KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION

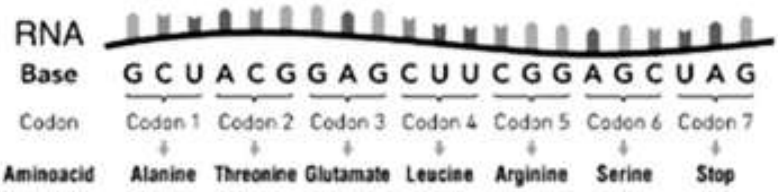
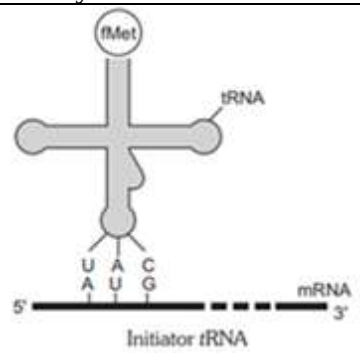
CLASS XII PRE-BOARD I EXAMINATION 2025-26

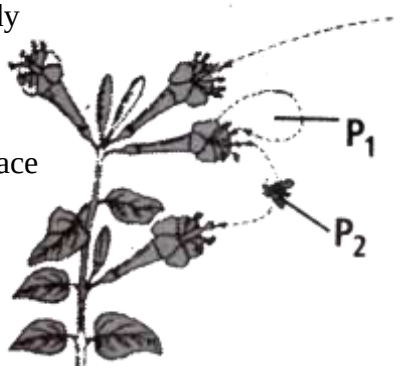
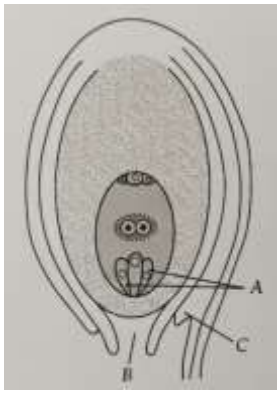
MAX MARKS -70 **BIOLOGY THEORY (044)** **TIME – 3 HOURS**

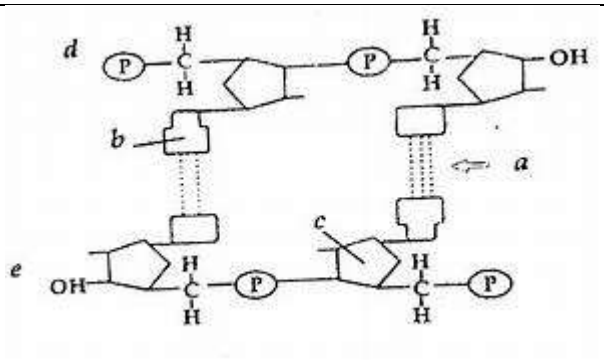
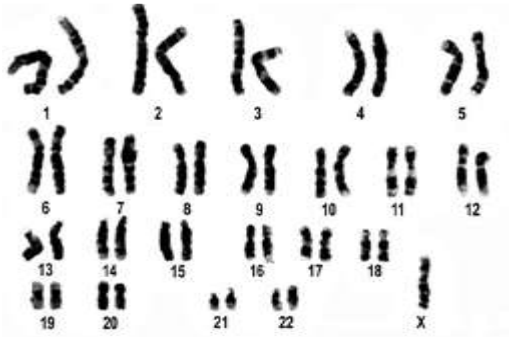
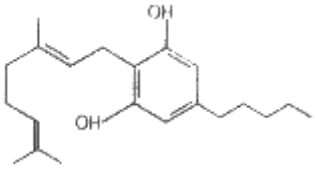
GENERAL INSTRUCTIONS

