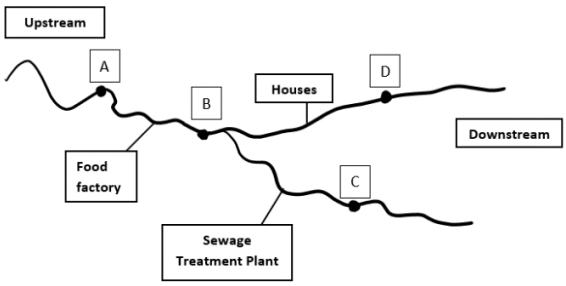
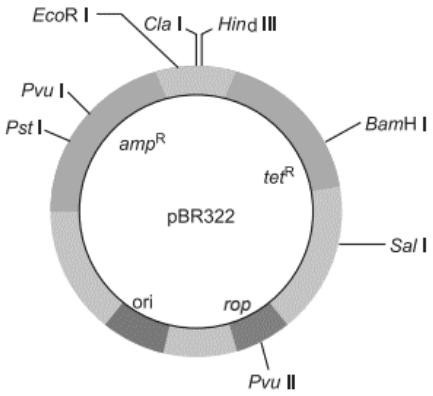
THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

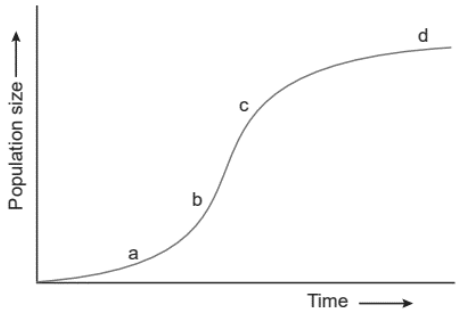
Date:16/12/2022 **Model Examination - 1 (2022-23)** **Max marks: 70**
GRADE: XII **BIOLOGY (044)** **Time: 3Hour**

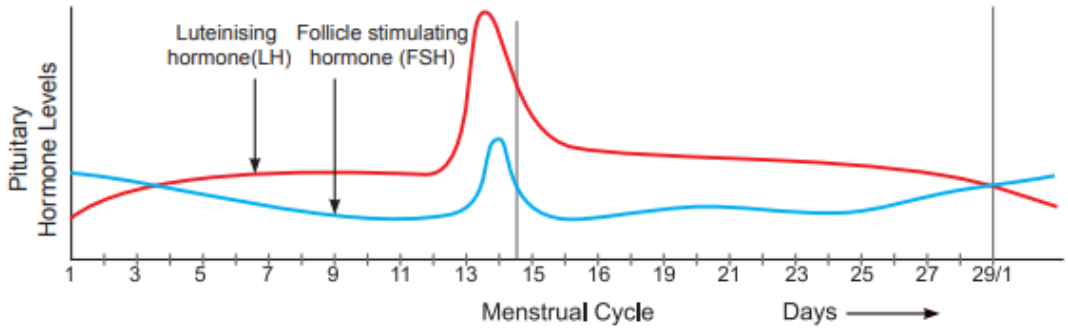
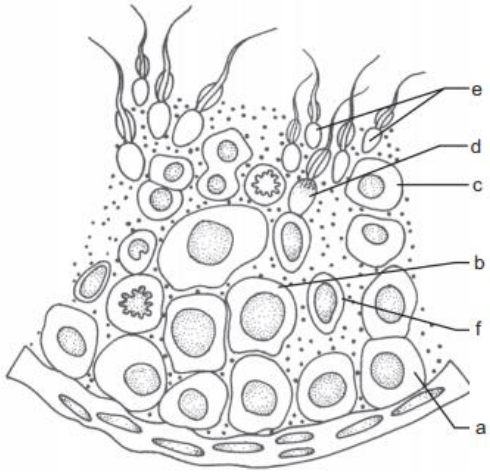
General Instructions:
(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions. All questions are compulsory.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based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

