

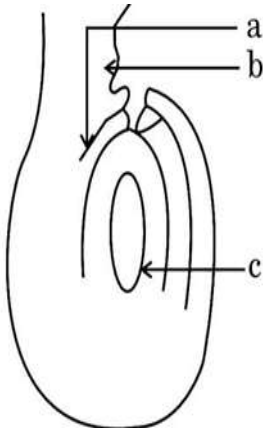
CLASS -XII
POST MID TERM-EXAMINATION (2024-25)
SUBJECT-BIOLOGY(CODE-044)
SET- B1

Time-3 hours

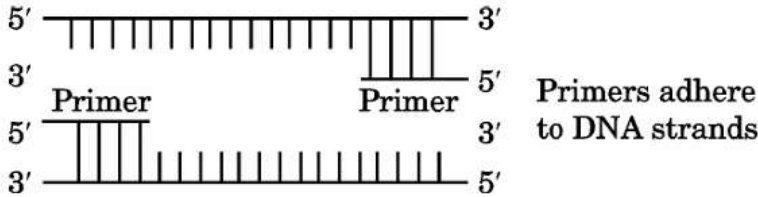
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General Instructions:*Read the following instructions carefully and follow them:*

- (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.
- (v) Wherever necessary, neat and properly labelled diagrams should be drawn.

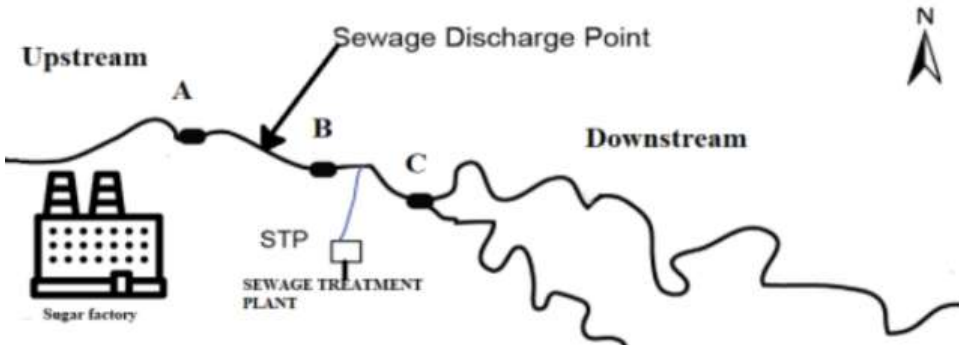
	SECTION A	
	Questions no. 1 to 16 are Multiple Choice Type Questions, carrying 1 mark each. Choose the correct option.	16x1=16
Q.1	Identify the various parts, 'a', 'b' and 'c', in the given diagram of ovule :  Diagram of an ovule (A) a – Embryo sac, b – Inner integuments, c – Outer integuments (B) a – Inner integuments, b – Nucellus, c – Chalazal end (C) a – Hilum, b – Funicle, c – Embryo sac (D) a – Micropylar end, b – Hilum, c – Inner integuments	1

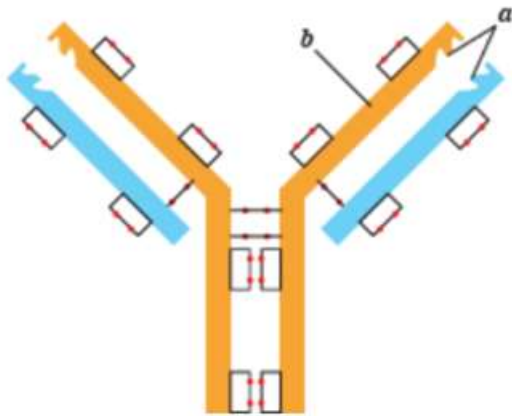
Q.2	A man has a history of haemophilia in his family and to his surprise only male members have the disease. Select the correct reason for the transmission of the disease: (A) From unaffected carrier female to her son (B) A metabolic disease in the blood of a female (C) When the parents are unaffected carriers for the gene (D) When male member has a dominant gene for this disease.	1																				
Q.3	Choose the correct option by which the genetic defect ADA (Adenosine Deaminase) deficiency can be cured permanently: (A) By periodic infusion of genetically engineered lymphocytes having functional ADA (cDNA) (B) If gene isolated from bone marrow cells producing ADA is introduced into cells at early embryonic stage (C) By giving ADA injections (D) By Enzyme Replacement Therapy	1																				
Q.4	Match the correct Structures given in Column I with the Fruit in Column II in the chart given below: <table border="1"> <tr> <th></th> <th>Column I (Structure)</th> <th></th> <th>Column II (Fruit)</th> </tr> <tr> <td>P</td> <td>Perisperm</td> <td>i</td> <td>Maize</td> </tr> <tr> <td>Q</td> <td>Thalamus</td> <td>ii</td> <td>Black pepper</td> </tr> <tr> <td>R</td> <td>Pericarp</td> <td>iii</td> <td>Strawberry</td> </tr> <tr> <td>S</td> <td>Endosperm</td> <td>iv</td> <td>Mango</td> </tr> </table> (A) P-i, Q-ii, R-iii, S-ii (B) P-ii, Q-iii, R-iv, S-i (C) P-iii, Q-i, R-i, S-iii (D) P-iv, Q-i, R-ii, S-iv		Column I (Structure)		Column II (Fruit)	P	Perisperm	i	Maize	Q	Thalamus	ii	Black pepper	R	Pericarp	iii	Strawberry	S	Endosperm	iv	Mango	1
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Q.5	The process of mineralisation by microorganisms helps in the release of (A) Inorganic nutrients from humus (B) Both organic and inorganic nutrients from detritus (C) Organic nutrients from humus (D) Inorganic nutrients from detritus and formation of humus.	1																				
Q.6	Select the options which is/are incorrect statement(s) with respect to T-lymphocytes in the human body. (i) They are a type of white blood cells. (ii) They are produced in bone marrow. (iii) They remain active at all times in the body. (iv) They mature in the bone marrow. (A) (i) and (iv) only (B) (iii) only (C) (iv) only (D) (iii) and (iv) only	1																				

