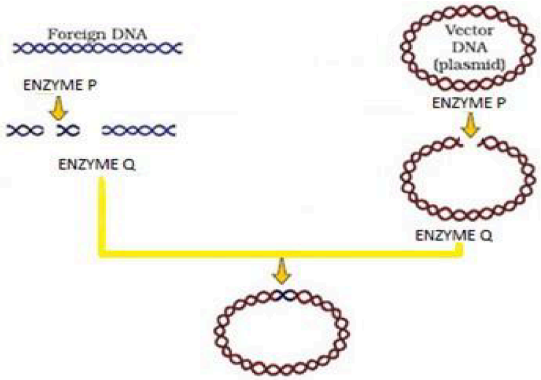
KENDRIYA VIDYALAYA SANGATHAN (LUCKNOW REGION)
PRE BOARD EXAM- I (2022-23)
Class XII - Biology (044) SET-1

Time: 3 Hours **M.M.:70**

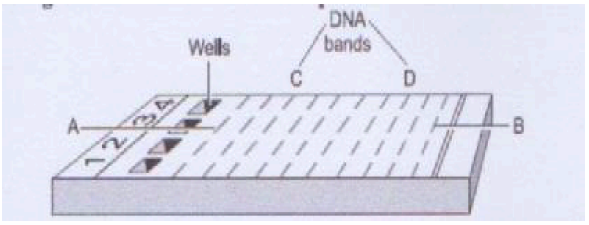
GENERAL INSTRUCTIONS –

(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
(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.

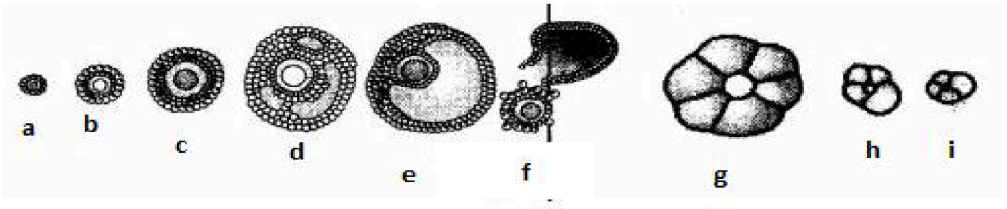
Q..	**SECTION - A**	Mrk
1	A procedure that finds use in testing for genetic disorders, but is also misused and become a causative factor for female foeticide is: a) Lactational amenorrhea b) Amniocentesis c) Artificial insemination d) Parturition	1
2	Which enzymes will be produced in an *E. coli* cell in which there is a nonsense mutation in the lac Y gene? a) lac permease b) Transacetylase c) lac permease and transacetylase d) β-galactosidase	1
3	A cross between two tall garden pea plants produced all tall plants.The possible genotypes of parents are I) TT, TT II) TT, Tt III) Tt, tt IV) Tt, Tt The correct answer is a) III, IV b) I, IV c) I, II d) II, III	1
4	What is not true about the oral contraceptive pill 'Saheli'? a) developed by CDRI, Lucknow b) once a week pill c) contains a steroidal preparation d) high contraceptive value	1

	5	Name the enzymes 'P' and 'Q' that are involved in the processes given below.  a) Enzyme 'P'- Exonuclease and Enzyme 'Q'- Permease b) Enzyme 'P'- Exonuclease and Enzyme 'Q'- Ligase c) Enzyme 'P'- Endonuclease and Enzyme 'Q'- Permease d) Enzyme 'P'- Restriction endonuclease and Enzyme 'Q'-Ligase	1
	6	Which one the following is not found in a female gametophyte of an angiosperm? a) Germ pore b) Synergids c) Filiform apparatus d)Antipodals	1
	7	Match the following list of microbes and their importance: (A) *Saccharomyces cerevisiae* — (i) Production of immune suppressive agents (B) *Monascus purpureus* — (ii) Large holes in Swiss Cheese (C) *Trichoderma polysporum* — (iii) Commercial production of ethanol	1