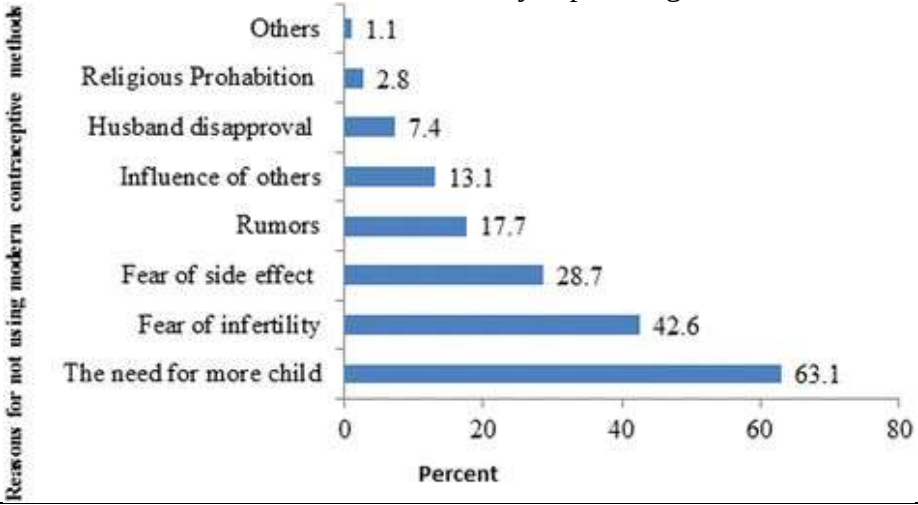
- **All questions are compulsory.**
- **The question paper has five sections and 33 questions.**
- **Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.**
- **There is no overall choice. Answer all 33 questions. 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	
Q NO.	**QUESTION**	**Marks**
1.	Which of the following represent the male gametophyte in flowering plants? A. stamen B. anther C. pollen sac D. pollen grain	1
2.	In which of the following plants are both male and female flowers borne on the same plant? A. Papaya B. Maize C. Date palm D. Both a & b	1
3.	Some important events in the human female reproductive cycle are given below. Arrange the events in a proper sequence. a) Secretion of FSH b) Growth of corpus luteum c) Growth of the follicle and oogenesis d) Ovulation e) Sudden increase in the levels of LH Choose the correct answer A. a → d→ c → e→ b B. b → a → c→ 4 → e C. c → a → d→ b→ e D. a → c → e → d→ b	1
4.	In an experiment, E. coli is grown in a medium containing $^{14}NH_4Cl$. (^{14}N is the light isotope of Nitrogen) followed by growing it for six generations in a medium having heavy isotope of nitrogen (^{15}N). After six generations, their DNA was extracted and subjected to CsCl density gradient centrifugation. Identify the correct density (Light/Hybrid/Heavy) and ratio of the bands of DNA in CsCl density gradient centrifugation. A. Hybrid : Heavy, 1 : 16 B. Light : Heavy, 1 : 31 C. Hybrid : Heavy, 1 : 31 D. Light : Heavy, 1 : 05	1
5.	Splicing means A. Removal of exons in DNA and occur in prokaryotes B. Removal of introns in DNA and occur in prokaryotes C. Removal of exons in RNA and occur in eukaryotes D. Removal of introns in RNA and occur in eukaryotes	1