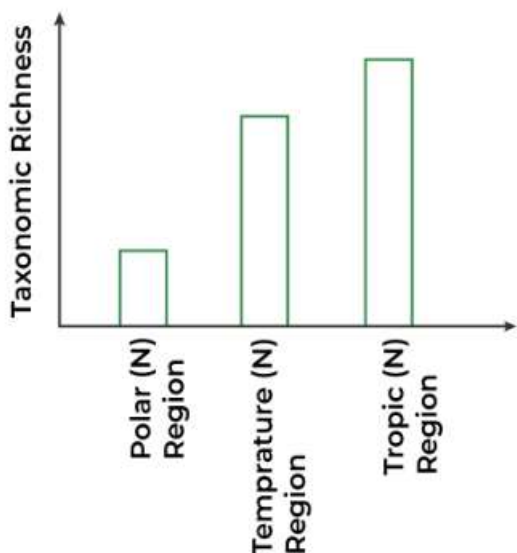
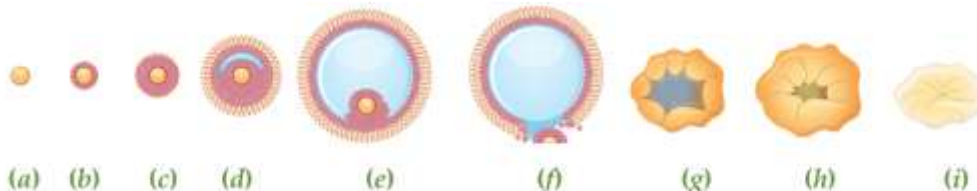
Q.7	The chronological order of evolution of modern man from man-like primates is given below. Choose the option that indicates the evolution of man in correct order from early to recent times: (A) <i>Australopithecines</i> → <i>Ramapithecus</i> → <i>Homo habilis</i> → <i>Homo erectus</i> → <i>Homo sapiens</i> (B) <i>Ramapithecus</i> → <i>Australopithecines</i> → <i>Homo habilis</i> → <i>Homo erectus</i> → <i>Homo sapiens</i> (C) <i>Ramapithecus</i> → <i>Homo habilis</i> → <i>Australopithecines</i> → <i>Homo erectus</i> → <i>Homo sapiens</i> (D) <i>Australopithecines</i> → <i>Homo habilis</i> → <i>Homo sapiens</i> → <i>Ramapithecus</i> → <i>Homo erectus</i>	1
Q.8	Which of the following statements are true in respect of chorionic villi in humans? (i) It appears after implantation of human embryo in the uterus. (ii) It becomes interdigitated with cervical tissue of female reproductive tract. (iii) It increases the surface area for exchange of materials (iv) It develops from the inner cell mass of blastocyst. (A) (i) and (ii) (B) (ii) and (iii) (C) (i) and (iv) (D) (i) and (iii)	1
Q.9	What is the process of binding a primer to the denatured strand called?  (A) Denaturation (B) Renaturation (C) Polymerisation (D) Annealing	1
Q.10	Which one of the following fixes the atmospheric nitrogen but is not an autotroph? (A) <i>Oscillatoria</i> (B) <i>Anabaena</i> (C) <i>Rhizobium</i> (D) <i>Nostoc</i>	1
Q.11	Out of the following, select the correct match: (A) Transgenic cow milk: Human beta-lactalbumin protein (B) ELISA : Antigen antibody interaction (C) Corn Borer :Cry II Ab gene (D) Cotton plant : <i>Meloidogyne incognita</i>	1

