

O.P.JINDAL SCHOOL , SAVITRI NAGAR

PRE – BOARD – II (2025-26)

(SET - B)

CLASS: XII
SUBJECT: BIOLOGY (044)

MAX MARKS:70
TIME: 3HRS

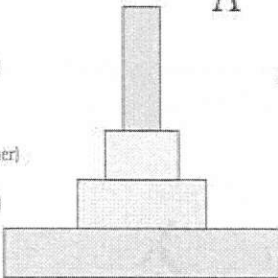
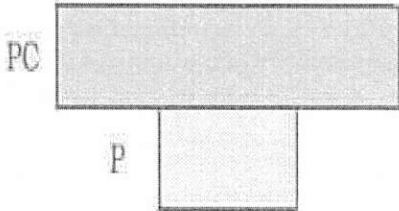
General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (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 4marks 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 labeled diagrams should be drawn.

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SECTION A		M										
1	The coconut water from tender coconut is- a) Cellular endosperm b) Free nuclear endosperm c) Both cellular and free endosperm d) Free nuclear embryo	1										
2	Opioid drugs bind to their specific receptors present in our heart - (a) Heart (b) Central Nervous system (c) Gastrointestinal tract (d) Both (b) & (c)	1										
3	Match column I with column II and select the correct option using the codes given below. <table><tr><th>COLUMN I</th><th>COLUMN II</th></tr><tr><td>A) <i>Aspergillus niger</i></td><td>i) Ripening of Swiss cheese</td></tr><tr><td>B) <i>Saccharomyces cerevisiae</i></td><td>ii) To remove oily stains from laundry</td></tr><tr><td>C) <i>Propionibacterium sharmanii</i></td><td>iii) Commercial production of Citric Acid</td></tr><tr><td>D) <i>Lipases</i></td><td>iv) Commercial production of ethanol</td></tr></table> a) A-(iii) , B-(iv) , C-(ii) , D-(i)	COLUMN I	COLUMN II	A) <i>Aspergillus niger</i>	i) Ripening of Swiss cheese	B) <i>Saccharomyces cerevisiae</i>	ii) To remove oily stains from laundry	C) <i>Propionibacterium sharmanii</i>	iii) Commercial production of Citric Acid	D) <i>Lipases</i>	iv) Commercial production of ethanol	1
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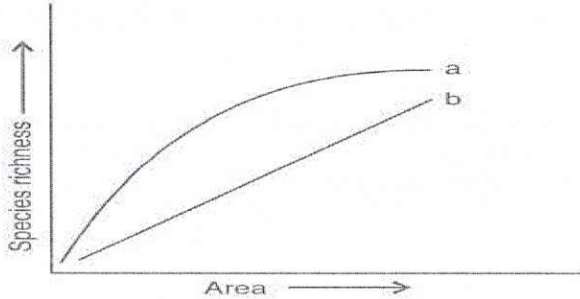
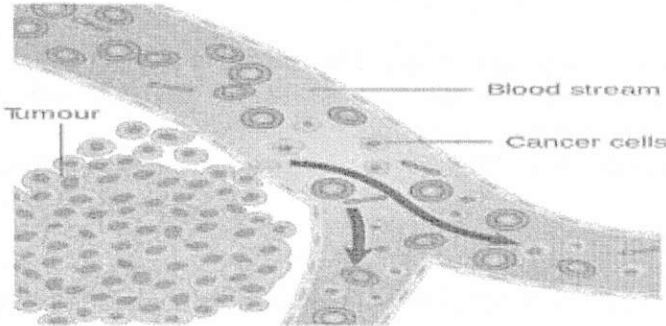
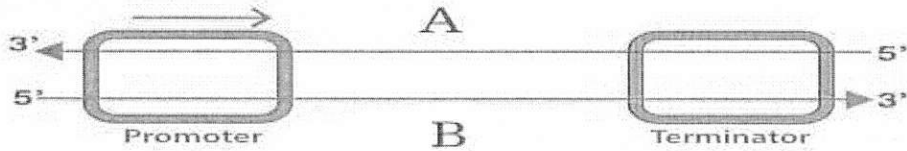
	b) A-(iv) , B-(iii) , C-(ii) , D-(i) c) A-(iii) , B-(iv) , C-(i) , D-(ii) d) A-(iv) , B-(iii) , C-(i) , D-(ii)																					
4.	Which of the following combination is correct? a) Thorn of bougainvillea and tendril of cucurbits - Convergent evolution b) Wings of a bat and Wings of an insect - Divergent evolution c) Sweet potato and Potato - Convergent evolution d) Flippers of Penguin and flippers of dolphin - Divergent evolution	1																				
5	Which option is true for insertional activation process- <table border="1"><thead><tr><th></th><th>Plasmid of E.coli</th><th>Bacterial Culture</th><th>Outcome</th></tr></thead><tbody><tr><td>(a)</td><td>Presence of an insert in plasmid</td><td>Blue coloured colony of E.coli</td><td>Recombinant</td></tr><tr><td>(b)</td><td>Presence of an insert in plasmid</td><td>White coloured colony of E.coli</td><td>Recombinant</td></tr><tr><td>(c)</td><td>Presence of an insert in plasmid</td><td>Blue coloured colony of E.coli</td><td>Non-Recombinant</td></tr><tr><td>(d)</td><td>Absence of an insert in plasmid</td><td>White coloured colony of E.coli</td><td>Non-Recombinant</td></tr></tbody></table>		Plasmid of E.coli	Bacterial Culture	Outcome	(a)	Presence of an insert in plasmid	Blue coloured colony of E.coli	Recombinant	(b)	Presence of an insert in plasmid	White coloured colony of E.coli	Recombinant	(c)	Presence of an insert in plasmid	Blue coloured colony of E.coli	Non-Recombinant	(d)	Absence of an insert in plasmid	White coloured colony of E.coli	Non-Recombinant	1
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6	Identify the amino acid residue pair which constitutes the histone core? (a) Lysine and Arginine (b) Asparagine and Arginine (c) Glutamine and Lysine (d) Asparagine and Glutamine	1																				
7	Which of these is NOT an example of in-situ method of conservation of biodiversity- a) Biosphere reserves b) Zoological parks c) Sacred grooves d) Hotspots																					
8	Match the following and choose the correct options: <table border="1"><tbody><tr><td>A. Trophoblast</td><td>i. Embedding of blastocyst in the endometrium</td></tr><tr><td>B. Cleavage</td><td>ii. Group of cells that would differentiate as embryo</td></tr><tr><td>C. Inner cell mass</td><td>iii. Outer layer of blastocyst attached to the endometrium</td></tr><tr><td>D. Implantation</td><td>iv. Mitotic division of zygote</td></tr></tbody></table> a. A-ii, B-i, C-iii, D-iv b. A-iii, B-iv, C-ii, D-i c. A-iii, B-i, C-ii, D-iv d. A-ii, B-iv, C-iii, D-i	A. Trophoblast	i. Embedding of blastocyst in the endometrium	B. Cleavage	ii. Group of cells that would differentiate as embryo	C. Inner cell mass	iii. Outer layer of blastocyst attached to the endometrium	D. Implantation	iv. Mitotic division of zygote	1												
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9	Identify the equation which describes the Verhulst-Pearl Logistic growth-	1																				

