Indian School Al Wadi Al Kabir
Second Rehearsal Examination (2024-2025)

Class: XII | Subject: Biology (044) | Max. marks: 70
Date: 25/01/2025 | SET I | Time: 3 Hours

General Instructions:

(i) All questions are compulsory.

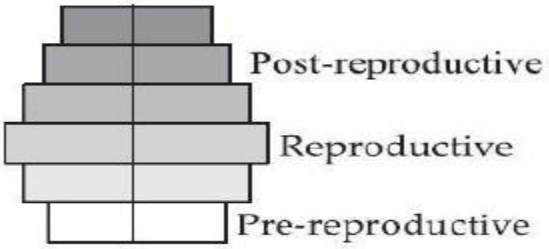
(ii) The question paper has five sections and 33 questions.

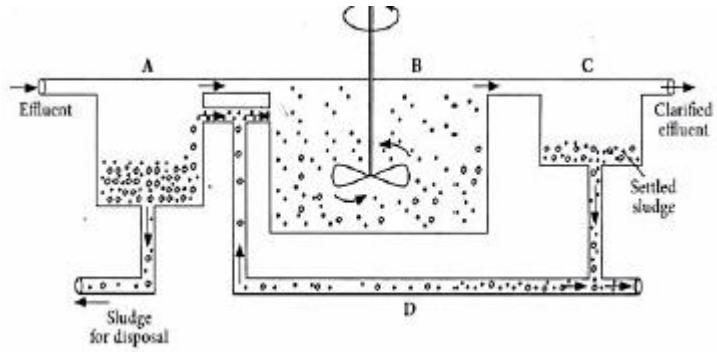
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.

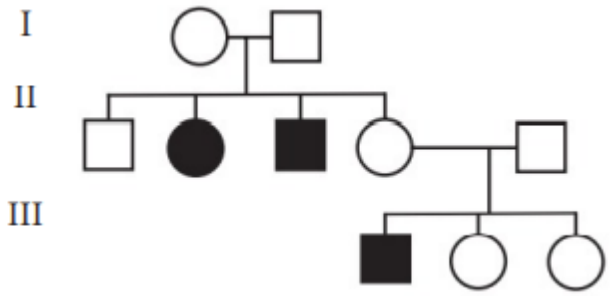
(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

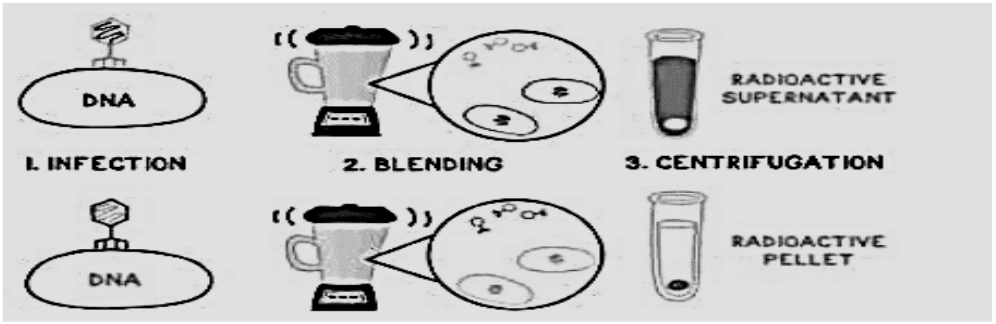
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

S. No	Questions	Mks.
	SECTION A	
1.	GIFT is an ART used for those females, who a) Cannot conceive normally. b) Cannot produce a functional ovum, but can produce suitable environment for fertilisation and embryo development. c) Can produce a functional ovum, but cannot produce suitable environment for fertilisation and embryo development d) All of the above.	1
2.	Recent studies have indicated that one of the possible reasons behind male infertility is specific mutations in the mitochondrial DNA of the sperms. Due to this mutation, mitochondria become non-functional in the sperms. What could be a possible effect of such a mutation on the sperm? a) It lowers the sperm count. b) It lowers the sperm motility. c) It lowers the ability to penetrate the egg. d) It lowers the ability to produce hormones.	1
3.	Which one of the following pairs is expected to give a ratio of 1:1:1:1 in the progeny of a Mendelian dihybrid cross? a) AaBb x AaBb b) AABB x AaBb c) AaBb x aabb d) AABB x aabb	1

