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INDIAN SCHOOL SALALAH
FIRST TERM EXAMINATION – SEPTEMBER 2026



BIOLOGY (044)

Class: XII

DATE: 22/09/2026

Time: 3 Hours

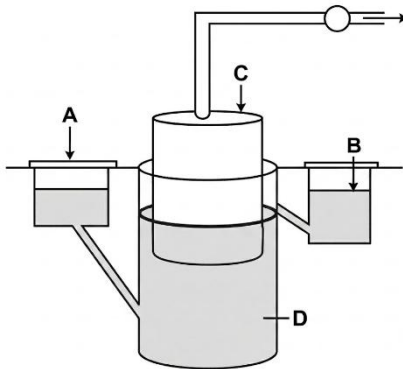
Maximum Marks: 70

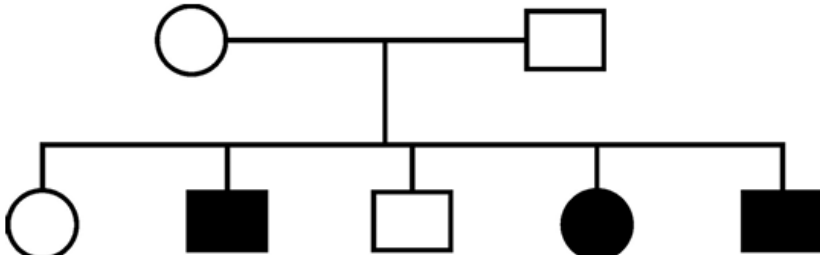
General Instructions:

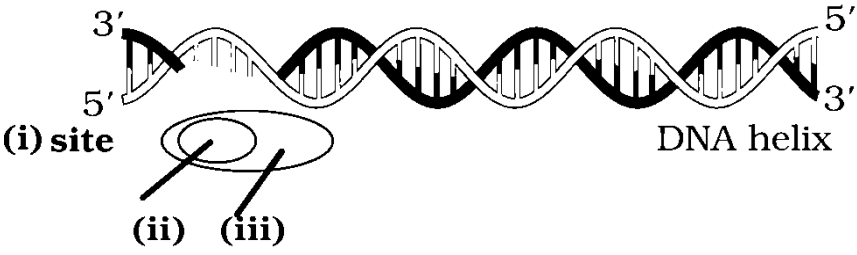
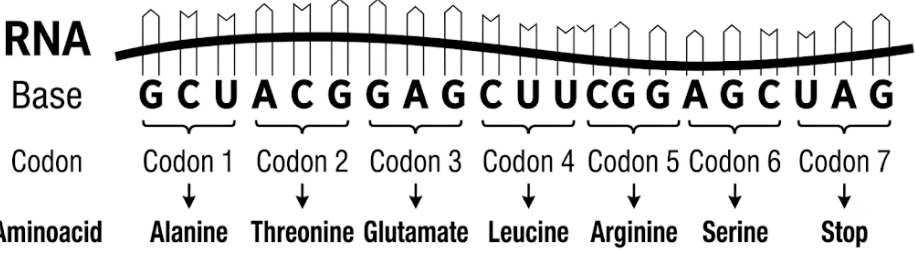
Read the following instructions very carefully and strictly follow them:

- (i) This question paper contains 33 questions. **All** questions are **compulsory**.
- (ii) This question paper is divided into **five** Sections - **A, B, C, D** and **E**.
- (iii) In **Section A** Questions no. **1** to **16** are multiple choice (MCQ) type questions, carrying 1 mark each,
- (iv) In **Section B** - Questions no. **17** to **21** very short answer (VSA) type questions, carrying 2 marks each.
- (v) In **Section C**-Questions no. **22** to **28** are short answer (SA) type questions, carrying 3 marks each.
- (vi) In **Section D** Questions no. **29** and **30** are case-based questions carrying 4 marks each. Each question has subparts with internal choice in one subpart.
- (vii) In **Section E** Questions no. **31** to **33** are long answer (LA) type questions carrying 5 marks each.
- (viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 1 question in Section C, 2 questions in Section D and 3 questions in Section E. A candidate has to attempt only one of the alternatives in such questions.
- (ix) Wherever necessary, neat and properly labelled diagrams should be drawn.