	a) $\frac{dN}{dt} = rN (K-N)$ b) $\frac{dN}{dt} = rN (K-N)/K$ c) $\frac{dN}{dt} = r (K-N)$ d) $\frac{dN}{dt} = N (K-N)/K$																					
10.	Given below are four contraceptive methods and their modes of action. Select the correct match: <table><tr><th>S. No</th><th>Method</th><th>S. No</th><th>Mode of action</th></tr><tr><td>a</td><td>Condom</td><td>(i)</td><td>Ovum not able to reach Fallopian tube</td></tr><tr><td>b</td><td>Vasectomy</td><td>(ii)</td><td>Prevents ovulation</td></tr><tr><td>c</td><td>Pills</td><td>(iii)</td><td>Prevents sperm reaching the cervix</td></tr><tr><td>d</td><td>Tubectomy</td><td>(iv)</td><td>Semen contains no sperms</td></tr></table> (a) a)–(i) b)–(ii) c)– (iii) d)–(iv) (b) a)–(iv) b)–(iii) c)–(ii) d) – (i) (c) a)–(iii) b)–(iv) c)–(ii) d)–(i) (d) a)–(iv) b)–(i) c)– (iii) d)–(ii)	S. No	Method	S. No	Mode of action	a	Condom	(i)	Ovum not able to reach Fallopian tube	b	Vasectomy	(ii)	Prevents ovulation	c	Pills	(iii)	Prevents sperm reaching the cervix	d	Tubectomy	(iv)	Semen contains no sperms	1
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11	Observe the two pyramids (A & B) given below and identify the correct option- Trophic level TC (Tertiary consumer) SC (Secondary consumer) PC (Primary consumer) P (Producer) A  B  <table><tr><th>OPTION</th><th>A</th><th>B</th></tr><tr><td>a</td><td>Pyramid of Biomass in aquatic ecosystem</td><td>Pyramid of number in a tree ecosystem</td></tr><tr><td>b</td><td>Pyramid of number in a tree ecosystem</td><td>Pyramid of Biomass in aquatic ecosystem</td></tr><tr><td>c</td><td>Pyramid of number in a tree ecosystem</td><td>Pyramid of energy in aquatic ecosystem</td></tr><tr><td>d</td><td>Pyramid of Biomass in terrestrial ecosystem</td><td>Pyramid of number in tree ecosystem</td></tr></table>	OPTION	A	B	a	Pyramid of Biomass in aquatic ecosystem	Pyramid of number in a tree ecosystem	b	Pyramid of number in a tree ecosystem	Pyramid of Biomass in aquatic ecosystem	c	Pyramid of number in a tree ecosystem	Pyramid of energy in aquatic ecosystem	d	Pyramid of Biomass in terrestrial ecosystem	Pyramid of number in tree ecosystem	1					
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12.	One petal of Mediterranean orchid <i>Ophrys</i> bears a resemblance to the female bee in size, colour and markings. The male bee ‘pseudo-copulates’ with the flower and accidentally does the pollination. The above interaction is an excellent example of – a) Parasitism b) Competition c) Co-evolution d) Predation	1																				
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.	
13.	Assertion: The yellowish fluid Colostrum secreted by mother during initial days of lactation has abundant antibodies IgA. Reason: Colostrum is an example of Active immunity.	1
14	Assertion: A plant with unknown genotype was found to be heterozygous dominant through test cross. Reason: The Ratio between Dominant and Recessive individuals as a result of test cross came out to be 1:1.	1
15	Assertion- In rural areas of England, where industrialization didn't occur, the count of Melanic moths was high. Reason- Lichens growing on the tree trunks helped the white -winged moths to camouflage.	1
16	Assertion – Bacterial cells are made competent by treating them with specific concentration of divalent cation. Reason – Divalent cation increases the efficiency with which DNA enters the bacterium through the pores in the cell wall.	1
SECTION B		
17.	<u>Attempt either option A or B.</u> A. Study the following sex determination process found in Honeybees and Identify the type of cell division A, B and number of chromosome C found in male drones. <pre> graph TD Parent[Parent] --> Female[Female honey bee 32 chromosomes] Parent --> Male[Male honey bee] Female -- A --> Gametes1[Gametes] Male -- B --> Gametes2[Gametes] Gametes1 -- Fertilisation --> Offspring1[Offspring Male honey bee C chromosomes] Gametes2 -- Fertilisation --> Offspring2[Offspring Female honey bee 32 chromosomes] </pre> b) Male Honey bees (drones) do not have father. Justify OR B. a) Write the Hardy -Weinberg's equation that explains that allele frequencies in a population are stable. b) Name any two factors which cause the disturbance in the Hardy-Weinberg genetic equilibrium in a population.	2
18	<u>Attempt either option A or B.</u> A. Observe the given diagram of the apparatus of gel electrophoresis and answer the	2

