



Indian School Al Wadi Al Kabir

Assessment 1 (2026-2027)

Class: XII
Date: 17/09/2026

Sub: Biology (044)
Set-1

Max. Marks:70
Time: 3 Hours

General Instructions:

- All questions are compulsory.
- The question paper has five sections and 33 questions. All questions are compulsory.
- 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.
- 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.
- Wherever necessary, neat and properly labelled diagrams should be drawn.

Section A

- Given below are the events that are observed in an artificial hybridisation programme. Arrange them in the correct sequential order and select the correct option. 1
 - Re-bagging
 - Selection of parents
 - Bagging
 - Dusting the pollen on stigma
 - Emasculation
 - Collection of pollen from male parent
 - (ii), (iii), (v), (vi), (iv), (i)
 - (ii), (v), (iii), (vi), (iv), (i)
 - (v), (ii), (iii), (vi), (i), (iv)
 - (ii), (iii), (vi), (iv), (v), (i)
- The hilum in a typical angiospermic ovule represents the junction between: 1
 - Integuments and the embryo sac
 - Embryo sac and the nucellus
 - Body of the ovule and the funicle
 - Nucellus and the funicle
- Which of the following statements are true in respect of chorionic villi in humans? 1
 - It appears after implantation of the human embryo in the uterus.
 - It becomes interdigitated with the cervical tissue of the female reproductive tract.
 - It increases the surface area for exchange of materials.
 - It develops from the inner cell mass of the blastocyst.
 - (i) and (ii)
 - (i) and (iv)

- (c) (ii) and (iii)
(d) (i) and (iii)
4. A woman using Cu-T does not become pregnant because copper ions released by the device: 1
(a) Prevent ovulation completely
(b) Increase phagocytosis of sperm and reduce sperm motility
(c) Destroy the endometrium permanently
(d) Prevent secretion of ovarian hormones
5. Which of the following stages of oogenesis is correctly matched with its description and chromosome number? 1
(a) Oogonium — Formed continuously throughout reproductive life — $2n$ (46)
(b) Primary Oocyte — Arrested in Prophase I of meiosis until puberty — $2n$ (46)
(c) Secondary Oocyte — Large haploid cell that completes Meiosis II before fertilisation — n (23)
(d) First Polar Body — Formed after the completion of Meiosis II — n (23)
6. Medical Termination of Pregnancy (MTP) is considered relatively safe up to how many weeks of pregnancy? 1
(a) Up to 12 weeks
(b) Up to 20 weeks
(c) Up to 24 weeks
(d) Up to 28 weeks
7. Which one of the gene pairs is expected to give a ratio of 1:1:1:1 in the progeny of a Mendelian dihybrid cross? 1
(a) $AaBb \times AaBb$
(b) $AABB \times AaBb$
(c) $AaBb \times aabb$
(d) $AABB \times aabb$
8. Choose the set of sex determining chromosomes that indicates the correct sex of the respective organism. 1
(a) Homozygous sex chromosomes (ZZ) determine female sex in birds
(b) XO type of sex chromosomes determines male sex in grasshoppers
(c) XXY condition in humans, as found in Turner Syndrome, determines male sex.
(d) Homozygous sex chromosomes (XX) produce male sex in *Drosophila*.
9. The promoter site and the terminator site for transcription are located at: 1
(a) 3' (downstream) end and 5' (upstream) end, respectively, of the transcription unit
(b) 5' (upstream) end and 3' (downstream) end, respectively, of the transcription unit
(c) The 5' (upstream) end of the transcription unit
(d) The 3' (downstream) end of the transcription unit
10. Meselson and Stahl grew *E. coli* in a medium containing heavy $^{15}\text{NH}_4\text{Cl}$ for many generations, then switched them to light $^{14}\text{NH}_4\text{Cl}$. What was the exact density composition of the DNA molecules extracted after exactly 20 minutes (Generation 1)? 1
(a) 100% Light DNA ($^{14}\text{N}/^{14}\text{N}$)
(b) 100% Heavy DNA ($^{15}\text{N}/^{15}\text{N}$)
(c) 100% Hybrid/Intermediate DNA ($^{14}\text{N}/^{15}\text{N}$)
(d) 50% Light DNA and 50% Hybrid DNA

11. At which stage during evolution did humans use hides to protect their bodies and bury their dead? 1
 (a) *Homo habilis*
 (c) Java man
 (b) Neanderthal man
 (d) *Homo erectus*

12. Identify the option that gives the correct type of evolution exhibited by the two animals shown, living in an isolated geographical area (different habitats) in Australia. 1

Placental mammals	Australian marsupials
Mole	Marsupial mole
Anteater	Numbat (anteater)
Mouse	Marsupial mouse
Wolf	Tasmanian wolf

- (a) Convergent Evolution
 (b) Disruptive Selection
 (c) Divergent Evolution
 (d) Homologous Ancestry

Questions 13 to 16 consist of two statements – Assertion (A) and Reason (R).