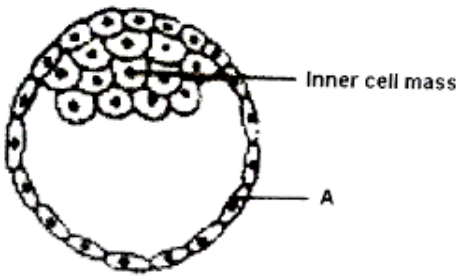
SECTION- A		
1	Which of the following sequences correctly represents the movement of sperm in the human male reproductive system from its site of production until it reaches the urethra? A. Seminiferous tubules → epididymis → vas deferens → ejaculatory duct → urethra B. Seminiferous tubules → vas deferens → epididymis → ejaculatory duct → urethra C. Epididymis → seminiferous tubules → vas deferens → urethra → ejaculatory duct	1

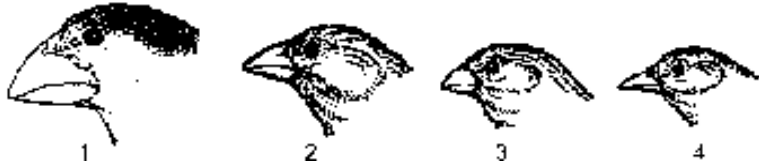
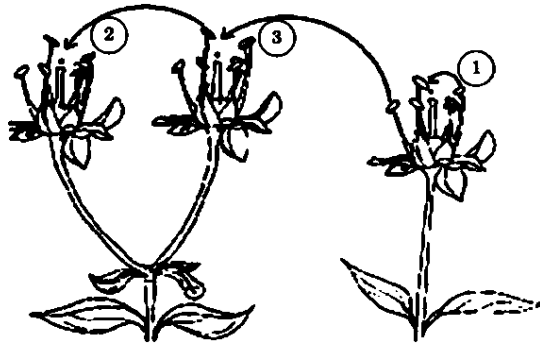
	D. Seminiferous tubules → ejaculatory duct → epididymis → vas deferens → urethra																
2	Study the given diagram of a biogas plant. Identify the structures labelled A, B, C and D and select the correct combination.  A. A–Sludge, B–Dung water, C–Gas holder, D–Digester B. A–Dung water, B–Sludge, C–Gas holder, D–Digester C. A–Gas holder, B–Outlet tank, C–Digester, D–Inlet tank D. A–Outlet tank, B–Gas holder, C–Inlet tank, D–Digester	1															
3	Match the items in column I with the items in column II. <table border="1" data-bbox="334 1018 1286 1247"> <thead> <tr> <th></th><th>COLUMN 1</th><th>COLUMN 2</th></tr> </thead> <tbody> <tr> <td>A</td><td>Remains of nucellus in a seed</td><td>1. Scutellum</td></tr> <tr> <td>B</td><td>Formation of seed without fertilization</td><td>2. Perisperm</td></tr> <tr> <td>C</td><td>Cotyledon in the seeds of grasses</td><td>3. Polyembryony</td></tr> <tr> <td>D</td><td>Occurrence of more than one embryo in a seed</td><td>4. Apomixis</td></tr> </tbody> </table> A. A-1, B-2, C-3, D-4 B. A-2, B-1, C-4, D-3 C. A-2, B-4, C-1, D-3 D. A-4, B-3, C-1, D-2		COLUMN 1	COLUMN 2	A	Remains of nucellus in a seed	1. Scutellum	B	Formation of seed without fertilization	2. Perisperm	C	Cotyledon in the seeds of grasses	3. Polyembryony	D	Occurrence of more than one embryo in a seed	4. Apomixis	1
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4	A couple seeks medical assistance because the male partner has a very low sperm count, while the female partner has normal ovulation and patent oviducts. Which assisted reproductive technique would most directly facilitate fertilization by introducing selected sperm into the female reproductive tract? A. GIFT B. ICSI C. IUI D. ZIFT	1															

