Indian School Al Wadi Al Kabir

Assessment – I (2025-2026)

Class: XII | Subject: Biology (044) | Max. marks: 70
Date: 28/09/2025 | 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.

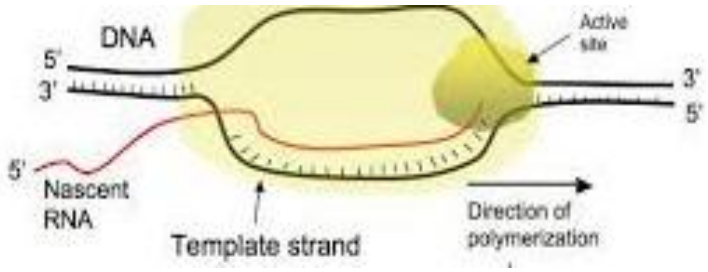
(iv) There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

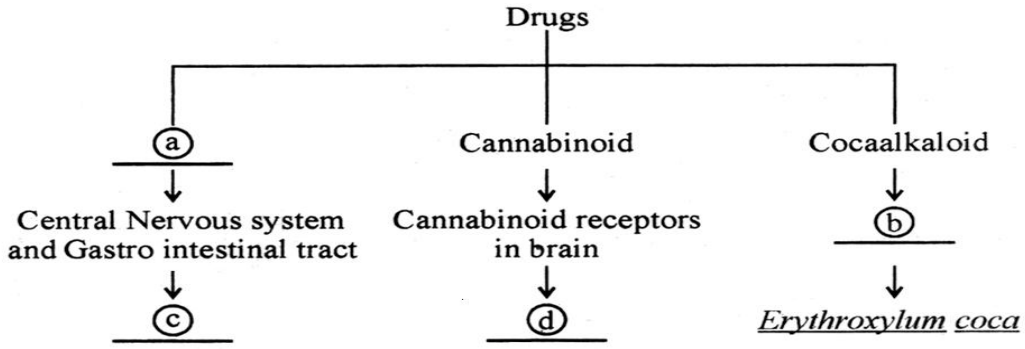
(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

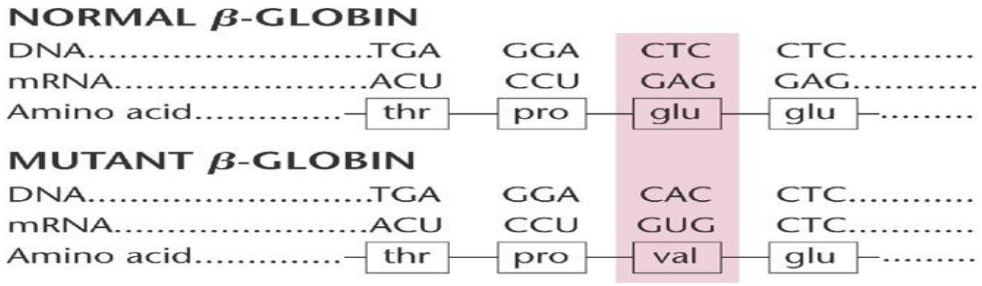
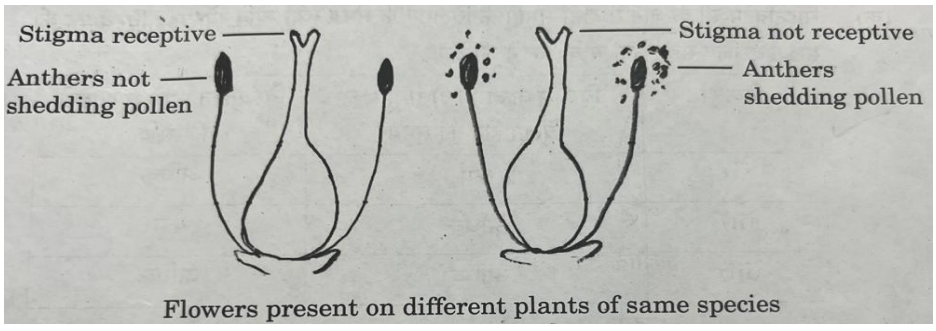
	SECTION A	
Sl. No.	QUESTION Q. No 1 to 12 are multiple-choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions	Marks
1.	Which mRNA will be translated to a polypeptide chain containing 8 amino acids? a. AUGUUAAUAGACGAGUAGCGACGAUGU b. AUGAGACGGACUGCAUUCCCAACCUGA c. AUGCCCAACCGUUAUUCAUGCUAG d. AUGUCGACAGUCUAAAACAGCGGG	**1**
2.	A plant having the genotype AaBbCC will produce _____ kinds of gametes. a. 5 b. 4 c. 3 d. 2	**1**
3.	Which tissue gives rise to pollen grains? a. Endothecium b. Tapetum c. Sporogenous d. Nucellus	**1**