Answer these 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): As the zygote moves through the isthmus of the oviduct towards the uterus, it undergoes rapid meiotic divisions called cleavage. 1
 Reason (R): Cleavage increases the cell number from 2 to 4, 8, and 16 daughter cells called blastomeres.
14. Assertion (A): A male honey bee cannot have a father and cannot have sons. 1
 Reason (R): Drones develop directly from the queen's unfertilised egg and can only pass their sperm to a queen to produce daughters.
15. Assertion(A): DNA is considered to be a better genetic material than RNA for most organisms. 1
 Reason(R): The 2'-OH group present in DNA makes it less reactive.
16. Assertion (A): In a given population, the gene pool (total genes and their alleles) remains constant from generation to generation under ideal conditions. 1
 Reason (R): Natural selection, genetic drift, gene migration, mutation, and genetic recombination are forces that maintain Hardy-Weinberg equilibrium.

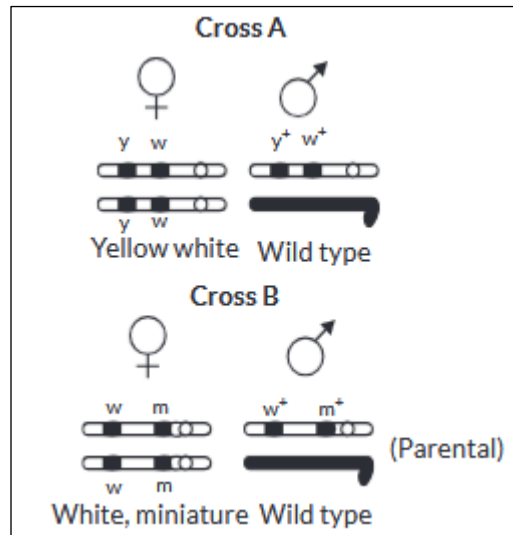
Section B

17. Attempt either option (a) or (b). 2
 (a)
 (i) Why does the primary endosperm nucleus undergo development before the embryo starts dividing?
 (ii) Describe the endosperm development in coconut.

OR

- (b) List the changes each part of a fertilised ovule undergoes to become a seed.

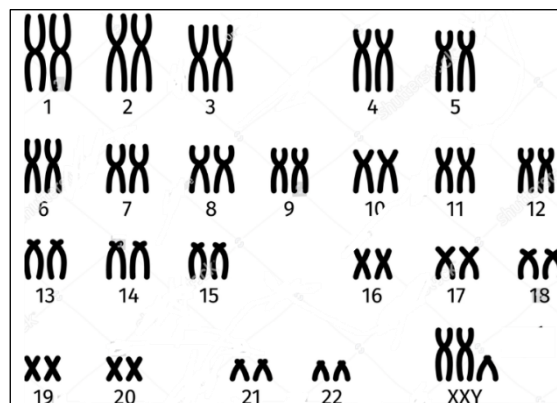
18. Draw a neat, labelled schematic diagram showing the process of spermatogenesis in human males. 2
19. (a) Mention any two objectives of RCH. 2
 (b) Why is there a statutory ban on amniocentesis? Why is the technique so named?
20. **Attempt either option (a) or (b).**
 (a)
 (i) Observe the given cross and identify in which of the crosses the strength of linkage between the genes is higher. Give reasons in support of your answer. 2



(ii) Define the term linkage.

OR

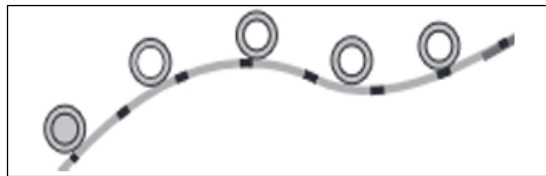
- (b)
 (i) Identify the genetic disorder with a reason. Write its karyotype.
 (ii) Give any two abnormalities of this disorder.



21. **Attempt either option (a) or (b).** 2
 (a) How did Avery, MacLeod, and McCarty prove that DNA was the genetic material? Explain.

OR

(b) The figure given below represents an important additional step in the transcription of Eukaryotes.