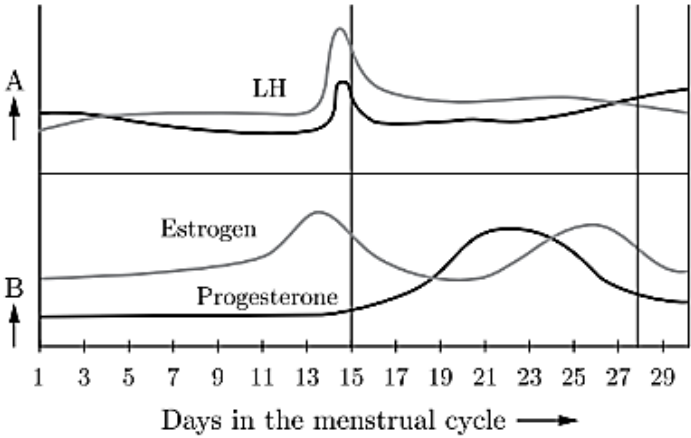
5	Consider the following statements regarding contraceptive methods: 1. Copper-releasing IUDs increase phagocytosis of sperms. 2. Hormone-releasing IUDs make the uterus unsuitable for implantation. 3. Oral contraceptive pills prevent ovulation and implantation. 4. Vasectomy prevents the formation of spermatozoa in the testes. Identify the correct combination from the following: A. 1, 2 and 3 only B. 1 and 3 only C. 2 and 4 only D. 1, 2, 3 and 4	1
6	Which of the following correctly explains why <i>Bacillus thuringiensis</i> is considered an effective biocontrol agent against insect pests? A. Its spores germinate inside the insect and release antibiotics that inhibit bacterial pathogens. B. Its toxic crystal proteins become active in the alkaline gut of susceptible insect larvae, causing death of the larvae. C. Its mycelium penetrates the insect cuticle and absorbs nutrients from the hemolymph. D. Its nitrogen-fixing ability deprives insect larvae of essential nitrogenous compounds.	1
7	The progeny of a cross between two Snapdragon plants heterozygous for flower colour bearing different coloured flower would be: A. 50% pink, 50 % white B. 25 % red 50% pink, 25% white C. 50% red, 50 % white D. 75% red, 25% white	1
8	Identify the category of genetic disorder depicted in the pedigree chart given below:  A. X-Linked recessive B. X-Linked dominant	1

	C. Autosomal recessive D. Autosomal dominant	
9	Transcription unit is represented in the diagram given below.  Identify site (i), factor (ii) and enzyme (iii) responsible for carrying out the process. A. (i) Promoter Site, (ii) Rho factor (iii) RNA polymerase B. (i) Terminator Site, (ii) Sigma factor (iii) RNA polymerase C. (i) Promoter Site, (ii) Sigma factor (iii) RNA polymerase D. (i) Promoter Site, (ii) Sigma factor (iii) DNA polymerase.	1
10	Consider the following genetic code:  Which among the following would cause a frameshift mutation? A. Substitution of A by C in codon 2 B. Insertion of G after C in codon 4 C. Insertion of GCU after C in codon 6 D. Deletion of codon 3, GAG	1
11	Which of the following observations would directly support Darwin's concept of natural selection rather than the inheritance of acquired characters? A. Development of muscles in an individual through repeated exercise B. Increased survival and reproduction of organisms possessing advantageous heritable variations C. Transmission of scars acquired during an individual's lifetime to its	1

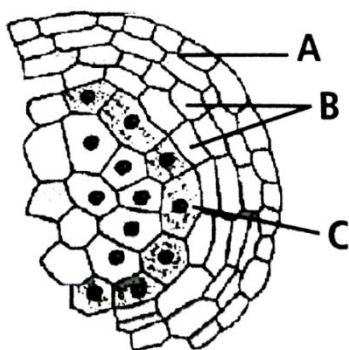
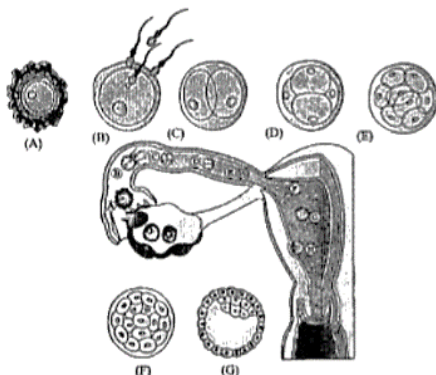
	offspring D. Transformation of an organism in response to its immediate need	
12	Identify the option that gives the correct type of evolution exhibited by the two animals shown, living in the same habitat in Australia.  FLYING SQUIRREL FLYING PHALANGER A. Convergent Evolution B. Divergent Evolution C. Disruptive Selection D. Homologous Ancestry	1
	For Questions 13 to 16, two statements are given one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below. A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion. B. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion. C. Assertion is true but Reason is false. D. Both Assertion and Reason are false.	
13	Assertion (A): The flow of genetic information in HIV deviates from the central dogma. Reason(R): HIV is a retrovirus and shows reverse transcription.	1
14	The given below figures show the different modification found in Bougainvillea and Cucurbita. Observe the figures carefully and comment upon the appropriateness of the Assertion and Reason.  Bougainvillea Cucurbita	1