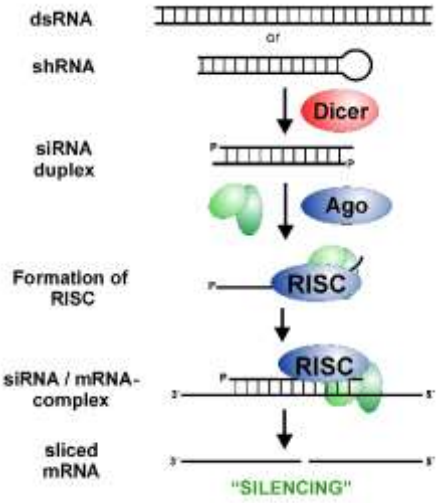
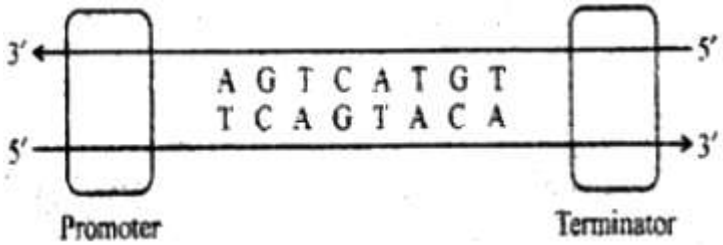
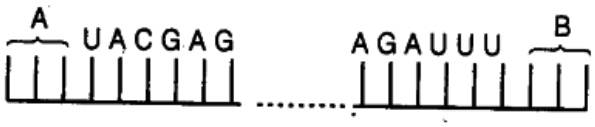
6.	A team of archaeologists found a fossilized skeleton of a human-like creature with a brain capacity of more than 700cc. The structure and its associated findings also show evidence that this creature could use tools for hunting. Which stage of human evolution is this creature NOT from? A. Homo erectus B. Homo habilis C. Neanderthal Man D. Australopithecines	1
7.	A Snapdragon plant bearing pink colour flowers is crossed with a Snapdragon plant bearing white colour flowers. Their F1 progeny will show : A. 25% Red : 50% Pink : 25% White B. 50% Red : 50% White C. 50% Pink : 50% White D. 25% Pink : 50% Red : 25% White	1
8.	Consider the following genetic code:  Which among the following would cause a frameshift mutation? A. substitution of A by C in codon 2 B. insertion of G after C in codon 4 C. insertion of GCU after C in codon 6 D. deletion of codon 3, GAG	1
9.	In which of the following diseases is/are the parasites NOT transmitted to a healthy individual through the bite of a female mosquito? P) malaria Q) ascariasis R) filariasis S) dengue A. only Q B. only P and S C. only Q and R D. only R	1
10.	 The anticodon and the codon in the given figure are- A. UAC & ATG B. UAC & AUG C. ATG & UAC D. AUG & UAC	1
11.	Restriction enzymes cut the strand of DNA – I. a little away from the centre of palindrome sites II. closer to the centre of palindrome sites III. at same sites on the opposite strands IV. at different sites on the opposite strands V. and leave single stranded portions at the ends VI. and do not leave the single stranded portions at the ends A. I, III and VI B. I, III and V C. I, IV and VI D. II, IV and V	1

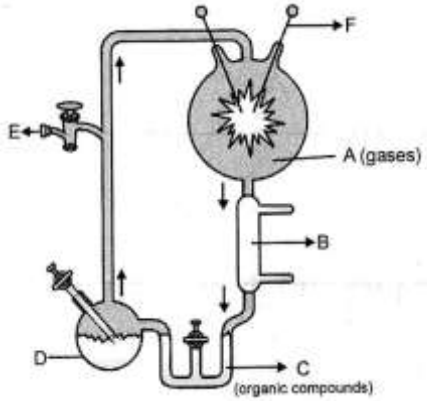
12.	The bioactive molecules used as an immuno- suppressive agent during organ transplant is A. Tetracycline B. Cyclosporin A C. Statin D. Streptomycin	1
	Directions: In the following questions,(13-16) a statement of assertion is followed by a statement of reason. Mark the correct choice as: A. If both Assertion and Reason are true and Reason is the correct explanation of Assertion. B. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion. C. If Assertion is true but Reason is false. D. If Assertion is false and Reason true.	
13.	Assertion (A): Occurrence of more than one embryo in a seed is called polyembryony. Reason (R): Cells of stamen and stigma develop into embryo by fertilisation.	1
14.	Assertion: Hugo de Vries said mutations cause speciation. Reason: Mutations are slow changes.	1
15.	Assertion - Heroin is also called smack. Reason - Heroin is a coca alkaloid.	1
16.	Assertion (A): Insertion of recombinant DNA within the coding sequence of beta-galactosidase results in colourless colonies. Reason (R): Presence of insert results in inactivation of enzyme beta -galactosidase known as insertional inactivation	1
	SECTION B	
17.	***Attempt A or B*** **A.** The following question is based on pollination. Study the figures carefully and answer the questions that follow.  (a) Give the scientific terms for the processes taking place in P1 & P2 respectively (b) State one advantage and one disadvantage of the process occurring in P1 **OR**  **B.** The figure given above shows the L.S of an anatropous ovule. (a) Label the parts A, B and C(any two) (b) Write the function/role played by the label A in the process of fertilisation.	2 2
18.	***Attempt A or B*** **A.** Study the given portion of double stranded polynucleotide chain carefully. Identify a, b, c and d terminal.	2