- (i) Identify this additional step in the transcription process of Eukaryotes and state its significance.
- (ii) Why do eukaryotes carry out this process while prokaryotes do not?

Section C

22. Attempt either option (a) or (b).

3

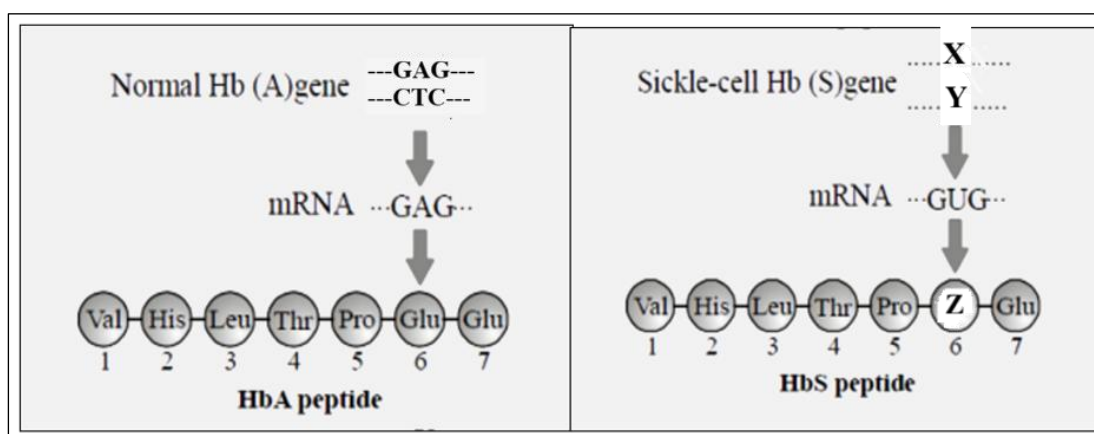
- (a) Describe the structure of a seminiferous tubule.

OR

- (b)
 - (i) Explain the role of LH and FSH during the follicular phase of the menstrual cycle.
 - (ii) What is an "LH surge"? State its immediate physiological consequence on the 14th day of a standard 28-day cycle.
 - (iii) Why is the luteal phase also referred to as the secretory phase? Explain what happens to the uterine lining if fertilisation fails.

23. (i) Identify the DNA nucleotide triplets **X** and **Y** in the mutated Sickle-cell Hb (S) gene from the figure given below.

3



- (ii) Name the amino acid 'Z' that is substituted at the 6th position of the HbS peptide chain.
- (iii) What specific type of mutation causes this genetic disorder, and how does this change affect the physical shape of Red Blood Cells (RBCs) under low oxygen tension?

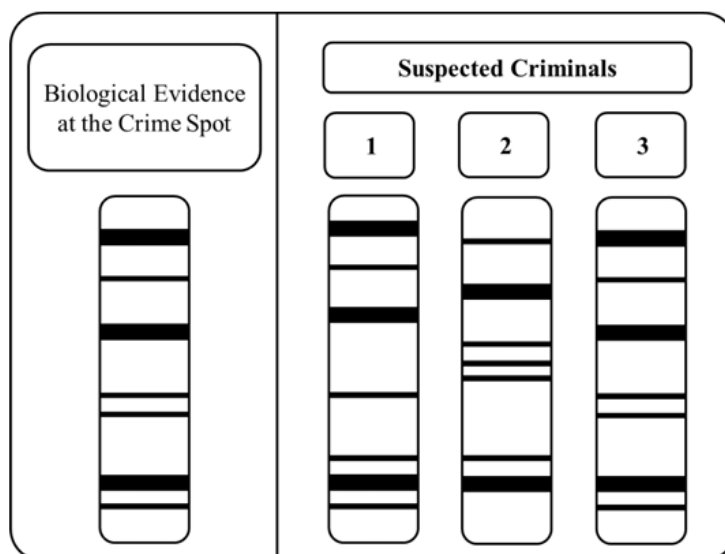
24. Attempt either option (a) or (b)

3

- (a)
 - (i) What is meant by the term "charging of tRNA" (or aminoacylation of tRNA)? Why is this process considered the very first phase of translation?
 - (ii) State the specific functions of the large subunit and the small subunit of the ribosome when they come together during protein synthesis.
 - (iii) Name the specific start codon that initiates translation, and list the three stop codons that terminate the process.

