

CLASS -XII
POST MID TERM-EXAMINATION (2024-25)
SUBJECT-BIOLOGY(CODE-044)
SET- B2

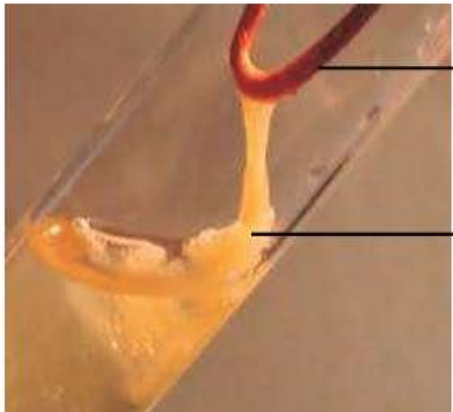
Time-3 hours

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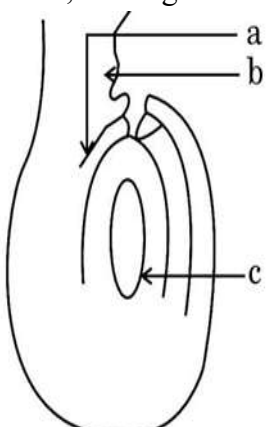
General Instructions:*Read the following instructions carefully and follow them:*

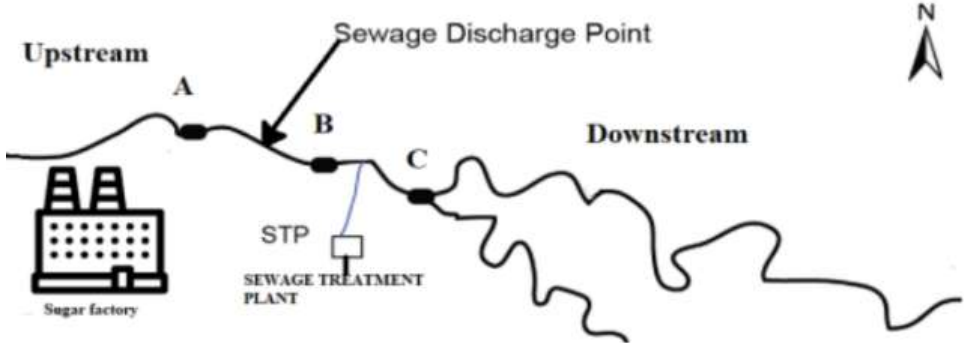
- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions.
- (iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E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

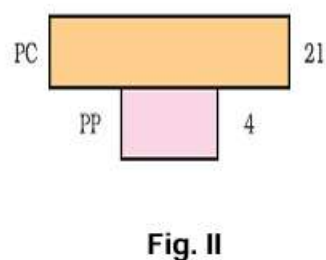
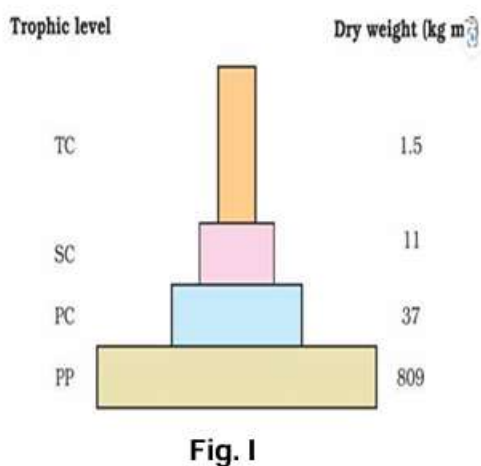
	SECTION A	
	Questions no. 1 to 16 are Multiple Choice Type Questions, carrying 1 mark each. Choose the correct option.	16x1=16
Q.1	The RNA triplet UAG acts as a stop codon which terminates the synthesis of a polypeptide. Below is given a strand of DNA which codes for four amino acids. In which position will an insertion of a thymine nucleotide result in the termination of translation? DNA strand: 3'TCCACCCGATGC5' ↓ (A) 3'TCCACCCGATGC5' ↓ (B) 3'TCCACCCGATGC5' ↓ (C) 3'TCCACCCGATGC5' ↓ (D) 3'TCCACCCGATGC5'	1