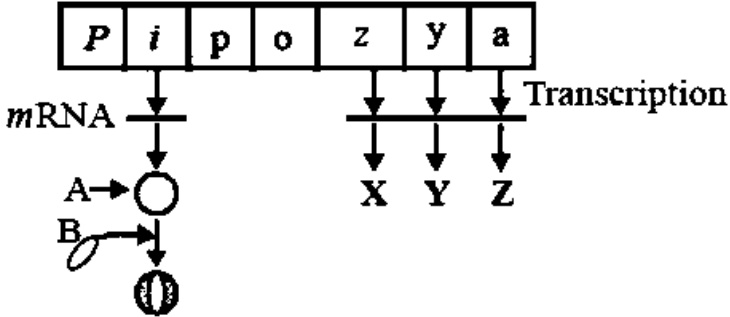
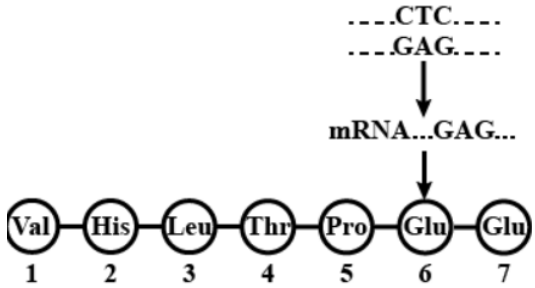
	Assertion (A): The given structures X and Y show divergent evolution. Reason(R): Structures X and Y are modified stems that perform different functions.	
15	Assertion (A): Megaspore mother cell undergoes meiosis to produce four megaspores. Reason (R): Megaspore mother cell and megaspores are both diploid.	1
16	Assertion (A): Methanogens are important in the production of biogas from cattle dung because they act aerobically on organic matter. Reason (R): Methanogens are archaebacteria that commonly occur in the aerobic environment of the rumen of cattle.	1
SECTION- B		
17 (I)	Differentiate between the following terms A. Geitonogamy and Xenogamy B. Coleorhiza and coleoptile	2
	OR	
17 (II)	A large number of married couples in the world are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless. A. State any one reason responsible for the cause of infertility in case of female. B. Suggest and explain any one technique that can help the couple to have a child where the problem is with male.	2
18	Study the figure given below and answer the questions that follows.  A. Name the stage of the human embryo the figure represents. B. What is A? Mention its function.	2
19	A couple with normal vision bears a colorblind child. Work out the cross to show how it is possible and mention the sex of the affected child.	2
20	A. Mention any two characteristics of Neanderthal man. B. Differentiate between convergent evolution and divergent evolution.	2

21(I)	Give reason for the following: A. DNA is more stable than RNA. B. Both the strands of DNA are not copied during transcription.	2
	OR	
21(II)	Observe the image given below and answer the following questions.  A. Mention the specific geographical area where these birds were found. B. Name and explain the phenomenon that has resulted in the evolution of such diverse species in the region.	2
SECTION- C		
22	Study the diagram given below showing the modes of pollination. Answer the questions that follow.  A. Identify the technical terms used for each of the pollen transfer methods labelled as 1 and 2. B. Differentiate between Cleistogamous and Chasmogamous flowers.	3
23	A. How does the Hardy-Weinberg expression ($P^2 + 2pq + q^2 = 1$) explain that genetic equilibrium is maintained in a population? B. List any two factors that can disturb the genetic equilibrium.	3
24	A. Gene encoding RNA polymerase III has been affected by mutation in a cell. Explain its impact on the synthesis of polypeptide, stating reasons. B. What is aminoacylation? Name the enzyme responsible for this process.	3

25	Inheritance is the process of passing genetic traits from parents to offspring through genes located on chromosomes. A. What is the inheritance pattern observed in the size of starch grains and seed shape in <i>Pisum sativum</i>? B. Work out the monohybrid cross showing the above traits. C. How does this pattern of inheritance deviate from that of Mendelian law of dominance?	3
26 (I)	In the figure given below, parts A and B show the levels of hormones which influence the menstrual cycle. Study the figure and answer the questions that follow:  A. State the impact of the hormone Estrogen in part B on the uterus of the human female during 6 to 15 days of the menstrual cycle. B. What happens to the level of progesterone and the uterine lining when fertilization does not occur?	3
	OR	
26(II)	A. What is amniocentesis? Why has the government imposed a statutory ban in spite of its importance in the medical field? B. A couple is unable to conceive naturally due to a blockage in the female reproductive tract. Which assisted reproductive technique can help them? Briefly explain.	3
27	A. Which type of natural selection is illustrated by the development of antibiotic-resistant bacteria? Explain your answer. B. Explain how industrial melanism in peppered moths provides evidence for natural selection.	3