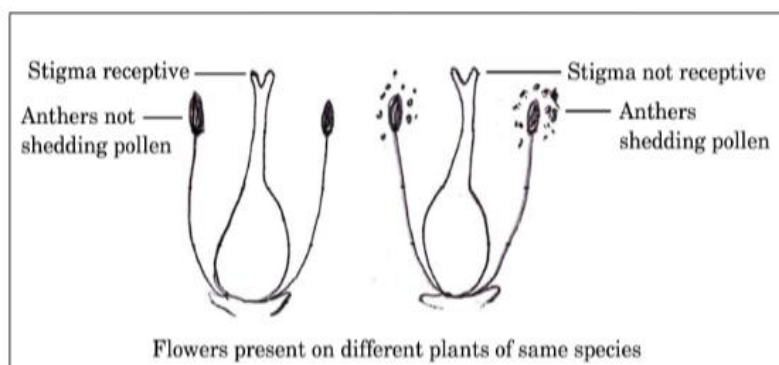
OR

(b) During a night patrol, the police came to know that a crime occurred at a park. Police investigated the case, collected blood and other samples from the crime scene, and sent them to the forensic department. The report of the forensic department was as follows.



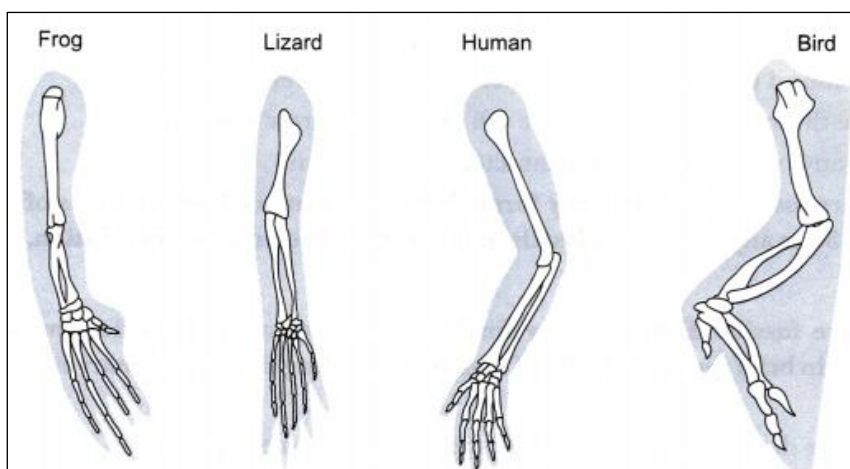
Identify the culprit who was involved in the crime from the above suspected criminal list and also list the major steps involved in DNA fingerprinting technology.

25. (a) A blood test reported negative for hCG. What does negative hCG imply? Name the tissue that produces hCG. 3
- (b) Name the three hormones that are produced in women only during pregnancy. Why is the increased production of maternal hormones essential during this period?
- (c) Explain the neuroendocrine mechanism of parturition.
26. Many flowering plants that produce bisexual flowers have evolved mechanisms 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: 3



- (a) Explain how the given type of pollination is advantageous to the plant.
- (b) Can this flowering plant show geitonogamy? Justify your answer.
- (c) How is the outbreeding device shown in the picture different from self-incompatibility?

27. (a) Describe the lactational Amenorrhoea method of birth control. 3
 (b) Why is 'Saheli' considered an effective contraceptive for women to space children?
28. (a) Identify and define the type of evolution these organs demonstrate across different animals. 3



- (b) What are such organs called? What do they indicate about ancestry?

Section D

- 29 A large number of couples all over the world, including India, are infertile, meaning they are unable to produce children despite unprotected sexual cohabitation. In India, often the female is blamed for the couple being childless, but more often than not, the problem lies in the male partner. Specialised health care units (infertility clinics) can help in diagnosis and corrective treatment of some of these disorders. However, where such treatments are not possible, the couples can be assisted to have children through special techniques commonly called Assisted Reproductive Technology (ART). 4

A fertility clinic analyses different couples facing trouble conceiving naturally:

- **Couple A:** The female partner is healthy and has an open reproductive tract but cannot produce a functional ovum. However, she can provide a suitable environment for fertilisation and further development.
- **Couple B:** The male partner has a very low sperm count and is unable to inseminate the female partner naturally.

