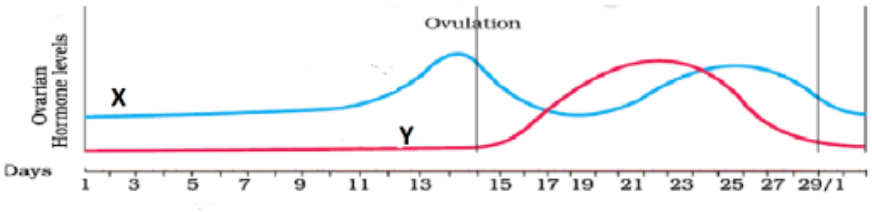
(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) 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 labeled diagrams should be drawn.

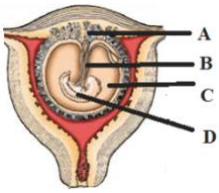
	Section A	
1	The wall layer of microsporangium which nourishes the pollen grain is: a) epidermis b) endothecium c) middle layers d) tapetum	**[1]**
2	Remnants of nucellus are persistent during seed development in: a) pea b) groundnut c) wheat d) black pepper	**[1]**
3	Sickle cell anemia is a/ an _____ disease. a. X linked b. autosomal dominant c. autosomal recessive d. Y linked	**[1]**
4	The cause of Klinefelter's syndrome in humans is: a) Absence of Y-chromosome b) Absence of X-chromosome c) Extra copy of an autosome d) Extra copy of an X-chromosome	**[1]**
5	Variations caused due to mutations are: a) random and directionless b) random and directional c) random and small d) random, small and directional	**[1]**
6	What is the smallest part of a DNA molecule that can be changed by a point mutation? a) Oligonucleotide b) Codon c) Gene d) Nucleotide	**[1]**
7	What should be the genotype of the indicated member? a) AA b) Aa c) XY d) aa 	**[1]**
8	A patient was advised to have a kidney transplant. To suppress the immune reaction, the doctor would administer him: a) statins produced from Monascus purpureus	**[1]**

	b) statins produced from Streptococcus thermophilus c) cyclosporin A produced from Trichoderma polysporum d) cyclosporin A produced from Clostridium butylicum	
9	Researchers over the world are trying to transfer apomictic genes to hybrid varieties as hybrid characters in the progeny: a) do not segregate b) segregate c) develop genetic variations d) will remain unexpressed	**[1]**
10	The aquatic plant having long and ribbon like pollen grains is: a) Vallisneria b) Hydrilla c) Eichhornia d)Zostera	**[1]**
11	During human embryonic development, the heart in the embryo is formed after: a) 15 days of pregnancy b) 30 days of pregnancy c) 45 days of pregnancy d) 60 days of pregnancy	**[1]**
12	Select the incorrect pair: a) Polygenic inheritance : Haemophilia b) Linkage : Drosophila c) Incomplete dominance : Antirrhinum d) Pleiotropy : Phenylketonuria	**[1]**
13	Assertion: Primary endosperm nucleus is diploid. Reason: It is the product of double fertilisation. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
14	Assertion: Ribosomal RNA is synthesized in the nucleus of the cell. Reason: It is translated with the enzyme RNA polymerase III. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
15	Assertion: Accumulation of phenylalanine in the brain results in mental retardation in Phenylketonuria. Reason: The affected person lacks phenylalanine which is therefore not converted to tyrosine. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
16	Assertion: Life appeared 500 million years after the formation of earth. Reason: There was no atmosphere on early earth. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
	SECTION B	