28	A. What are sexually transmitted infections (STIs)? Name any two STIs that can be completely cured if detected early. B. What is Medical Termination of Pregnancy (MTP)? Mention one reason why it may be advised.		3
SECTION- D Q. No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.			
29	A couple visits a health-care center to seek advice on preventing an unplanned pregnancy. The doctor explains that different contraceptive methods are available and that the choice depends on factors such as effectiveness, duration of protection and the reproductive needs of the couple. Some methods require regular use, while others can provide protection for a longer period. Certain methods can also help reduce the risk of reproductive tract infections. The doctor also explains that permanent methods are available for couples who do not wish to have children in the future.		
	A)	Explain the permanent methods of contraception used in males and females?	2
	B)	Mention one disadvantage of using oral contraceptive pills.	1
<u>Attempt either subpart C or D</u>			
	C)	State one advantage and one limitation of contraceptive methods.	1
OR			
	D)	Lactational Amenorrhea is a method of contraception. Justify.	1
30	Thomas Hunt Morgan performed genetic experiments on <i>Drosophila melanogaster</i> and observed that certain traits did not show the expected independent assortment. When he studied the inheritance of eye colour and body colour, the genes controlling these traits were found to be located on the same chromosome. However, the offspring did not always show only the parental combinations, because exchange of genetic material could occur between homologous chromosomes during meiosis. Morgan concluded that the physical distance between genes influences the frequency of recombination.		
	A)	List any two major findings of Morgan's experiment.	2
	B)	What is the relationship between the distance separating two genes and their recombination frequency?	1
<u>Attempt either subpart C or D</u>			

	C)	Name any two pairs of contrasting characters studied by Morgan in <i>Drosophila melanogaster</i> .	1
OR			
	D)	Why did Morgan select <i>Drosophila melanogaster</i> for his genetic experiments? State any two reasons.	1
SECTION- E			
31(I)	The given diagram shows microsporangium of a mature anther.  A. Identify A, B and C. B. Write down the function of structure 'C' C. Comment on the significance of sporogenous tissue. D. The meiocyte of rice has 24 chromosomes. Write the number of chromosomes in its endosperm.		5
OR			
31(II)	Observe the image given below and answer the following questions.  A. Name the site of fertilization in human. B. What is the 8-16 cell stage of embryo called as? C. Which layer of the uterus supports implantation? D. Illustrate the process of spermatogenesis in humans with a neat, well-labelled flow diagram.		5
32(I)	A diagram showing the lac operon in the "switched on" state. The structural genes (<i>z</i> , <i>y</i> , <i>a</i>) are shown being transcribed.		5

	 A. Name the inducer molecule in this process. B. Explain how the binding of the inducer results in the "switching on" of the operon. C. Name the enzyme produced by the Z gene. D. In a molecular biology experiment, how did Griffith demonstrate the transformation of the non-virulent R strain of <i>Streptococcus pneumoniae</i> into the virulent S strain?	
	OR	
32(II)	Given below is the representation of a relevant part of amino acid composition of the β-chain of haemoglobin, related to the shape of human red blood cells.  A. Is this representation indicating a normal human or a sufferer from certain related genetic disease? Give reason in support of your answer. B. Explain haplo-diploid sex determination with an example.	5
33(I)	A wastewater treatment facility uses microorganisms to convert organic pollutants in sewage into simpler substances, thereby reducing the pollution load before the treated water is discharged. Answer the following: A. What are microbial flocs formed during secondary sewage treatment? B. Explain the role of microbial flocs in reducing the biochemical oxygen demand (BOD) of sewage. C. How is the activated sludge further utilised in the treatment process? D. Define BOD.	5

	OR	
33(II)	Microorganisms are extensively used in the production of industrially and medically important substances. Answer the following: A. How do microbial biocontrol agents help in reducing the dependence on chemical pesticides? B. Explain the role of microorganisms in the production of alcoholic beverages. C. Name the microorganism used for the production of statins and mention its significance. D. Name the microorganism used for the production of streptokinase and state its medical application.	5