Q.2	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>Meloidegyne incognitia</i>	1
Q.3	Integrated Pest Management involves I. Using pesticides/insecticides judiciously II. Using biocontrol agents III. Engaging in organic farming (A) Only I (B) Only II (C) Both I and II (D) Only III	1
Q.4	 Hook Precipitated DNA Identify the material that helps in the precipitation of purified DNA during the process of isolation of DNA as shown in the given diagram. (A) Protease (B) Lysozyme (C) Cellulase (D) Chilled ethanol	1
Q.5	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.6	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.7	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.8	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.9	Match the correct Structures given in Column I with the Fruit in Column II in the chart given below: <table><tr><td></td><td>Column I (Structure)</td><td></td><td>Column II (Fruit)</td></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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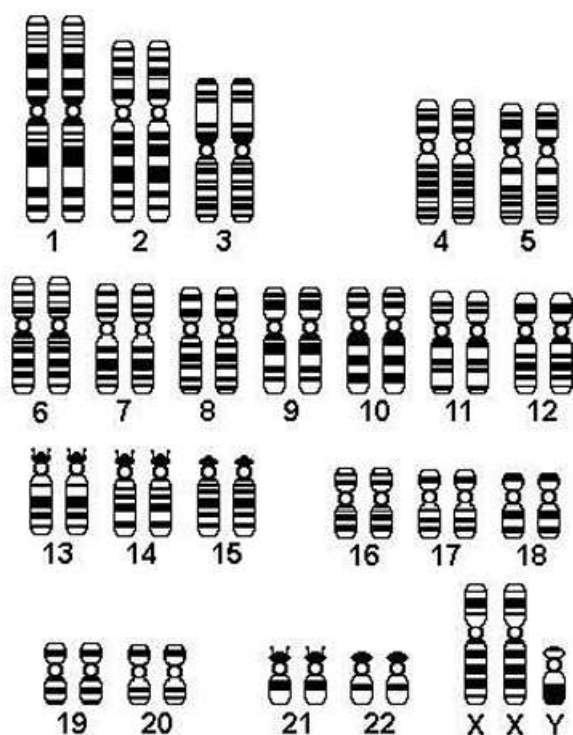
Q.10	Choose the correct option by which the genetic defect ADA (Adenosine Deaminase) deficiency can be cured permanently: (A) By periodic infusion of genetically engineered lymphocytes having functional ADA (cDNA) (B) If gene isolated from bone marrow cells producing ADA is introduced into cells at early embryonic stage (C) By giving ADA injections (D) By Enzyme Replacement Therapy	1
Q.11	Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino? (A) 100% (B) 25% (C) 50% (D) 75%	1
Q.12	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.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): 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

Q.14	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.15	Assertion (A): Deoxyribonucleoside triphosphates serve dual purposes. Reason (R): They act as proof readers and provide template for DNA replication.	1
Q.16	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
Section – B (2 Marks Questions)		
Q.17	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 2
Q.18	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.	2 2



Q.19 A karyotype of a human suffering from a certain disorder is given below:

2



- Identify the disorder.
- Write the symptoms of the disorder.
- Give reason for such a disorder.

Q.20 | *Attempt either option A or B.*

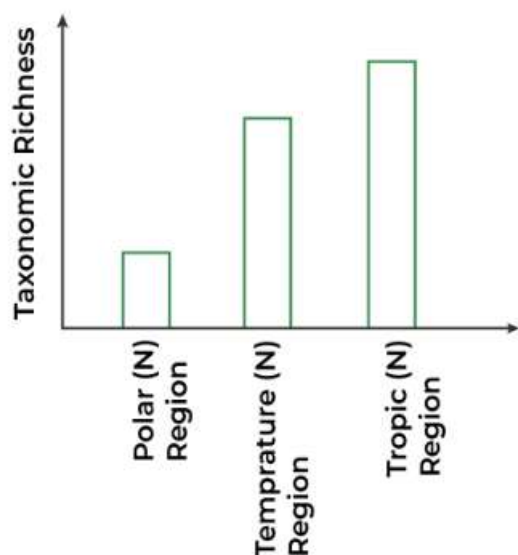
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A. Explain how recombinant DNA technology is used to detect a disease even before any clinical symptom appears.

OR

B. Why does the 'insertional inactivation' method to detect recombinant DNA is preferred to 'antibiotic resistance' procedure?