		(D) *Propionibacterium sharmanii* | (iv) Production of blood cholesterol lowering agents a) (A) - (iii), (B) - (i), (C) - (iv), (D) - (ii) b) (A) - (iii), (B) - (iv), (C) - (i), (D) - (ii) c) (A) - (iv), (B) - (ii), (C) - (i), (D) - (iii) d) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)	
	8	Viviparity is considered to be more evolved because: a) the embryo takes a long time to develop b) the young ones are protected by a thick shell c) the young ones are protected inside the mother's body and are looked after they are born leading to more chances of survival d) the young ones are left on their own	1
	9	A man of A-blood group marries women of AB blood group. Which type of progeny would indicate that man is heterozygous A? a) AB b) A c) O d) B	1
	10	Match the following: A) Natural active immunity | I) Develops due to vaccination B) Natural passive immunity | II) Anti-tetanus serum C) Artificial active immunity | III) Acquired after smallpox infection D) Artificial passive immunity | IV) Transferred from mother to child The correct match is a) A-IV, B- III, C- I, D- II b) A- III, B- I, C-IV, D- II c) A-III, B- IV, C- I, D-II d) A-III, B- IV, C- II, D-I	1
	11	Select the correct statement from the following a) Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria. b) Biogas is produced by the activity of aerobic bacteria on animal waste. c) *Methanobacterium* is an aerobic bacterium found in rumen of cattle. d) Biogas, commonly called gobar gas, is pure methane.	1
	12	During the processing of the prohormone 'proinsulin' into mature 'insulin' a) C- peptide is added to proinsulin b) C - peptide is removed from proinsulin c) B- peptide is added to proinsulin d) B -peptide is removed from proinsulin	1
	Question No. 13 to 16 consist of two statements – Assertion **(A)** followed by 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 but R is not the correct explanation of A. c) A is true but R is false. d) A is false and R is true.		
	13	Assertion: Interstitial cell is present in the region outside the seminiferous tubule called interstitial spaces. Reason: Interstitial cells provide nutrition to the sertoli cells.	1
	14	Assertion: hnRNA is larger than mRNA. Reason: hnRNA has non-translating introns which are not required for translation.	1
	15	Assertion: Tobacco contains a large number of alkaloids including nicotine. Reason: Nicotine stimulates adrenal gland which decreases blood pressure and increase heart rate.	
	16	Assertion: Dragonflies can be used to decrease occurrence of diseases like malaria, dengue, etc. Reason: Baculoviruses are effective in controlling many insects and other arthropods	
		SECTION - B	

	17	Write the basis of naming the restriction endonuclease *EcoRI*.	2
	18	Study the table given below. Identify A, B, C and D in the table. Name of the drug | Scientific name of Source plant | Effect on human system Opioids | 'A' | 'B' 'C' | *Cannabis sativa* | 'D'	2
	19	How do copper and hormone releasing IUDs act as contraceptives? Explain	2
	20	Why are grasshopper and *Drosophila* said to show male heterogamety? Explain.	2
	21	In black pepper remnants of nucellus are persistent. Name the term used for persistent nucellus. Give one more example of such type of seed. OR What do the following parts form in a fruit: a) Ovule b) Ovary wall c) Outer integument d) Zygote	2
		SECTION - C	
	22	Explain the process of splicing, capping and tailing which occur during transcription in eukaryotes.	3
	23	i) Describe any two devices in a flowering plant which prevent both autogamy and geitonogamy. ii) Give an example of a plant which came into India as a contaminant and is a cause of pollen allergy.	3
	24	Write the specific location and the functions of the following cells in human males: (i) Leydig cells (ii) Sertoli cells (iii) Primary spermatocyte.	3
	25	How can Hardy - Weinberg equilibrium be affected? Explain giving three factors.	3
	26	i) Explain the process of synthesis of insulin by Eli Lilly Company. Name the technique used by the company. ii) How is the insulin produced by human body different from the insulin produced by the above mentioned company? OR A child is born with ADA-deficiency. i) Suggest and explain a procedure for possible life-long (permanent) cure. ii) Name any other possible treatment for this disease.	3
	27	Study the diagram given below and answer the questions that follow:  i) Why have DNA fragments in band 'D' moved farther away in comparison to those in band 'C'? ii) Identify the anode end in the diagram. iii) How are these DNA fragments visualized?	3
	28	Explain the process of secondary treatment given to the primary effluent up to the point it shows significant change in the level of biological oxygen demand (BOD) in it.	3
		SECTION - D	
	Q. No. 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.		
	29	**Read the following and answerthe questions from 29 (i) to 29 (iv) given below:** Sickle cell anemia is a genetic disorder where the body produces abnormal hemoglobin called hemoglobin S (Hb^s). Red blood cells are normally flexible and round, but when the hemoglobin is defective, blood cells take on a "sickle" or crescent shape. Sickle cell anemia is caused by mutations in a gene called HBB which provides instructions for making a protein called beta-globin, which is a subunit of hemoglobin. It is an inherited blood disorder that occurs if both the maternal and paternal copies of the HBB gene are	4