	following questions- a) Identify whether the anode end is towards 'A' or 'B' in the given diagram. b) At which end will you find smaller DNA fragments? Give reason. c) How are these DNA fragments visualised? OR B. a) When the Bt-toxin protein does gets converted to its active form? b) How does it eliminate the insect pest of crop plants?	
19	Aman fell in the ground while playing and got severe bruises on his elbow. Blood stopped oozing after a while but there was pain and swelling in the elbow. Answer these questions based on this information- a) Which type of immunity (CMI/Humoral) will develop in his body initially? b) Name the defence cells which generate the initial immune response? c) Which cells of our immune system stimulate the production of antibodies in our blood? d) Is it an Active or a Passive immunity generated in Aman in this situation?	2
20	<u>Attempt either option A or B.</u> A. In the diagram given below, a procedure has been shown to determine the sex of the foetus which has been banned in India. Answer the questions that follows: a) Name the method which has been demonstrated and also name the fluid which is being withdrawn. b) What is the significance of this method? OR B. a) List two reasons that make copper releasing IUDs as effective contraceptives b) Explain how the intake of oral contraceptive pills prevent pregnancy in humans	2
21	A colour-blind man marries a woman with normal vision whose father was colour-blind. Work out a cross to show- a) The genotype of the couple. b) What is the percentage of their sons and daughters respectively, who are colour-blind	2
SECTION C		