17	How do we compute the age of a fossil? OR What is the most important pre-condition for adaptive radiation?	**[2]**
18	Explain the phases in embryonic development from the morula stage till the establishment of pregnancy in a human female.	**[2]**
19	Predict the effect if, the codon UAU coding for an amino acid at the 25th position of a polypeptide of 50 amino acids, is mutated to UAA.	**[2]**
20	Name the common function that cotyledons and nucellus perform. OR What is the function of the two male gametes produced by each pollen grain in angiosperms.	**[2]**
21	Explain the process of hormonal regulation of spermatogenesis.	**[2]**
	SECTION C	
22	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.	**[3]**
23	A pregnant human female was advised to undergo MTP. It was diagnosed that the fetus she was carrying had developed from a zygote having 45 chromosomes with only one X chromosome. a) What is this condition called and how does it arise? b) Why was she advised to undergo MTP?	**[3]**
24	A snapdragon plant with violet flowers was crossed with another such plant with white flowers. The F1 progeny obtained had pink flowers. Explain, in brief, the inheritance pattern seen in offsprings of F1 generation?	**[3]**
25	Does self incompatibility impose any restrictions on autogamy? Give reasons and suggest the method of pollination in such plants.	**[3]**
26	Give an example for convergent evolution and identify the features towards which they are converging.	**[3]**
27	In peas, tallness is dominant over dwarfness, and red colour of flowers is dominant over the white colour. When a tall plant bearing red flowers was pollinated with a dwarf plant bearing white flowers, the different phenotypic groups were obtained in the progeny in numbers mentioned against them:	**[3]**

	Tall, Red = 138 Tall, White = 132 Dwarf, Red = 136 Dwarf, White = 128 Mention the genotypes of the two parents and of the four offspring types	
28	The evolutionary story of moths in England during industrialisation reveals, that 'evolution is apparently reversible'. Clarify this statement.	**[3]**
	SECTION D	
29	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 transcribed, along with its polarity. b) If GUA of the transcribed mRNA is an intron, depict the sequence involved in the formation 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? OR d) How is hnRNA different from mRNA?	**[1]** **[2]** **[1]**
30	A group of medical students carried out a detailed study on the impact of various factors on the different hormones during the menstrual cycle in a human female. They collected the data with different factors. Given below is the graph plotted from the data collected showing the morning temperature and concentration of hormones FSH, LH, estrogen and progesterone during normal menstrual cycle in a woman.  	

	1). The time of ovulation is of importance in cases of: (i) couples having difficulty in conception. (ii) to know the safe period for prevention of pregnancy. (iii) to inhibit the process of ovulation. (iv) to stimulate ovarian follicular development. a) (i) and (iv) b) (ii) and (iv) c) (i) and (ii) d)(iii) and (iv)	**[1]**
	b). i) The increase in the level of progesterone is maximum under the influence of LH during which phase of menstruation? ii). The early morning recording of temperature in the graph during actual menstruation and during ovulation respectively are: a) low, high b) high, low c) low, low d)high, high	**[2]**
	c). Which hormone/hormones is/are showing rapid surge leading to changes in Graafian follicle just before ovulation? OR d). The human corpus luteum starts regressing ..... days after ovulation.	**[1]**
	SECTION E	
31	Evaluate the suitability of DNA and RNA as genetic material and justify the suitability of the one that is preferred as an ideal genetic material. OR Explain the mechanism of DNA replication as suggested by Watson and Crick.	**[5]**
32	Study the graph given below related with menstrual cycle in females:  a. Identify ovarian hormones X and Y mentioned in the graph and specify their source. b. Corelate and describe the uterine events that take place according to the ovarian hormone levels X and Y mentioned in the graph on - i. 6 – 15 days ii. 16 – 25 days iii. 26 – 28 days (when ovum is not fertilized) OR The following figure shows a foetus within the uterus. On the basis of the given figure, answer the questions that follow:	**[5]**

	 (a) In the above figure, choose and name the correct part (A, B, C or D) that act as a temporary endocrine gland and substantiate your answer. Why is it also called the functional junction? (b) Mention the role of B in the development of the embryo. (c) Name the fluid surrounding the developing embryo. How is it misused for sex-determination?	
33	A normal visioned woman, whose father is colour blind, marries a normal visioned man. What would be probability of her sons and daughters to be colour blind? Explain with the help of a pedigree chart. OR Define aneuploidy. How is it different from polyploidy? Describe the individuals having following chromosomal abnormalities. a. Trisomy of 21st Chromosome b. XXY c. XO	**[5]**