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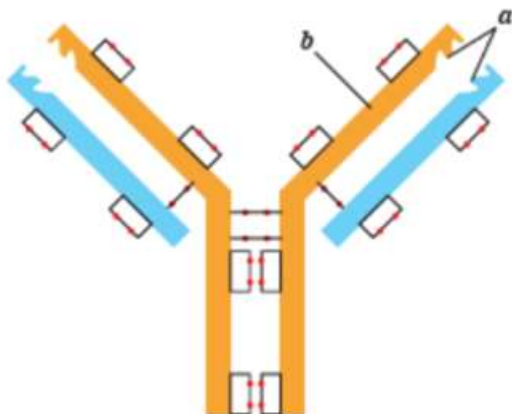


Panama has nearly 560 species of mammals, Canada has nearly 301 species of mammals and Denmark has 67 species of mammals.

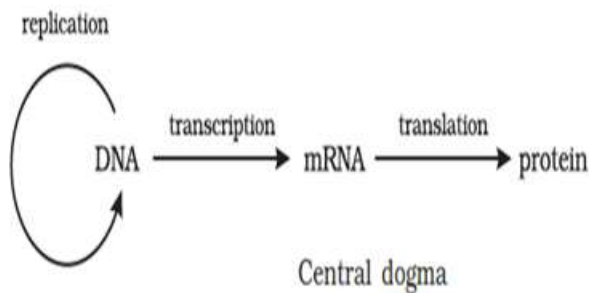
- Based on the species richness, identify the location of these countries in the respective climatic regions given.
- Plants and animals do not have a uniform diversity in the world. Give reason. Write the term given to this pattern of diversity.

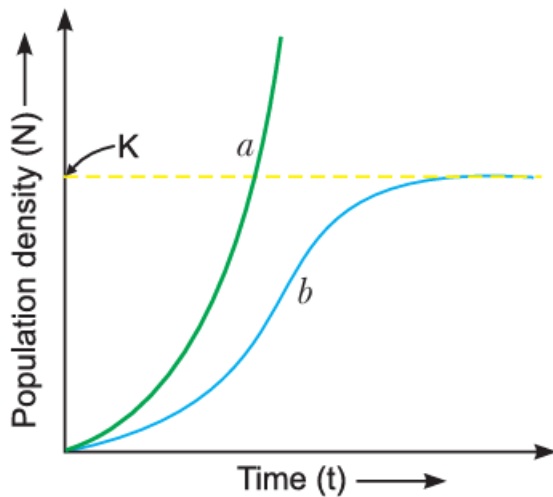
Q.24 Study the figures given below and answer the questions that follow.

3



- Identify (a) and (b) in the diagram of an antibody molecule given below.
- Name the type of cells that produce this molecule.
- Why is an antibody represented as 'H₂L₂'

Q.25	The schematic representation given below shows the concept of Central Dogma.  A. During the process of replication and transcription the pairing of nitrogenous bases is not similar. Explain. B. How is the above process modified in a retrovirus? Name the process. C. Justify why during the process of transcription only a segment of DNA is copied into RNA.	3
Q.26	Describe the roles of heat, primers and the bacterium <i>Thermus aquaticus</i> in the process of PCR.	3
Q.27	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.28	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
	SECTION D (CASE BASED:4 Marks questions) Each question has 3 subparts with internal choice in one subpart.	
Q.29	Study the graph given below and answer the questions which follow:	4



(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)

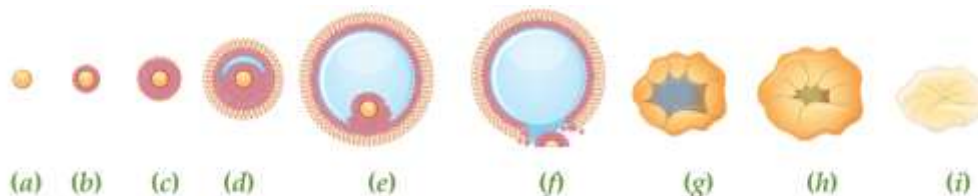
(c) State the basis for the difference in the shape of these curves.

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.

Q.30

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.

Attempt either c) or d)

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'

4

	SECTION E (5 MARKS QUESTIONS)	
Q.31	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
Q.32	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. 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.33	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
		5