22	If the gene of interest is inserted in Pst I site of the plasmid of pBR322 shown below, answer the following questions- <i>E. coli</i> cloning vector pBR322 a) Which selectable marker will help us to identify transformants? b) How can we select the recombinants and eliminate non-recombinants? c) What is the dual role of 'ori' sequence?	3
23	i) How are flocs produced in the secondary treatment of a sewage treatment plant? Explain their role. ii) What is an activated sludge? State its two applications. iii) Name the tank in which the activated sludge is processed.	3
24	a) What is the base of DNA fingerprinting? b) The DNA sequences which are identified with this technique belong to which class of Satellite DNA? c) After separating the DNA fragments by Gel electrophoresis, how the DNA fragments are identified? Write the further steps of the process sequentially	3
25	a) A plant breeder is interested to develop a superior variety of a unisexual plant by the method of artificial hybridization. Suggest two successive steps for the process and explain them. b) Which type of flowers produce assured seed set even in the absence of pollinators? How it could be disadvantageous to the plant?	3
26	a) State Gause's Competitive Exclusion principle. b) Can the species living in a particular geographical area avoid facing the interspecific competition? Explain the mechanism of their co-existence.	3
27	Observe the given diagram of human seminiferous tubule and answer the following questions- a) Identify the label of the cell that undergoes spermiogenesis and name it. b) Which label in the diagram indicates the cell that nourishes the male gametes, name it. c) Name the cells which undergo Meiosis-I and Meiosis-II respectively.	3

28	A graph is given below that explains the relationship between species richness and area as observed by Alexander von Humboldt in South American jungles.  a) State the observation made by Alexander von Humboldt. b) Write the equation for the straight line 'b'. c) When will be the slope of the line 'b' become steeper?	3														
SECTION D (CASE BASED QUES)																
29	Observe the given diagram and answer the following questions-  a) Identify the type of tumour shown in the figure. By which property it spreads to other organs? b) Explain any two methods of cancer detection <u>Attempt either subpart c or d.</u> c) Why α-interferons are given to the patients suffering from cancer? OR d) Mention the genetic cause of transformation of normal cells into neoplastic cells.	4														
30	Observe the Transcription unit and answer the following questions-  (a) Identify 'A' and 'B' in the given transcription unit when we switch the position of Promoter and Terminator. (b) Base sequence of Coding strand of DNA is as follows- <table border="1" data-bbox="247 1747 1192 1821"><tr><td>5'</td><td>A</td><td>T</td><td>G</td><td>A</td><td>C</td><td>G</td><td>G</td><td>A</td><td>A</td><td>C</td><td>T</td><td>C</td><td>3'</td></tr></table> Predict the base sequence of the m-RNA strand.	5'	A	T	G	A	C	G	G	A	A	C	T	C	3'	4
5'	A	T	G	A	C	G	G	A	A	C	T	C	3'			

Attempt either subpart c or d

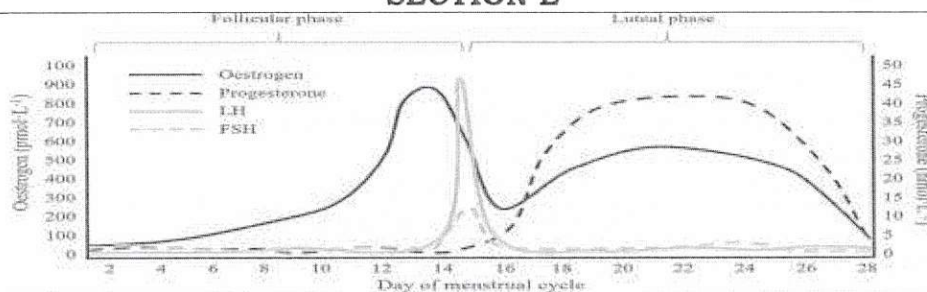
(c) State TWO differences between the structural gene of Prokaryotes and Eukaryotes respectively.

OR

(d) The transcription process in Eukaryotes has some additional complexities in comparison to the prokaryotes. Briefly explain any two complexities

SECTION E

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5

- On which day of the cycle does ovulation occur? Which hormone induces it?
- If the ovum fails to fertilize in oviduct, what are the changes that occur in the uterus? How does it affect the levels of progesterone and estrogen hormones?
- How does corpus luteum develop in the ovary? What is the function of corpus luteum?