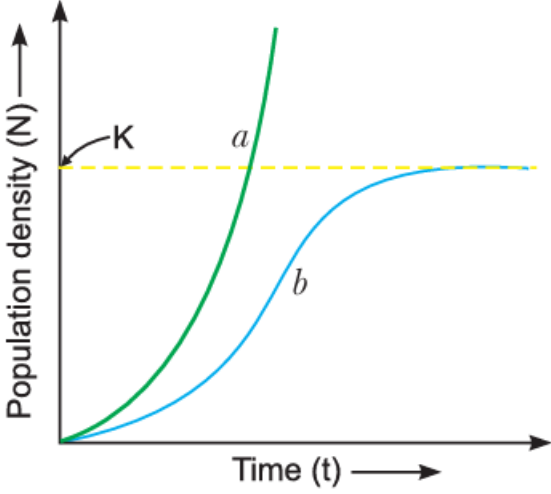
Q.12	What would happen if in a gene encoding a polypeptide of 51 amino acids, codon present at 32 position (UAU) is mutated to UGA ? Select the option that indicates the polypeptide with correct number of amino acids formed after mutation. (A) A polypeptide of 50 amino acids will be formed. (B) A polypeptide of 32 amino acids will be formed. (C) Two polypeptides of 20 and 31 amino acids will be formed. (D) A polypeptide of 31 amino acids will be formed.	1
Q.13	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (A) Both A and R are true and R is the correct explanation of A. (B) Both A and R are true and R is not the correct explanation of A. (C) A is true but R is false. (D) A is False but R is true. Assertion (A): In a monohybrid cross between tall plants and dwarf plants, the F₂ generation showed tall and dwarf plants in the ratio of 3 : 1. Reason (R): There is no blending of traits/characters in the F₂ generation.	1
Q.14	Assertion (A): Deoxyribonucleoside triphosphates serve dual purposes. Reason (R): They act as proof readers and provide template for DNA replication.	1
Q.15	Assertion(A): A piece of DNA inserted into an alien organism does not replicate, if inserted into a chromosome. Reason(R): Chromosomes have specific sequence called 'ori' region where DNA replication is initiated.	1
Q.16	Assertion(A): IUT is the transfer of embryo with more than 8 blastomeres into the uterus. Reason(R): IUT is a very popular method of forming embryos in vivo.	1
Section – B (2 Marks Questions)		
Q.17	Attempt either option A or B. A. Write the scientific name of the fruit fly. Why did Morgan prefer to work with fruit flies for his experiments? State any three reasons. OR B. Study the figures given below and answer the question.	2 2

	Cross A Yellow, white Wild type Cross B White, miniature Wild type Parental Identify in which of the crosses is the strength of linkage between the genes higher. Give reasons in support of your answer.	
Q.18	Attempt either option A or B. A. Explain how recombinant DNA technology is used to detect a disease even before any clinical symptom appears. OR B. Why does the 'insertional inactivation' method to detect recombinant DNA is preferred to 'antibiotic resistance' procedure?	2 2
Q.19	A karyotype of a human suffering from a certain disorder is given below : a) Identify the disorder. b) Write the symptoms of the disorder. c) Give reason for such a disorder.	2

Q.20	Attempt either A or B A. Construct an ideal pyramid of energy if 200,000 joules of sunlight is available. OR B. Compare the two ecological pyramids of biomass I and II given below and explain the situations in which this is possible. Trophic level Dry weight (kg m⁻³) <table><tr><td>TC</td><td>1.5</td></tr><tr><td>SC</td><td>11</td></tr><tr><td>PC</td><td>37</td></tr><tr><td>PP</td><td>809</td></tr></table> Fig. I <table><tr><td>PC</td><td>21</td></tr><tr><td>PP</td><td>4</td></tr></table> Fig. II	TC	1.5	SC	11	PC	37	PP	809	PC	21	PP	4	2
TC	1.5													
SC	11													
PC	37													
PP	809													
PC	21													
PP	4													
Q.21	Attempt either option A or B. A. Water samples were collected at points A, B and C in a segment of a river near a sugar factory and tested for BOD level. The BOD levels of samples A, B and C were 400 mg/L, 480 mg/L and 8 mg/L respectively. What is this indicative of? Explain why the BOD level gets reduced considerably at the collection point C?  OR B. Pranay suffered from measles at the age of 10 years. There are rare chances of his getting infected with the same disease for the rest of his life.” Give reason for the statement.	2												
Section – C (3 Marks questions)														