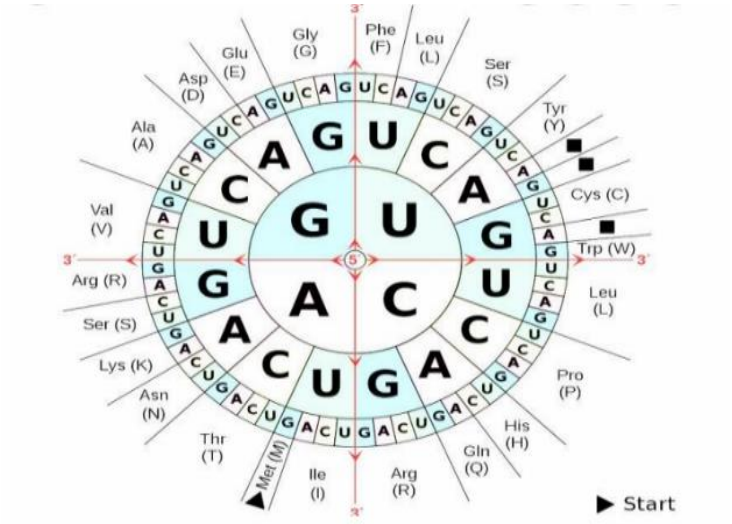
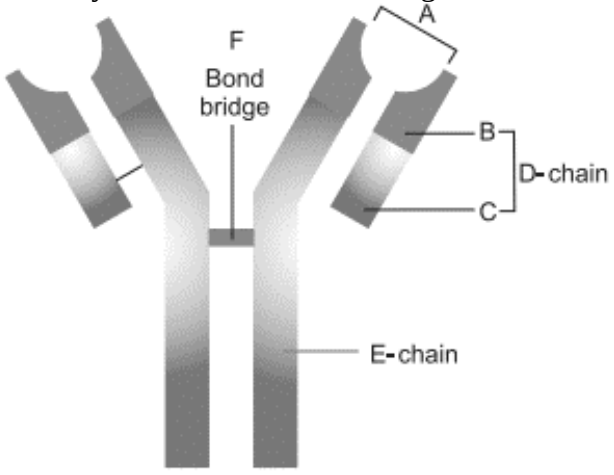
	SECTION A	
Q. No:	**Questions**	**Mark**
1	The technique called gamete intra fallopian transfer (GIFT) is recommended for those females A) who cannot produce and ovum B) who cannot retain the foetus inside the uterus C) whose cervical canal is too narrow to allow passage for the sperm D) who cannot provide suitable condition for fertilization	1
2	Match the items of column I with suitable items of column II. Column I — Column II A. Barrier method — (i) Condoms B. IUD — (ii) Tubectomy C. Surgical technique — (iii) Multiload 375 D. Hormone administration — (iv) Implants Choose the correct option. A) A-(i), B-(ii), C-(iv), D-(iii) B) A-(i), B-(iii), C-(ii), D-(iv) C) A-(i), B-(iv), C-(ii), D-(iii) D) None of these	1
3	The net electric charge on DNA and histone is: A) both positive B) both negative C) negative and postive respectively D) zero	1
4	When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed as A) microevolution B) co-evolution C) convergent evolution D) divergent evolution.	1