(a) What are three common reasons or factors that can cause infertility in couples? (1)

(b) Differentiate between GIFT and ZIFT. (2)

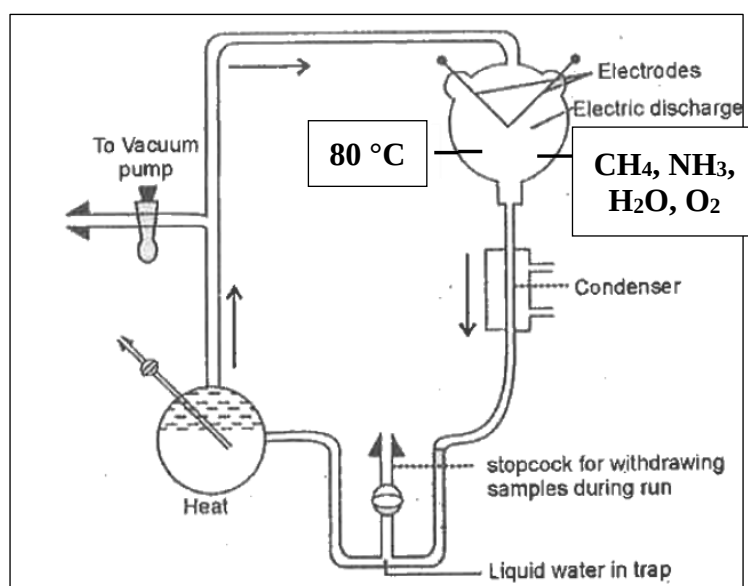
Attempt either subpart (c) or (d).

(c) Which ART technique should be recommended for Couple A, where the female cannot produce an egg (ovum) but has a healthy uterus? (1)

OR

(d) Which technique can help Couple B, where the male partner has a very low sperm count and cannot inseminate naturally? (1)

30. A student was simulating Urey and Miller's experiment to prove the origin of life. The setup used by the student is given: 4



(a) Find out the reason why he could not get the desired results. (1)

(b) How did S. L. Miller create conditions that existed before the origin of any life on Earth? (2)

Attempt either subpart (c) or (d)

(c) Name the organic compound formed and collected at the end of the experiment. (1)

OR

(d) Mention the kind of evolution this experiment supported. (1)

Section E

31. Attempt either option (a) or (b)

5

(a)

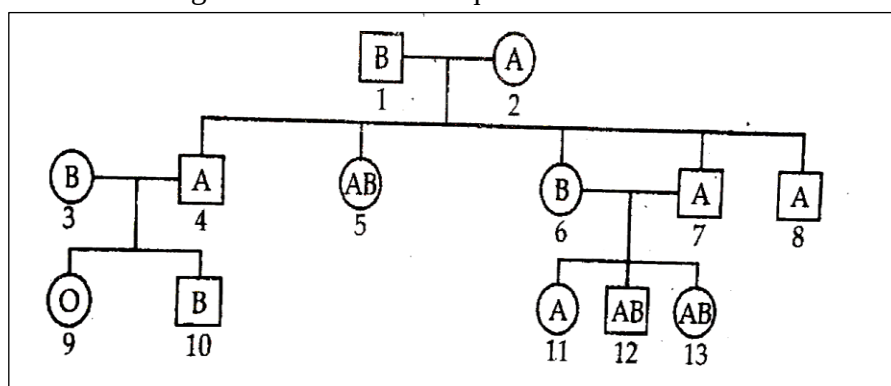
(i) What is the inheritance pattern observed in the size of starch grains and seed shape of *Pisum sativum*?

(ii) Work out the monohybrid cross showing the above traits.

(iii) How does this pattern of inheritance deviate from that of Mendelian law of dominance?

OR

(b) Observe the diagram and answer the questions that follow:



(i) Give the possible genotypes of individuals 1 and 2.

(ii) Which antigen or antigens will be present on the plasma membranes of the RBCs of individuals 5 and 9.

(iii) What is pedigree analysis? Suggest how such an analysis can be useful.

(iv) Differentiate between a Mendelian disorder and a Chromosomal disorder based on the nature of the mutation that causes them.

32. **Attempt either option (a) or (b)**

5

(a)

- (i) Explain the monosporic development of the embryo sac in the ovule of an angiosperm.
- (ii) Draw a diagram of the mature embryo sac of an angiospermous ovule and label any four parts.

OR

(b)

- (i) Explain with a neat labelled diagram the structure of a typical microsporangium (young anther) with a focus on its wall layers and their functions.
- (ii) Explain the process of microsporogenesis and its subsequent development into a mature male gametophyte.

33. **Attempt either option (a) or (b)**

5

(a)

- (i) Explain the functioning of the *lac* operon in *E. coli* when lactose is present in the growth medium. Draw a neat, labelled schematic diagram.
- (ii) List two methodologies that were involved in the Human Genome Project.

OR

(b)

- (i) Explain DNA replication with a neat labelled diagram.
- (ii) Why is DNA replication considered semi-conservative?

All the Best