KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION

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 4 marks each; and Section–E has 3 questions of 5 marks each.

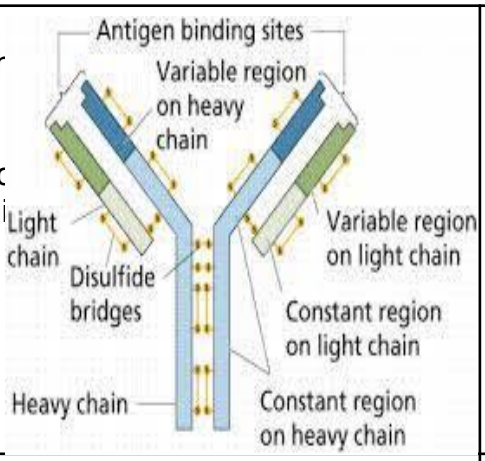
(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

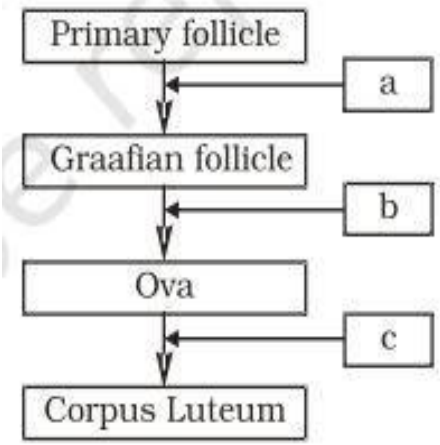
(v) Wherever necessary, neat and properly labelled diagrams should be drawn

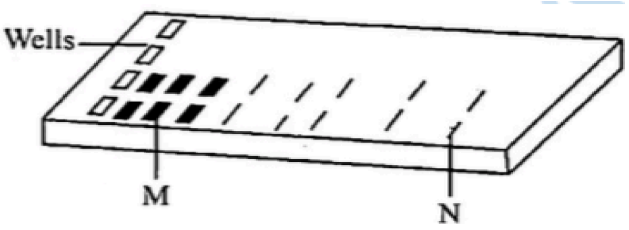
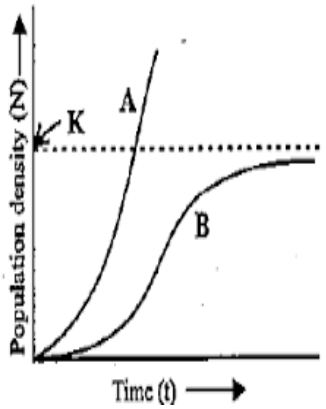
SECTION A

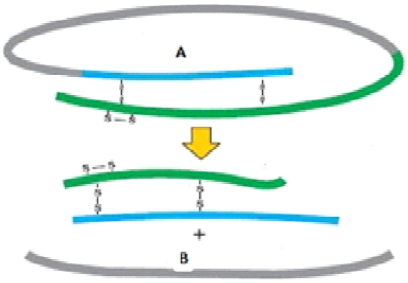
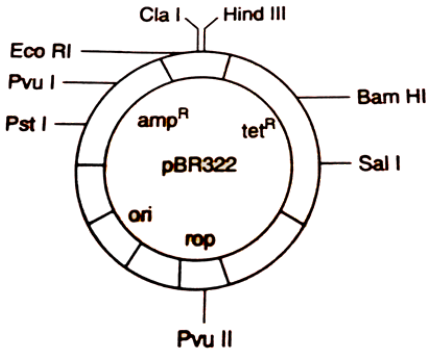
Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

S.NO	QUESTION	MARKS
1	Which among the following came into India as a contaminant with imported wheat, has become ubiquitous in occurrence and causes pollen allergy a) *Lantana* b) *Eicchhornia* c) *Parthenium* d) *Chenopodium*	1
2.	Spermiation is the process of the release of sperms from a) Seminiferous tubules b) Vas deferens c) Epididymis d) Prostate gland	1
3	If a genetic disease is transferred from a phenotypically normal but carrier female to only some of the male progeny, the disease is: a) Autosomal dominant b) Autosomal recessive c) Sex- linked dominant d) Sex -linked recessive	1
4	Discontinuous synthesis of DNA occurs in one strand, because a) DNA molecules being synthesised is very long. b) DNA dependent DNA polymerase catalyses polymerisation only in one direction (5'to 3'). c) It is a more efficient process. d) DNA ligase has to have a role.	1
5	In gel electrophoresis separated DNA fragments can be visualised with the help of a) Ethidium bromide in UV radiation b) Acetocarmine in UV radiation c) Ethidium bromide in infrared radiation a) d) Acetocarmine in bright blue light.	1