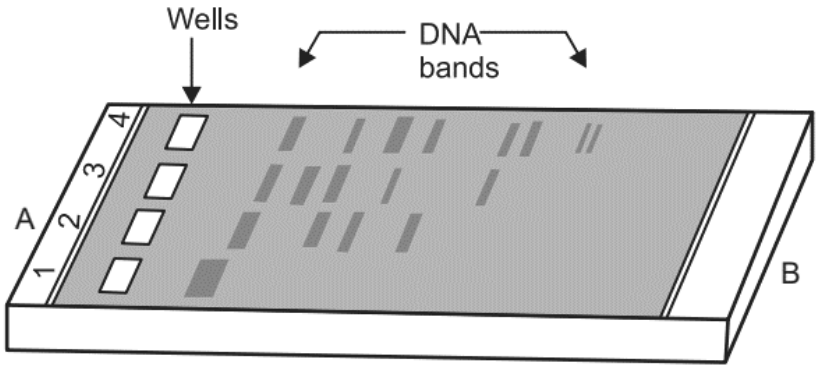
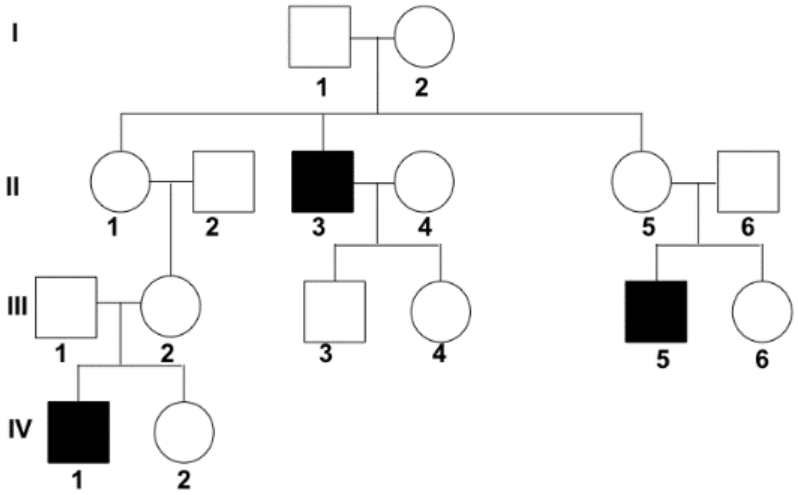
5	Antivenom injections contain preformed antibodies, while polio drops that are administered into the body contains: A) globin antigen B) attenuated pathogen C) activated pathogen D) harvested antibodies	1
6	Viral infections spread very fast. The substance produced by a cell in viral infection that can protect other cells from further infection is A) serotonin B) colostrum C) interferon D) histamine	1
7	 Which of the following points in the data given above, will have a higher concentration of organic matter? A) A B) B C) C D) D	1
8	 A foreign gene is inserted to pBR322 vector using EcoRI restriction enzyme. The transformants were then grown in a medium containing antibiotics tetracycline and ampicillin. Choose the correct observation for the growth of bacterial colonies from the given table	1

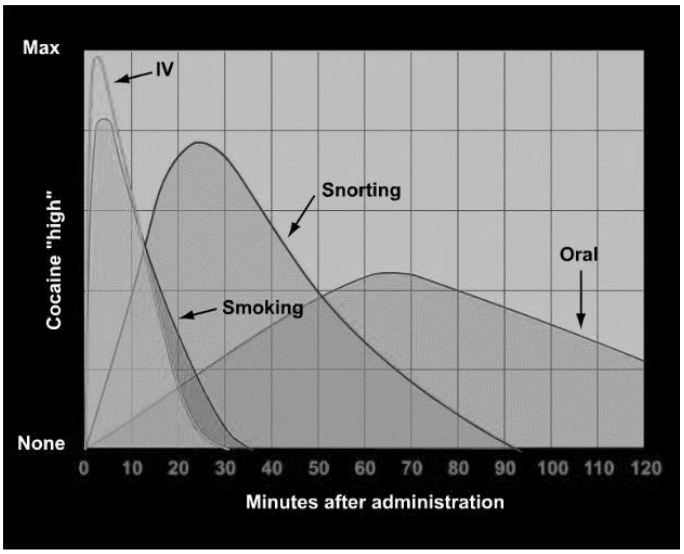
	Medium with Tetracycline	**Medium with Ampicillin**
A)	Growth	No growth
B)	No growth	Growth
C)	No growth	No Growth
D)	Growth	Growth