	 **OR** **B.** Given below is the karyotype of an individual.  a) Name this disorder. Specify the sexual category of the individual. b) What kind of disorder is this and how does this occur?	
19.	The outline structure of a drug is given below: a) Which group of drugs does this represent? b) What are the modes of consumption of these drugs? c) Name the part of the body which is affected by consumption of these drugs? d) From which plant is it obtained?  	2
20.	***Attempt A or B*** **A.** i) A bacterium was used in the first instance of the construction of an artificial recombinant DNA molecule. Name the scientists who accomplished this. ii) What is BAC? Give its use. **OR** **B.** State what happens when an alien gene is ligated at Pvu I site of pBR322 plasmid.	2
21.	Fish farming involves the commercial breeding of fish either in fish tanks or in artificial enclosures such as fish ponds. Is a fish farm an example of an ecosystem? Justify your answer. Identify any two abiotic factors of this ecosystem.	2
	SECTION C	
22.	Consider the following three possible diagnoses for infertility and answer the trailing questions. (i) Inability to produce a normal egg. (ii) Low Count of Sperm. (iii) Blocked Fallopian tube Suggest and explain different methods of ART based on clinical examination for the above cases.	3
23.	In some varieties of Citrus and Mango, seeds are produced without fertilization. (a) What is this phenomenon called as? Name the seeds developed by this process. (b) Mention any two benefits of the plants developed by this method. (c) How does it differ from parthenocarpy?	3

24.	In maize, the trait for the purple kernel (P) is dominant over the yellow kernel (p). A plant with purple kernels is crossed with another plant with yellow kernels and produces 2 offspring with purple kernels and 2 offspring with yellow kernels. (a) What is the genotype of the parental maize plants? (b) Draw a Punnett square to depict the cross between the two offspring with purple Kernels, that is produced in the above cross. (c) Identify the genotypic and phenotypic ratios obtained from the cross in (b).	3
25.	(a) State any two phenomena in which the Hardy-Weinberg principle may not hold true. (b) A population of 100 individuals has a frequency of allele A of 0.3 and a frequency of allele a of 0.7. The frequency of the heterozygous genotype (Aa) is 0.49. Is this population in Hardy-Weinberg equilibrium? Justify.	3
26.	State whether each of these statements given below is/are true or false. Justify your answer. (a) Flocs reduce the pollution in water by increasing its BOD. (b) Mycorrhiza is a type of parasitic relationship in which only the plants benefit from fungi (c) Dragon flies are useful to get rid of aphids.	3
27.	X is the first restriction enzyme isolated from strain H of *Bacillus amyloliquefaciens*. This enzyme cuts between two guanine bases of the following palindromic sequence: 5'-G G A T C C-3' 3'-C C T A G G-5' (a) Name the restriction enzyme X. Explain how you arrived at this name. (b) Draw the DNA fragments produced due to the action of enzyme X on the palindromic sequence shown above.	3
28.	The following table contains values of the population of seals inhabiting Alaska. Year Number of seals 1975 1500 1980 3000 1985 5500 1990 7400 1995 7200 2000 7100 2005 7050 2010 7100 (a) Based on the values in the table above, construct a population growth curve. (b) Name and describe the type of growth as seen in the curve plotted.	3
	SECTION D	
29.	The bar graph shows a significant number of married women globally, not using contraception, with high rates in some regions like India, where around 31 million have an unmet need for family planning due to various reasons.  	4