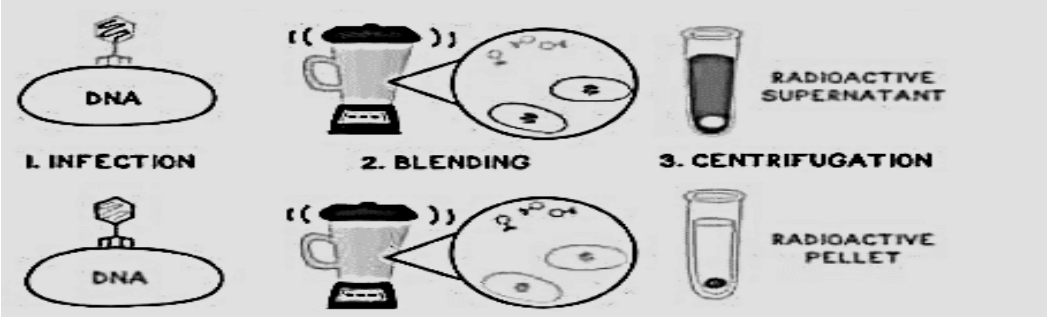
4.	A short piece of DNA, having 20 base pairs, was analysed to find the number of nucleotide bases in each of the polynucleotide strands. Some of the results are as follows. <table><tr><td></td><td colspan="4">Number of nucleotide bases</td></tr><tr><td></td><td>Adenine</td><td>Cytosine</td><td>Guanine</td><td>Thymine</td></tr><tr><td>Strand 1</td><td>4</td><td>4</td><td></td><td></td></tr><tr><td>Strand 2</td><td></td><td>5</td><td></td><td></td></tr></table> How many nucleotides containing Thymine were present in strand 1? a. 2 b. 4 c. 5 d. 7	1
5.	Ichthyosis is a group of genetic skin disorders characterised by dry, scaly or thickened skin. It is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin was suffering from Ichthyosis. What is the probability that their second child will also suffer from the same condition? a. 100% b. 25% c. 50% d. 75%	1
6.	Given below is a fragment of DNA which is going to be transcribed, the upper strand with polarity 3' to 5' is the template strand: 3´ ATAGCC 5´ 5´ TATCGG 3´ After transcription, the mRNA can be represented by: a. 5´ UATGCC 3´ b. 5´ AUUGCC 3' c. 5´ UAUCGG 3´ d. 5´ GGCAAU 3´	1
7.	To produce 2400 seeds, the number of meiotic divisions required will be a. 2400 b. 2000 c. 1600 d. 3000	1
8.	The bones of the forelimbs of whale, bat, cheetah and man are similar in structure, because a. One organism has given rise to another. b. They share a common ancestor. c. They perform the same function. d. They have biochemical similarities.	1