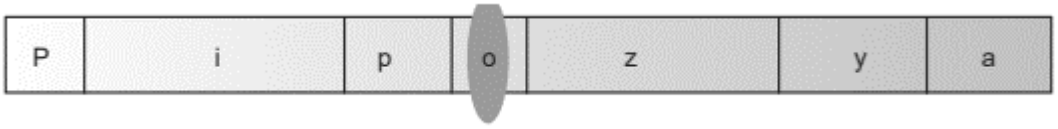
9	At which point in the graph shown below would there be zero population growth (DN/Dt = 0)?  A) a B) b C) c D) d	1
10	Cuscuta is an example of A) ectoparasites B) brood parasitism C) predation D) endoparasites	1
11	How much of the net primary productivity of a terrestrial ecosystem is eaten and digested by herbivores? A) 1% B) 10% C) 40% D) 90%	1
12	What is common to (i) national parks, (ii) Sacred grooves and (iii) wild life sanctuaries A) All are in situ conservation methods. B) All are ex situ conservation methods. C) All require ultra-modern equipment for its maintenance. D) All are methods of conservation of extinct organisms.	1
Question number 13 to 16 consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses. A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion. B) If both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion. C) If Assertion is true but the Reason is false. D) If both Assertion and Reason are false		
13	**Assertion:** In apomixis, plants of new genetic variations are not produced. **Reason:** In Apomixis, reductional division takes place.	1
14	**Assertion:** In four o'clock plant or Snap dragon plant, a cross between homozygous white flowered individual and a homozygous red flowered one, produces pink flowered plants. **Reason:** In these plants, the flower colour is determined by three alleles.	1
15	**Assertion:** The first gene therapy was given for ADA deficiency. **Reason:** The normal gene for ADA was delivered to patient's cells using retroviral vector.	1
16	**Assertion:** Population pyramid (graphically) depicts the rate at which population will grow in future. **Reason:** A triangular population pyramid depicts population size is stable.	1

	SECTION - B	
17	Study the graph given below and answer the questions that follow:  i. What is the importance of LH surge? ii. Identify the ovarian phases during the menstrual cycle. (a) 5th day to 12th day of the cycle. (b) 14th day of the cycle.	2
18	With the help of a Punnett square, find the percentage of heterozygous individuals in a F2 population in a cross involving a true breeding pea plant with green pods and a true breeding pea plant with yellow pods respectively.	2
19	A young boy when smelled a flower started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the flower. (i) Name the type of antibody and the chemicals responsible for such a response in the boy. (ii) Mention the name of any one drug that could be given to the boy for immediate relief from such a response.	2
20	(A) Mention the difference in the mode of action of exonuclease and endonuclease. (B) How does restriction endonuclease function?	2
21	Construct a pyramid of biomass starting with phytoplankton. Label three trophic levels. Is the pyramid upright or inverted? Why? OR "Pyramid of energy is always upright." Explain.	2
	SECTION - C	
22	 (i)Name 'a' and 'b' cells. What is the difference between them with reference to the number of chromosomes? (ii) Pick out and name the motile cells. (iii) What is 'f' cell? Mention its function.	3

23	(i) Write the characteristic features of anther, pollen and stigma of insect-pollinated flowers. (ii) How do flowers reward their insect pollinators? Explain.	3
24	 i)Keeping the above diagram as the reference, find out the amino acid sequence that can be assembled from the given mRNA strand. 5' AUG UCU CUG GCU UAC CGG UAA 3' ii) Which codon can be substituted with CUU to show the degenerative property in the mRNA sequence 5' AUG UCU CUG GCU UAC CGG UAA 3' ? iii) How are translational unit and untranslated regions in mRNA different from each other?	3
25	What is disturbance in Hardy-Weinberg genetic equilibrium indicative of? Explain how it is caused.	3
26	i. Identify A, D, E and F in the diagram of an antibody molecule given below:  ii. Explain the relationship between B-lymphocytes and T-lymphocytes in developing an immune response. OR i. Write the scientific names of the two species of filarial worms causing filariasis. ii. How do they affect the body of infected person(s)? iii. How does the disease spread?	3