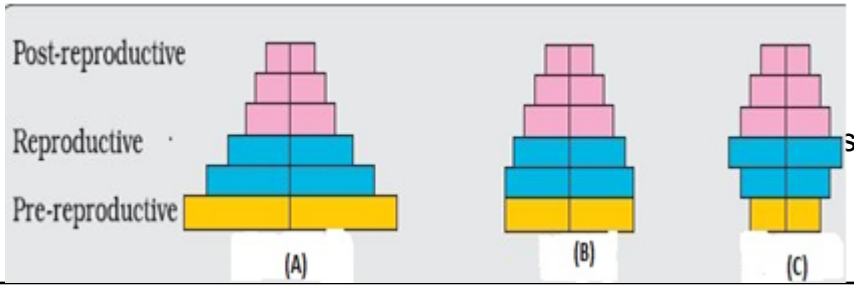
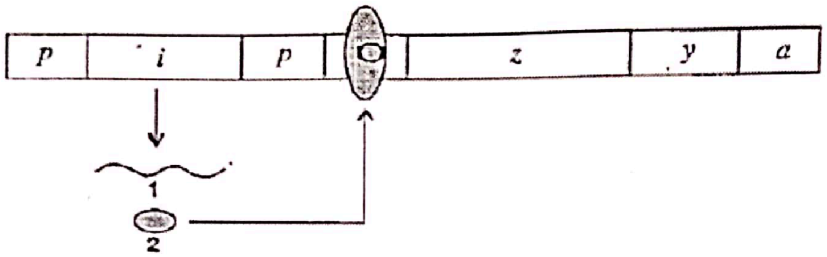
6	Observe the following diagram- i) Each antibody molecule has four disulph ii) an antibody is represented as H2L2. iii) antibodies are found in the blood iv) Different types of antibodies are produc Identify the correct pair from the options gi a) i & ii b) iii & iv c) i& iv d) ii &iii  	1
7	The two samples of the water are taken from different sources, labelled as A and B. During the process of supply of oxygen, sample A requires a smaller amount of oxygen, and sample B requires a high amount of oxygen to oxidize organic materials present in them. So, which option is correct related to it - a) Sample A is more polluted b) Sample B is more polluted c) Sample A and B are equally polluted d) Sample B is less polluted	1
8	On what basic principle the Enzyme-Linked Immunosorbent Assay works? a) Mechanism of enzyme action b) Role of chemicals in body c) Antigen-antibody interaction d) Neutralising the chemicals	1
9	In a given plant, red colour (R) of fruits is dominant over white fruit (r); and tallness (T) is dominant over dwarfness (t). If a plant with genotype RrTt is crossed with a plant of genotype rrtt, what will be the percentage of tall plants with red fruits in the next generation? a) 25% b) 50% c) 40% d) 60%	1
10	The hot spots of biodiversity conservation are characterized by: a) high levels of species richness and low degree of endemism b) low levels of species richness and high degree of endemism c) low levels of species richness and high degree of endemism d) high levels of species richness and high degree of endemism	1
11	If Meselson and Stahl's experiment is continued for four generations in bacteria, the ratio of N^{15}/N^{15}: N^{15}/N^{14}: N^{14}/N^{14} containing DNA in the fourth generation would be a) 1 : 1 : 0 b) 1 : 4 : 0 c) 0 : 1 : 3 d) 0 : 1 : 7	1
12	Which of the following is/are used in recombinant DNA technology? 1. Agarose gel 2. Restriction endonuclease 3. Plasmid vector 4. Ethidium bromide a) 1 and 2 b) 2 and 3 c) 3 and 4	1

	d) All of these	
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:** 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:** Allele frequencies in a population are stable and is constant from generation to generation. **Reason:** In Hardy-Weinberg principle the gene pool remains constant.	1
15	**Assertion:** Organisations like GEAC are necessary to monitor GM researches and test the safety of introducing GM organisms for public services. **Reason:** When genetically modified organisms are introduced into the ecosystem GM Researches can have unpredictable results which even can be disastrous.	1
16	**Assertion:** The prickly pear cactus introduced into Australia in early 1920s caused havoc by spreading rapidly into millions of hectares of land range. **Reason:** When certain exotic species are introduced into a geographical area, they become invasive and start spreading fast because the invaded land does not have the natural predators.	1
	SECTION B	
17.	*Attempt either option A or B.* A. Given below is a flow chart showing ovarian changes during menstrual cycle.  i) Fill in the spaces giving the name of the hormones responsible for the events shown. ii) Name the source of the 'c' hormone. OR B. i) Where do the signals for parturition originate from in humans? ii) Consuming mother's milk for the first few days is important for the baby not just for energy, but also for other reasons. Elaborate.	2
18	In pea plant, round seed coat is dominant over wrinkled seed coat. What will be the expected ratio of phenotypes, when we cross i) heterozygous round x heterozygous round	2