9.	Which of the following statements correctly describes the function of the seminal vesicles in the male reproductive system? a. They store sperm and provide motility. b. They secrete an alkaline fluid rich in fructose that nourishes sperm. c. They produce testosterone for sperm maturation. d. They are the site of spermatogenesis.	1
10.	Which of the following is the hormone-releasing IUD? a. Cu T b. Lippe's Loop c. Saheli d. LNG-20	1
11.	Which of the following immunoglobulins is primarily found in body secretions such as saliva, tears, and colostrum and acts as the first line of defense? a. IgG b. IgA c. IgM d. IgE	1
12.	Adaptive radiation leads to which of the following? a. Increased competition among species b. Decreased speciation rates c. Limited morphological diversity among species d. Rapid divergence of traits among populations inhabiting a given geographical area.	1
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer the questions by 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):** *Penicillium notatum* was the first fungus used to produce antibiotics. **Reason (R):** It produces penicillin, which inhibits bacterial cell wall synthesis.	1
14.	**Assertion(A)**: Genes are stretches of DNA that make up the different codes for the different proteins. **Reason(R)**: DNA is a complex biomolecule made up of sugars, phosphorus and nitrogen bases.	1
15.	**Assertion(A):** Heroin is a depressant drug. **Reason(R):** Heroin stimulates the central nervous system and increases alertness.	1
16	**Assertion(A):** Intrauterine devices (IUDs) are effective methods of birth control. **Reason(R):** IUDs prevent ovulation in females.	1
	SECTION B	
17	The figure given below shows the heart-shaped embryo in a dicot plant. Draw neat and labelled diagrams showing the stage before and after this stage.	2

	 **OR** Draw a neat and labelled diagram showing the enlarged view of an egg apparatus entering into the pollen tube through a synergid.	
18.	Suggest a suitable contraceptive device for the following cases with justification. (a) Deepali does not want to take the risk of conception and sexually transmitted infections (STIs). (b) Jagruti wants a contraceptive that she can take till she wants to avoid conception and can resume her fertile life without the intervention of the doctor. Also, it should have a lower failure rate.	2
19.	The figure given below illustrates the process of DNA transcription in prokaryotes.  (a) Briefly explain the Initiation stage of the transcription process. (b) What are the two additional steps that are carried out in Eukaryotes at the end of termination?	2
20	Complete the illustration chart given below (a, b, c &d)	2

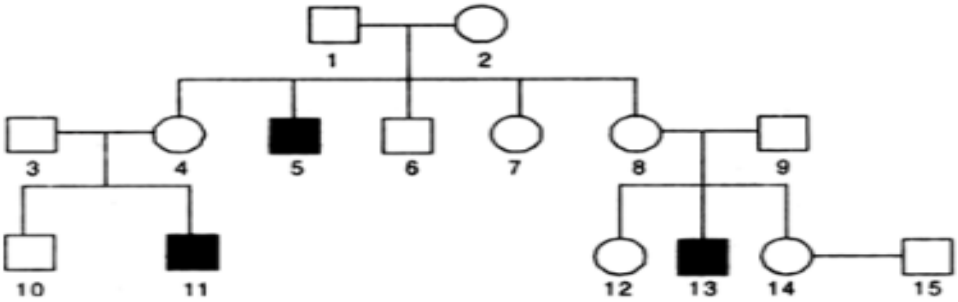


21	(a) From the information given below, identify the type of mutation shown by the βHb with reason. (b) Relate the mutation to sickle cell anaemia and explain how it affects the shape of the RBC and the affected individual.  	2
	SECTION C	
22	Flowering plants have developed many devices to discourage self-pollination and encourage cross-pollination. Given below is a picture of one such outbreeding device in a flowering plant. Study the picture and answer the questions that follow.  (a) Explain how the given type of pollination is advantageous to the plant. (b) Can this flowering plant show geitonogamy? Justify your answer.	3

	(c) How does the genetic mechanism prevent self-pollination in flowering plants?	
23	(a)The given picture depicts a kit commonly used for the detection of pregnancy. What is the principle behind this kit?  (b) How is the IVF method used to assist infertile couples to have children?	3
24.	How is the placenta formed? Apart from the other functions it carries out, it also acts as an endocrine tissue and provides passive immunity. Briefly explain these additional functions.	3
25.	(a) How are cancer cells different from normal cells, which makes them very fatal? (b) How can viruses and genes cause cancer in humans? (c) Name any two techniques used in detecting cancer. **OR** (a) Briefly explain the type of immunity given by the blood to humans with two examples. (b) Identify the type of barrier given by the mucus coating and the acids in the stomach. (c) Differentiate between humoral immunity and cell-mediated immunity.	3
26.	(a)What type of evolution is seen between the mole and the marsupial mole? Briefly explain.  (b) Explain Darwin's theory of evolution. (c) How was his theory supported by the evolution of moths in England?	3
27	In 1952, Alfred Hershey and Martha Chase made an effort to find the genetic material in organisms. Their experiments led to an unequivocal proof of the genetic material.  	3