27	Sanjay is performing gel electrophoresis in a laboratory to purify DNA fragments. He has loaded the samples near end A, in the wells. The DNA fragments separate according to their size through sieving effect provided by the agarose gel. Given below is the sketch of the observations of the experiment performed by him. Rajesh was doing gel electrophoresis to purify DNA fragments. Given below is the sketch of the observations of the experiment performed by him.  i. At which end he would have connected the positive end / anode and negative end / cathode? ii. Analyse the reason for different positions taken up by the DNA bands. iii. Write any one way, the products obtained through this technique can be utilized.	3
28	Why should biodiversity be conserved? List any two ethical arguments in its support.	3
	SECTION - D	
Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.		
29	 Study the Pedigree chart given below and answer the questions that follow: i. What pattern of inheritance is shown in the pedigree? ii. From this pedigree chart, what can you conclude about generation I parents? iii. What is the genotype of individual II-5, II-6, III-2 and IV-1? OR iii. Why IV-I is affected even though its parents and grandparents are not having the disease?	4

30	The data given below shows the relationship between the mode of cocaine intake and the intensity and duration of its euphoric effects.  i. With reference to the above data which mode of intake takes nearly one hour for its euphoric effect? ii. What is the mode of action of cocaine in a human body? iii. What are the sources of cocaine? iv. List down the effects of it in human body. OR iv. If a regular dose of drugs or alcohol is not provided to an addicted person, he shows some withdrawal symptoms. List any four such withdrawal symptoms.	4
	SECTION - E	
31	Explain the process of fertilisation in human female, and trace the post-fertilisation events in a sequential order up to implantation of the embryo. OR i. Why is the process of fertilisation in angiosperms termed as double fertilisation? Explain. ii. Draw a diagram of an angiosperm embryo sac where fertilisation is just completed. Label the following parts: a. Micropylar end of the embryo sac. b. The part that develops into an embryo. c. The part that develops into an endosperm. d. The degenerating cells at the chalazal end.	5
32	What are the two additional complexities for coupling transcription and translation in eukaryotes? OR Observe the representation of genes involved in the lac operon given below:	5



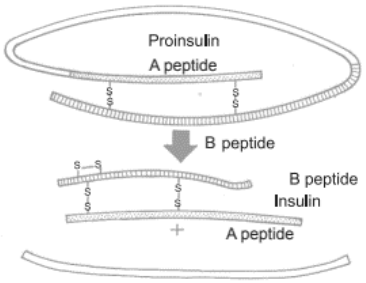
i. Identify the region where the repressor protein will attach normally.
ii. Under certain conditions repressor is unable to attach at this site. Explain.
iii. If repressor fails to attach to the said site what products will be formed by z, y and a?
iv. Analyse why this kind of regulation is called negative regulation.

33 The best method of sustaining the environment is to return back all the wastes in a recyclable way so that the waste becomes useful. Micro-organisms have expanded the environment where they live in, by evolving enzymes that allow them to metabolize various man-made chemicals. A micro-organism *Micrococcus luteus* and Azotobacter sp. have been modified by inserting a gene and genetically modified microbes have shown to immobilize large quantities of lead from sites containing high concentrations of lead salts, without a detectable effect on viability. 5

i. For amplification of the gene of interest PCR was carried out. The PCR was run with denaturation and elongation. How will this impact the efficiency of the PCR?
ii. Why Indian Govt has set up organisations such as GEAC (Genetic Engineering Approval Committee)?
iii. Genetically modified microbes are created through the process of rDNA technology. Enumerate the steps of rDNA technology used here.

OR

Replacement insulin therapy should mimic the body's own insulin response as closely as possible. Great strides have been made in achieving this goal through innovation and the use of biotechnology, including recombinant DNA technology, protein engineering, formulation strategies, and advances in manufacturing. Production of insulin by rDNA techniques was achieved by an American company, Eli Lilly, in 1983.



(i) How are two short polypeptide chains of insulin linked together?
(ii) State the role of C-peptide in human insulin.
(iii) Mention the chemical change that proinsulin undergoes, to be able to act as mature insulin.

THE END