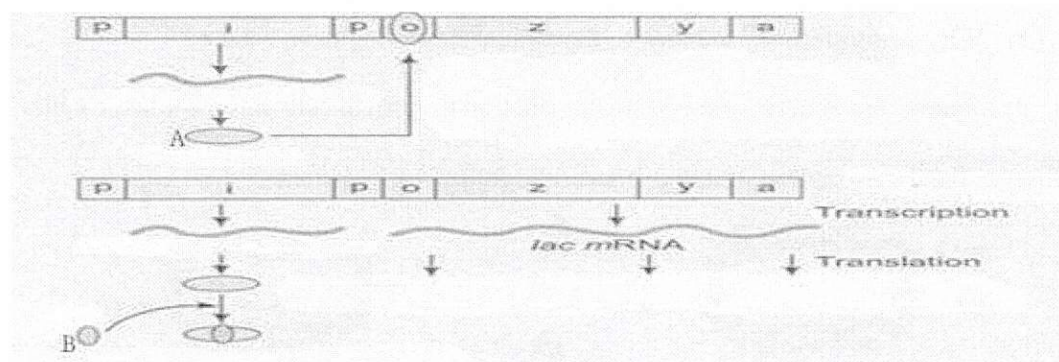
OR

- Explain the process of monosporic development of Embryo sac in angiosperms with the help of labelled diagrams.
- Draw well labelled diagram of three celled stage of pollen grain and label its parts.

32

Study the figure given below and answer the questions:

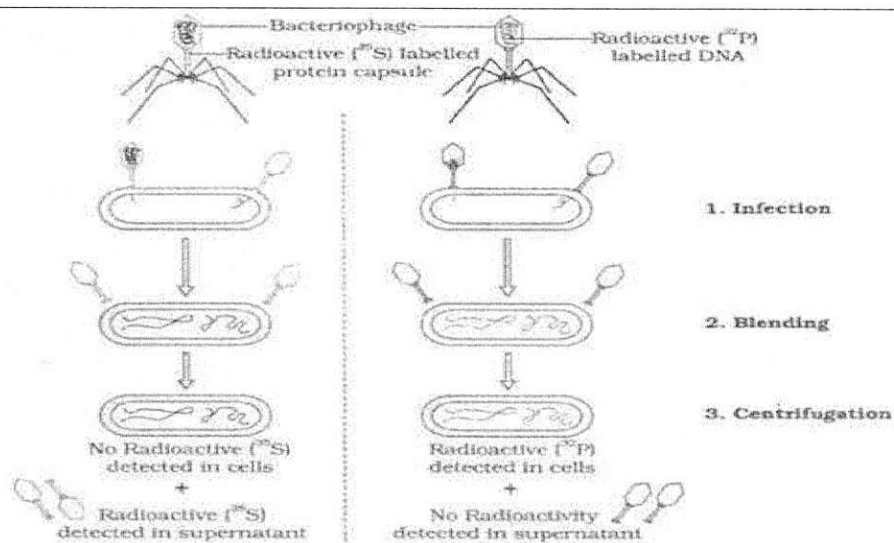
5



- Identify 'A' and 'B' in the above diagram.
- Which molecule acts as an inducer in this operon?
- How does the transcription of structural genes start?
- Name the enzyme transcribed by the gene 'Y' and its function.
- Why a low level of expression of Lac Operon has to be present all the time in a cell?

OR

Observe the given diagram and answer the following questions-



- Which were the two biomolecules tested in this experiment?
- Bacteriophages were cultured in radioactive sulphur and phosphorus medium why?
- State the importance of the action of Blending and Centrifugation in this process respectively.
- What was the conclusion of this experiment?

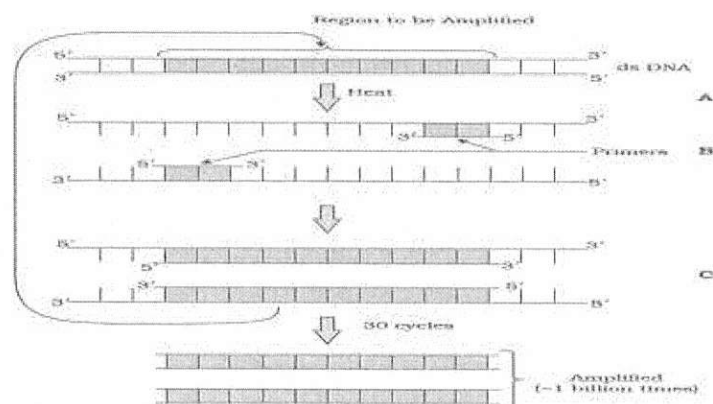
33

- How does RNA interference help in developing resistance in tobacco plant against nematode infection?
- Explain the steps involved in synthesis of human insulin by Eli Lilly Company. Mention one difference between this insulin and the one produced by the human pancreas.

5

OR

Observe the given diagram of Polymerase Chain reaction and answer the following questions-



- How the process will be affected if Step A is missed?
- Identify Step 'B' and 'C'
- Which enzyme is required in Step C? Why is the source of that enzyme?
- What is the specific property of that enzyme?