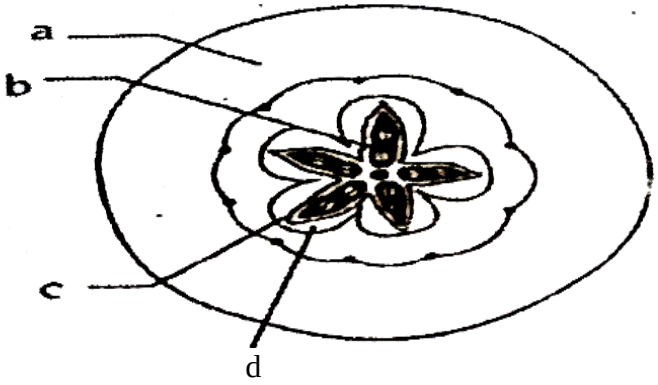
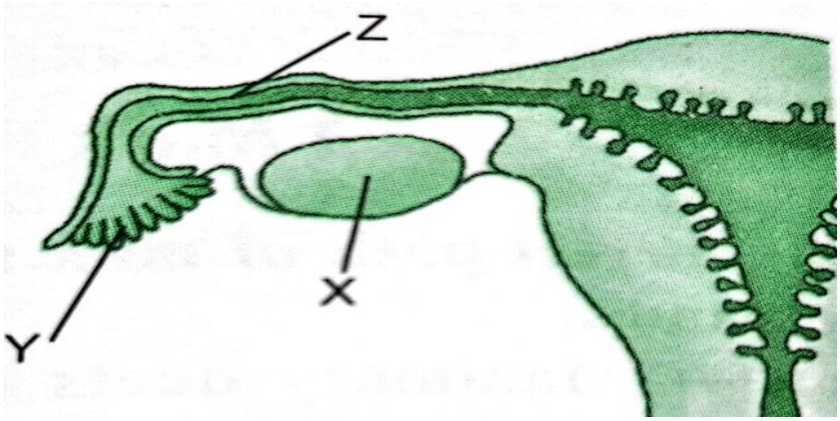
4.	The population of an insect species shows an explosive increase in number during the rainy season, followed by its disappearance at the end of the season. Which of the following is the correct inference of this observation? a) The food plants flourish during rainy season and die at the end of the season. b) The population growth curve of the insect is J shaped. c) The population growth curve of the insect is sigmoid. d) The population of the predators must have increased.	1
5.	What type of human population is represented by the following age pyramid?  a) Vanishing population b) Stable population c) Declining population d) Expanding population	1
6.	Rahul observed a plant in his garden. He hypothesized that the stem height exhibited incomplete dominance. For checking, he has created true-breeding lines of tall and short plants. Then he crossed these and sampled 1000 progeny. Which of the following cases, matches his hypothesis? a) 500 tall plants, 250 intermediate plants, and 250 small plants b) 250 tall plants, 500 intermediate plants, and 250 small plants c) 250 tall plants, 250 intermediate plants, and 500 small plants d) 125 tall plants, 750 intermediate plants, and 125 small plants	1
7.	The construction of the first recombinant DNA was achieved by using the native plasmid of a) Escherichia coli b) Agrobacterium tumefaciens c) Salmonella typhimurium d) Bacillus thuringiensis	1
8.	In *E. coli*, the lac operon gets switched off when lactose is a) Present in the medium and it binds to the repressor. b) Not present in the medium and the repressor binds to the operator. c) Not present in the medium and RNA polymerase binds to the operator. d) Active lactose present in the medium binds to RNA polymerase	1
9.	Sharon, a post graduate student, gets an assignment on sewage treatment plant (STP) to study the microbial load. After visiting such plant in his locality, he makes a Simplified diagram of the STP for his project. Study the diagram given below and answer the following questions.	1

	 In the diagram 'A' denotes a) aeration tank. b) primary settling tank. c) secondary settling tank. d) sludge digester.	
10.	A mixture of DNA fragments P, Q, R, & S was subjected to agarose gel electrophoresis. The molecular weights of the fragments are as follows. R > S, S-P=Q, Q > P. The positions of these fragments in the gel from cathode to anode end will be a) P-Q-R-S b) R-S-Q-P c) Q-P-S-R d) P-S-Q-R	1
11.	Who proposed that the first form of life could have come from pre-existing non-organic molecules? a) S.L. Miller b) Oparin and Haldane c) Louis Pasteur d) Darwin	1
12.	In Swiss cheese, big holes are made by a a) Bacterium producing methane gas. b) Machine producing the cheese. c) Fungus releasing a lot of carbon dioxide gases. d) Bacterium producing large quantities of carbon dioxide.	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(A): Megaspore mother cell undergoes meiosis to produce four megaspores. Reason(R): Megaspore mother cell and megaspore both are haploid.	1
14.	Assertion(A): ABO blood group system is a good example of pleiotropic genes. Reason(R): In ABO blood group system, when I^A and I^B alleles are present together, both express themselves.	1

15.	Assertion(A): cryI Ac and cryII Ab provide resistance to cotton plants against lepidopterans. Reason(R): cryI Ab provide resistance to corn plants against borer pest.	1
16.	Assertion(A**)**: A bacterial cell has to be made competent to take up DNA. Reason(R): DNA is a hydrophilic molecule that can easily pass through cell membranes.	1
	SECTION B	
17.	*Attempt either option A or B.* A.i) What is pollen pistil interaction? ii) Name the two steps that follows after this process. OR B.i) Why can pollen grains be preserved as fossils? ii) How is it possible in Oxalis and Viola plants to produce assured seed-sets even in the absence of pollinators?	2
18.	Rinku with a circular DNA contains sequence 5' → GGAATTCC → 3' 3' → CCTTAAGG → 5' She wishes to add a new segment of DNA into it. a) Identify the technology she planned. b) Suggest the specific enzyme to make a cut in the DNA with above sequence. c) How does this enzyme identify the sequence? d) Draw the cut ends of the DNA with sequence.	2
19.	A person claimed that he has seen sounds, heard colours and smells light. i) Which drug could be the possible reason for his hallucinations? Mention any one source for this chemical. ii) Name two well- known plants with hallucinogenic properties.	2
20.	Study the given pedigree chart and answer the question that follow.  a) Is the trait sex-linked or autosomal? b) Is the trait recessive or dominant? c) Give the genotypes of the parents in generation I and of their third and fourth child in generation II.	2
21.	*Attempt either option A or B* A. i) Name and explain the mechanism where two species competing for the same resource co-exist. ii) State Gause's exclusion principle and give an example how it may not apply in some situations? OR	2