	ii) heterozygous round x homozygous wrinkled	
19	A person shows strong unusual hypersensitive reactions when exposed to certain substances present in the air. Identify the condition. Name the cells responsible and chemicals released for such reactions	2
20	Satish was doing gel electrophoresis to purify DNA fragments with the observations as shown below  a) At which end he would have loaded the sample and where? b) Analyse the reason for different positions M and N taken up by the DNA bands	2
21	*Attempt either option A or B.* A. A population of 300 spotted deer was living without any carnivores in an enclosure of a few hectares of rich tropical forest land. Deer census was taken after a few years. Now study the graph and answer the questions that follows:  (i) Identify the curve that represents the deer population. (ii) Is it a realistic one? Justify. OR B. Marshy areas often consist of hard outer coverings as detritus that are remains of organisms such as crabs. State two reasons why decomposition would be limited in such areas.	2
	SECTION C	
22	a) Cryptorchidism is a condition in which one or both testes fail to descend from the abdomen. (i) If cryptorchidism of both testes is left untreated, would it lead to infertility? Give reason. (ii) Can a male with cryptorchidism of only one testis produce sperm? Give reason. b) Orchidopexy is a surgical procedure for treating cryptorchidism. (i) Name the part to which the testes are moved outside the abdomen. (ii) Write the temperature range of the testes after orchidopexy.	3
23	a) During polyembryony, if one embryo is formed from synergids and the other from nucellus, state the one that is haploid and the one that is diploid.	3

	b) Is it possible that an unfertilized apomictic embryo sac gives rise to a diploid embryo? Give a reason in support of your answer.	
24	The DNA packaging in eukaryotes is carried out with the help of lysine and arginine rich basic proteins called histone. The unit of compaction is nucleosome. (a) What would happen if histones were to be mutated and made rich in valine and glutamic acid in place of basic amino acids such as lysine and arginine? (b) What is the role of non-histone chromosomal proteins in DNA packing?	3
25	Assuming that within a population of beetles where Hardy Weinberg conditions are met, the black colour (B) is dominant over the red colour (b). 36% of all beetles are red. On the basis of this information, answer the following: a) What is the frequency of allele 'b'? b) What percentage of beetles in the population would be heterozygous? c) How many beetles would be black and red in colour in a population of 1500?	3
26	a) Name and explain giving reasons the type of immunity provided to the new-borns by i) colostrum ii) vaccination b) Name the type of antibody present in colostrum and that produced in response to allergens in the human body. c) Name two primary lymphoid organs.	3
27	Observe the given diagram and answer the following questions-  a) Identify A and B. b) How natural insulin is different from Humulin? c) Which technology is used in the preparation of Humulin by Eli Lily company? OR Observe the given diagram and answer the following questions-  	3

	a) In pBR322, foreign DNA has to be introduced in tet^R region. From the restriction enzymes given below, which one should be used and why? PvuI, EcoRI, BamHI (b) Give reasons, why the other two enzymes cannot be used.	
28	How did the Hershey and Chase experiment prove that DNA, not protein, functioned in controlling genetic inheritance?	3
	SECTION D	
29	Read the given case study and answer the questions given after ABO blood group system in human beings is determined by two types of antigens present on the surface coating of red blood cells A and B. Presence, absence and type of antigens are determined by three immunogen alleles I^A, I^B and i. I^A forms antigen A, I^B forms antigen B, while allele i is recessive and does not form any antigen. Both I^A and I^B are dominant over i but not over each other. The blood group of next generation is determined according to the one allele shared by each of the parents. a) How many combinations (genotypes) of blood group are possible in ABO blood group system? b) In gene I and i, which does not produce antigen? *Attempt either subpart c or d* c) In the ABO blood group system how will you describe co--dominance? Write with example. OR d) How the example of ABO blood grouping provides a good example of multiple allelism?	4
30	Acquired immunity, on the other hand, is pathogen specific. It is characterized by memory. This means that our body when it encounters a pathogen for the first time produces a response called primary response which is of low intensity. Subsequent encounters with the same pathogen elicit a highly intensified secondary or anamnestic response. This is ascribed to the fact that our body appears to have memory of the first encounter. a) Name the two types of cells that carry out the immune responses? b) When does a human body elicit an anamnestic response? *Attempt either subpart c or d.* c) Write two characteristics of acquired immunity, other than being pathogen specific OR d) How do both the cells of our immune system differ from each other in their functions?	4
	SECTION E	
31	*Attempt either option A or B.* A. Give reasons why (i) Most zygotes in angiosperms divide only after certain amount of endosperm is formed. (ii) Groundnut seeds are ex-albuminous and Castor seeds are albuminous. (iii) Micropyle remains as a small pore in the seed coat of a seed. (iv) Integuments of an ovule harden and the water content is highly reduced as the seed matures. (v) Apple and Cashew are not called true fruits. (OR)	5

	B. A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless. i) Why in your opinion the female partner is often blamed for such situations in India? ii) State any two reasons responsible for the cause of infertility. iii) Suggest a technique that can help the couple to have a child where the problem is with the male partner.	
32	*Attempt either option A or B.* (A) i) Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with any three examples. ii) What are the two types of desirable approaches to conserve biodiversity? Explain with examples bringing out the difference between the two types. OR (B)  s for long term	5
33	*Attempt either option A or B.* (A) Study the schematic representation of the genes involved in lac operon given below and answer the questions that follow:  a) If the nutrient medium for the bacteria contains lactose will operon be expressed? Justify the answer. b) The active site of enzyme permease present in the cell membrane of a bacterium has been blocked by an inhibitor, how will it affect the lac operon? OR (B) a) Describe the steps of post transcriptional modifications of hnRNA in a eukaryotic cell. b) How is this process of mRNA synthesis different from that in prokaryotes?	5