		defective. In other words, if an individual receives just one copy of the defective HBB gene, either from mother or father, then the individual has no sickle cell anemia but has what is called "sickle cell trait". People with sickle cell trait usually do not have any symptoms or problems but they can pass the mutated gene onto their children. There are three inheritance scenarios that can lead to a child having sickle cell anemia: - Both parents have sickle cell trait - One parent has sickle cell anemia and the other has sickle cell trait - Both parents have sickle cell anemia i) Sickle cell anemia is a/an _____ disease. a) X-linked b) Autosomal dominant c) Autosomal recessive d) Y-linked ii) If both parents have sickle cell trait, then there is _____of the child having sickle cell anemia. a) 25% risk b) 50% risk c) 75% risk d) No risk iii) If one parent has sickle cell anemia and the other has sickle cell trait, there is_____ that their children will have sickle cell anemia and ____ will have sickle cell trait. a) 25% risk, 75% risk b) 50% risk, 50% risk c) 75% risk, 25% risk d) No risk iv) The point mutation in sickle cell anemia lead to a change in codon **a)** UGA to UAA **b)**AUG to GAG **c)** GAG to GUG **d)**GUG to CAG OR In sickle cell anaemia the defect is caused by the substitution of _____ by Valine at the sixth position of the beta globin chain. a) Aspartic acid b) Butyric acid c) Glutamic acis d)Alanine	
	30	**Read the following and answer the questions from 30 (i) to 30 (iv) given below:** Every day we are exposed to large number of infectious agents. However, only a few of these exposures result in disease. Why? This is due to the fact that the body is able to defend itself from most of these foreign agents. This overall ability of the host to fight the disease-causing organisms, conferred by the immune system is called immunity. Immunity is of two types: (i) Innate immunity and (ii) Acquired immunity. Innate immunity is non-specific type of defence that is present at the time of birth. This is accomplished by providing different types of barriers to the entry of the foreign agents into our body. Innate immunity consists of four types of barriers. These are — 1. Physical barriers: Skin on our body is the main barrier which prevents entry of the micro-organisms. Mucus coating of the epithelium lining the respiratory, gastrointestinal and urogenital tracts also help in trapping microbes entering our body. 2. Physiological barriers: Acid in the stomach, saliva in the mouth, tears from eyes–all prevent microbial growth. 3. Cellular barriers: Certain types of leukocytes (WBC) of our body like polymorpho-nuclear leukocytes (PMNL-neutrophils) and monocytes and natural killer (type of lymphocytes) in the blood as well as macrophages in tissues can phagocytose and destroy microbes. 4. Cytokine barriers: Virus-infected cells secrete proteins called interferons which protect non-infected cells from further viral infection. i) Skin that protects our body from entering micro-organisms is a _____ barrier. a) Cellular barrier b) Physical barrier c) Physiological barrier d) Both (a) and (c) ii) A non-specific type of defence is also known as _____ . a) Innate immunity b) Acquired immunity c) Pathogen specific d) PMNL iii) When the host is able to fight against disease-casing organisms, then the ability is known as _____. a) Microbial growth b) Immunity c) Barriers d) Interferons iv) Which type of barrier include interferons that protects non-infected cells from further viral infection? a) cytokine b) Immunity c) PMNL d) CMI OR	4
		Find the odd one out a) Erythrocytes b) Lymphocytes c) Monocytes d) Neutrophils	

	SECTION - E	
31	The following is the illustration of the sequence of ovarian events (a-i) in a human female:  i) Identify the figure that illustrates corpus luteum and name the pituitary hormone that influences its formation. ii) Identify the figure that illustrates ovulation and mentions the stage of oogenesis it represents. iii) Specify the endocrine function of corpus luteum. How does it influence the uterus? Why is it essential? OR i) Draw a diagrammatic labelled sectional view of a seminiferous tubule of a human. ii) Differentiate between spermiation and spermiogenesis.	5
32	Describe how the lac operon operates, both in the presence and absence of an inducer in *E.coli.* OR i) List the salient features of double helix structure of DNA. ii) Mention the various levels of regulation of gene expression in eukaryotes.	5
33	i) List any four beneficial effects of GM plants. ii) Why has the Indian Government set up the organisation named GEAC? Give any two reasons. OR i) Mention the biochemical/molecular diagnostic procedures for early detection of viral infection. ii) When *Bacillus thuringiensis* enters a certain insect's body, the insect gets killed, but itself remains unaffected. Explain how it is possible.	5