	B. Name and differentiate the two types of approaches to conserve biodiversity, with any two examples.	
	SECTION C	
22.	A flower of tomato plant following the process of sexual reproduction produces 240 viable seeds. Answer the following questions. a) How many megaspore mother cells and microspore mother cells are involved in the above process? b) How many male gametes and meiotic divisions will be required in the above case? c) State the advantage a farmer has if he uses apomictic seeds of hybrid varieties.	3
23.	Draw a sectional view of seminiferous tubule of a human . Label the following cells in the diagram. i) Cells that divide by mitosis. ii) Cells that undergo meiosis-I. iii) Cells that undergo meiosis-II. iv) Cells that help in the process of spermiogenesis.	3
24.	In 1952, Alfred Hershey and Martha Chase took an effort to find the genetic material in organisms. Their experiments led to an unequivocal proof to the genetic material.  a) Why did they use bacteriophage for their experiment and use two types of culture media to grow them? b) What was the need for using a blender and later a centrifuge during their experiments? c) State the observations drawn from each culture by them after the experiments.	3
25.	a) Name any two natural cloning vectors and give reasons that make them act as cloning vectors. b) How does β-galactosidase coding sequence act as a selectable marker?	3
26.	a) State any three defense mechanisms evolved in preys to avoid their predators. b) List any three ways of measuring population density of a habitat.	3
27.	a) Construct a complete transcriptional unit on the basis of a hypothetical coding strand given below with their polarity. A T G C A T G C A T A G T A A A T T ← b) Write the RNA strand transcribed from the above transcriptional unit.	3
28.	Co-evolution is seen at different levels of biological organisation. a) What is co-evolution? Which two interacting species in a population does it affect the most? b) With the help of an example, explain co-evolution.	3

	SECTION D	
29.	The image given below shows how a moth went from light winged to dark winged. This interesting observation from England supports evolution by natural selection. Answer the questions related to it.  a) Who proposed the concept of natural selection and what does this theory state? b) Name the three ways by which natural selection operates on different traits. *Attempt either subpart c or d.* c) Briefly explain the peppered moth's evolution to dark moths. OR d) Explain with an example how anthropogenic actions can also contribute to evolution.	1 1 2
30.	The image given below shows normal cells transforming to cancerous cells. There is a breakdown of the normal cell's regulatory mechanism, leading to uncontrolled proliferation of cells, which result in tumors.  a) Name and define one regulatory mechanism that normal cells possess but is lost in cancer cells. b) What are carcinogens? Name any two carcinogens. *Attempt either subpart c or d.* c) Differentiate between the two types of tumors. OR d) What is metastasis? Why is it fatal?	1 1 2

	SECTION E	
31.	*Attempt either option A or B.* A) Given below is the T.S of an apple, observe and answer the questions that follow.  i) Identify and name the edible part of the fruit. ii) Identify the seed and name the layers in the wall of the fruit as labelled. iii) How does this fruit differ from a fruit of banana? iv) Explain the significance of each of the following features present in plants given below: a) The bisexual flower of sunflower exhibits rejection of self-pollen grain. b) How is autogamy prevented in castor and papaya plant respectively? OR B) The diagram given below shows a part of the human female reproductive system.  i) Name the gamete cells that would be present in 'X', if taken from a newborn baby. Explain the changes this gamete cell will undergo till the girl reaches puberty. ii) Identify 'Y' and state its function. iii) Identify the site 'Z' and write the event that takes place here.	5
32.	*Attempt either option A or B.* A) i. In the future, genetic therapies may be used to prevent, treat, or cure certain inherited disorders in humans. What is gene therapy? With a suitable example explain how the first clinical gene therapy was administered. ii. Apart from gene therapy what other treatments can be used to treat the above disease? OR B) i. What are bioreactors? Draw a neat and labelled diagram of a sparged-tank bioreactor. ii. How can disarmed pathogens be used as a vector for cloning genes in plants and animals? Explain giving an example for each.	5

33.	*Attempt either option A or B.* A i) Why is the Amazon rain forest dwindling at a very fast rate? ii) Explain with two examples how introduction of alien species has threatened our indigenous species. iii) Identify the factors on which the rate of decomposition depends. OR B i) Explain the interaction shown below in the picture.  ii) Differentiate between Grazing food chain and Detritus food chain. iii) Construct a pyramid of Biomass in the sea and a pyramid of number in the parasitic food chain.	5