	(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.	
28	(a) Microbes can be used to decrease the use of chemical fertilisers and pesticides. Explain how this can be achieved, citing any two examples. (b) Briefly explain how the retrovirus replicates in the host cell.	3
	SECTION D	
	Q.no 29 and 30 are case-based questions. Each question has subparts with an internal choice in one subpart	
29.	A 17-year-old student returns from a trip to a tropical region and begins experiencing high fever, chills, and sweating in cycles. Upon medical examination, the doctor suspects malaria; a blood smear test confirms the disease. The doctor explains that the disease is transmitted by a specific vector and involves a complex life cycle. Answer the following questions in relation to the above case. (a) Name the causative organism and the vector responsible for transmitting malaria**.** (b) Identify any two Plasmodium species that cause malaria. (c) A simplified flow chart depicting the life cycle of the causative organism is shown below. Identify the missing blanks P & Q. [Infected Mosquito Bite] → [-------P------] → [Merozoites released into blood] → [Infect RBCs] → [------Q-------] → [Mosquito bites human] → [fertilisation takes place in mosquito] → [Cycle repeats]- Explain why malaria symptoms occur in cycles. **OR** (d) Diagrammatically represent the life cycle with the following terms: Sporozoite, asexual reproduction in the liver cells, Gametocyte, RBC, Liver.	1 1 2
30	Assuming that within a population of beetles where Hardy-Weinberg conditions are met, the colour black (B) is dominant over the colour red (b), 30% of all beetles are black (BB). Given this information, answer the questions below: (a) What is the frequency of homozygous recessive beetles? (b) State the Hardy-Weinberg principle. (c) Calculate the percentage of beetles in the population that are heterozygous. **OR** (d) Assuming that Hardy-Weinberg conditions are met in the beetle population consisting of 1800 beetles, how many beetles would you expect to be black and red in colour, respectively? State any 4 factors that interfere with Hardy-Weinberg's principle.	1 1 2

	SECTION E	
31	A patient who has been undergoing chemotherapy is suffering from blood coagulation around the central venous catheters that have been used to administer the related drugs. (a) Suggest a possible enzyme that could be considered for administration to potentially restore proper blood flow. (b) Based on (a), mention the microorganism from which it is produced. (c) Pectinases are used in bottled juices as well as in the textile industry. Identify how pectinases can help in each of these industries. (d) Identify the bioactive molecule used as an immunosuppressant in organ transplant patients, and also mention its source. (e) Why is an immunosuppressant administration an important part of the treatment? (f) A patient recovering from illness is generally asked to have a light diet of curd rice. Why? **OR** (a) What is BOD, and why is its measure very important before releasing the sewage into the water bodies? (b) How is this achieved in the sewage treatment plant, in the secondary treatment process? (c) Why is it very important to treat sewage before discharging it into the water bodies?	5
32	In the lac operon, the genes encode proteins that allow the bacteria to use lactose as a source of energy. Explain this regulation of the Lac Operon in i. the glucose medium ii the lactose medium. **OR** The DNA samples of two suspects were taken to solve a crime scene, as shown.	5

	 (a) Which process was used to get these DNA bands? State its principle. (b) Identify the criminal out of the two suspects, with a reason (c) Who developed this technique, which DNA did he use, and why? (d) One of the steps in this method is Gel electrophoresis. Why is this step done, and which step follows it? (e) Why was this process used after the Air India crash in Ahmedabad?	
33	(a) The body and eye colour in the offspring of Drosophila show more parental characters, but the size of the wings did not. Briefly explain why this phenomenon was shown and who explained it. (b) Explain with the help of crosses the inheritance of flower colour in snapdragon. How is it different from the inheritance of ABO blood grouping in humans? **OR** The following pedigree chart shows the inheritance of Haemophilia in a family.  (a) What would be the possible genotype of members 2 and 5? (b) A blood test shows that member 14 has the haemophilia gene. What would be the probability that her child will be a hemophilic boy or a hemophilic girl? (c) How is the similarity between Haemophilia and colour blindness in relation to its inheritance and different from each other in terms of the manifestation of the disease? (d) What is the meaning of a split gene arrangement? Briefly explain.	5