	A. On the basis of the above histogram, what will be the impact of this scenario on the population of a country? B. What can be the ideal contraceptive method for them? Support your answer by giving a suitable reason. C. Why is birth control so important? **Or** C. Give the example of following (i) Non-medicated IUDs (ii) Barrier method	
30.	In the late 18th century, smallpox was a widely spreading disease causing the death of several affected individuals in Britain. Edward Jenner, who pioneered the concept of vaccination, inoculated matter from the cowpox lesions of a dairymaid into an 8-year-old boy. Post-inoculation, the boy developed a mild fever, loss of appetite and discomfort but was better after a few days. Next, he was inoculated with matter from a smallpox lesion and he did not develop any disease. A. What form of immunity, now known, did Edward Jenner provide the boy with? Give a reason to support your answer. B. Describe the form/s of immunity that is provided when an individual is vaccinated/immunised? Use an appropriate example/s to justify your answer. **OR** B. Name the type of immunity in each scenario given below and justify your answer. (i) A foetus receives antibodies from its mother through the placenta. (ii) A person receives a blood transfusion from a donor who has been vaccinated against a disease.	4
	SECTION E	
31.	***Attempt A or B*** **(A)** (i) How does alien species invasion cause a decline in biodiversity? Explain. How have the following contributed to biodiversity loss? I. Nile Perch II. Lantana and Eichhornia III. Clarias gariepinus (ii) Why have certain regions been declared as biodiversity hotspots by environmentalists of the world? Name any two such regions in India. **OR** **(B)** i) Biomass of a standing crop of phytoplankton is 4kg / m^2 which supports a large standing crop of zooplankton having a biomass 11 kg/m^2. This is consumed by small fishes having biomass 25kg/m^2 which are then consumed by large fishes with the biomass 37 kg/m^2. Draw an ecological pyramid indicating the biomass at each stage and also name the trophic levels. Mention whether it is an upright or inverted pyramid. ii) Use the information provided in the table given below to answer the following questions: Trophic level Net Production (kJm^2y^{-1}) Respiration (kJm^2y^{-1}) Top Carnivore 50 35 Carnivore 420 378 Herbivore 4490 4041 Producers 45000 40,367 (a) Calculate the gross primary productivity. (b) Analyze the trend in the Net Production from Producers to Top carnivore. Give a reason for your observation.	5

32.	***Attempt A or B*** **A)** Bt cotton- the genetically modified crop has greatly helped the cotton farmers to increase their crop yield. i)What is Bt? ii) How was Bt cotton plant made resistant to bollworms? Name the genes involved iii)Describe the mechanism that leads to the death of bollworms feeding on Bt cotton plants. **OR** **B)** Given below is a schematic diagram of a defence mechanism occurring in all eukaryotes  (a) Name and explain the defence mechanism used. (b) In which plant it has been done? (c) Name the pathogen. (d) Name the vector used in this technique.	5
33.	***Attempt A or B*** **A. a**) A transcriptional unit is given below. Write the sequence of RNA formed from this unit? Name the two strands with directions.  b) Study the mRNA segment given below, which is complete and to be translated into a polypeptide chain and answer the following questions:  (i) Write codons 'A' and 'B'. (ii) What do they code for? (iii) Sequences before A and after B are needed for efficient translation. What are they called? **OR** **B**. The origin of life is considered a unique event in the history of universe. A diagrammatic representation of the experimental set up by two scientists is shown below, answer the question that follow:	5



A) Name the organic compounds observed in the sample collected at 'c' in the figure.
B) Electric discharge was created in the closed chamber containing the gases.
What was the temperature maintained in the chamber?
C) Name the gases enclosed in the chamber.
D) The experimental set up was based on a hypothesis postulated by two scientists. What was the hypothesis and who were those scientists? Also name the scientists who performed this experiment.