Q.22	Give reason for the following statements: a) A plasmid DNA and a linear DNA (both of the same size) have one site for a restriction endonuclease. When cut and separated on agarose gel electrophoresis, plasmid shows one DNA band while linear DNA shows two fragments. b) A mixture of fragmented DNA was electrophoresed in agarose gel. After staining the gel with ethidium bromide, no DNA bands were observed.	3
Q.23	i)How did S.L. Miller create the conditions, which existed before the origin of any life on earth? ii)Name the organic compound formed and collected at the end of the experiment. iii)Mention the kind of evolution his experiment supported.	3
Q.24	Describe the roles of heat, primers and the bacterium <i>Thermus aquaticus</i> in the process of PCR.	3
Q.25	a) Name the enzyme responsible for the transcription of tRNA. b) Draw a labelled diagram of an initiator tRNA charged with its respective amino acid attached to m RNA (4 labels including respective amino acid)	3
Q.26	Study the figures given below and answer the questions that follow.  i. Identify (a) and (b) in the diagram of an antibody molecule given below. ii. Name the type of cells that produce this molecule. iii. Why is an antibody represented as 'H₂L₂'	3
Q.27	The data collected based on the survey conducted for species richness of a group of mammals in three different climatic regions of the world is shown in the bar graph given below	3

	 Panama has nearly 560 species of mammals, Canada has nearly 301 species of mammals and Denmark has 67 species of mammals. a) Based on the species richness, identify the location of these countries in the respective climatic regions given. b) Plants and animals do not have a uniform diversity in the world. Give reason. Write the term given to this pattern of diversity.	
Q.28	A village health worker was taking a session with women. She tells them that one has to be careful while using oral pills as a method of birth control. Wrong usage can actually promote conception. (a) Analyse the above statement and compare the merits and demerits of using oral pills and surgical methods of birth control. (b) Village women are confused as to how a thin metallic copper loop can provide protection against pregnancy. Explain the mode of action of IUDs. Give two points.	3
	SECTION D (CASE BASED:4 Marks questions) Each question has 3 subparts with internal choice in one subpart.	
Q.29	The following is the illustration of the sequence of ovarian events (a – i) in a human female.  a) Identify 'a' and mention the stage of life at which it is formed. b) Identify 'g' and name the hormone it secretes. <i>Attempt either c) or d)</i>	4

	c) i) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents. ii) Name the ovarian hormone and the pituitary hormone that have caused the above mentioned event. OR d) Identify and write one difference between 'c' and 'e'	
Q.30	Study the graph given below and answer the questions which follow:  (a) The curve 'b' is described by the following equation: $\frac{dN}{dt} = rN \left\{ \frac{K - N}{K} \right\}$ What does 'K' stand for in this equation?. (b) Mention its significance Attempt either c) or d) (c) State the basis for the difference in the shape of these curves. OR (d) Which one of the curves represent the human population growth at present? Do you think such a curve is sustainable? Give reason in support of your answer.	4
	SECTION E (5 MARKS QUESTIONS)	
Q.31	Attempt either option A or B. A. Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below.  B. How is transcription a more complex process in eukaryotic cells? Explain the additional processes that a precursor mRNA has to undergo in these organisms.	5

	OR B. i) Both haemophilia and thalassemia are blood related disorders in humans. Write their cause and ONE difference between the two disorders. Name the category of genetic disorder they both come under. ii) The pedigree chart given below, present a particular generation which shows a trait irrespective of sexes (i.e., present in both male and female). Neither of the parents of the particular generation shows the trait. Draw your conclusion on the basis of the pedigree.	5
Q.32	Attempt either option A or B. A. Malarial parasite ‘Plasmodium’ completes its life cycle in two hosts. Explain various stages it follows throughout its life. OR B. i) Choose any three microbes, from the following which are suited for organic farming, which is in great demand these days for various reasons. Mention one application of each one chosen. <i>Mycorrhiza</i>; <i>Monascus</i>; <i>Anabaena</i>; <i>Rhizobium</i>; <i>Methanobacterium</i>; <i>Trichoderma</i>. ii) What are the harmful effects of chemical pesticides? (Enlist any two harmful effects)	5
Q.33	Attempt either option A or B. A. i) Explain the development of endosperm in coconut. ii) Mention one advantage and one disadvantage of apomictic seeds to a farmer who uses them. OR B. In a tabular form mention the month-wise changes observed in the fetus/embryo during its development in the mother’s womb during the gestation period.	5