



Indian School Al Wadi Al Kabir

Assessment I (2026-2027)

Sub: BIOLOGY (044)

Class: XI

Date: 24/09/2026

SET-1

Max. Marks: 70

Time: 3 Hours

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

1. The role of the cytoskeleton in a cell is 1
 - A. Protein synthesis
 - B. DNA replication
 - C. Structural support and movement
 - D. Energy production
2. A patient is diagnosed with a genetic disorder that impairs the function of lysosomes. What symptom is most likely to be observed? 1
 - A. Decreased protein synthesis
 - B. Accumulation of undigested cellular waste
 - C. Increased ATP production
 - D. Inability to carry out photosynthesis
3. A polysaccharide found in the exoskeleton of arthropods and the cell walls of fungi is: 1
 - A. Cellulose
 - B. Glycogen
 - C. Chitin
 - D. Starch
4. What is the primary significance of mitosis in multicellular organisms? 1
 - A. Reduction of chromosome number by half.
 - B. Growth, repair of tissues, and replacement of dead cells.
 - C. Increasing genetic variation through crossing over.
 - D. Production of gametes for reproduction.
5. If the initial DNA content of a diploid cell is 2C at G₁, what will be the DNA content and the number of chromosomes at the end of S-phase, respectively? 1

- A. 4C and 4n
B. 2C and 2n
C. 4C and 2n
D. 2C and 4n
6. What will happen if CO₂ level increases in blood? 1
A. Respiration rate becomes faster to compensate for oxygen requirement.
B. Chemo-sensitive area adjacent to respiratory rhythm centre gets activated.
C. Respiratory rhythm centre in medulla gets activated to regulate the breathing rate.
D. All the above.
7. The volume of air inspired or expired during a normal respiration is called: 1
A. Tidal Volume (TV)
B. Residual Volume (RV)
C. Inspiratory Reserve Volume (IRV)
D. Vital Capacity (VC)
8. The enzyme that catalyses the conversion of fibrinogen in the plasma into fibrin is 1
A. Thrombin
B. Thrombokinas
C. Erythropoietin
D. Prothrombin
9. Ammonia produced during protein catabolism is converted to uric acid in the liver of 1
A. Ureotelic animals
B. Uricotelic animals
C. Ammonotelic animals
D. Ornithinotelic animals
10. Which of the following statements is false? 1
A. Smooth muscles are found in the urinary bladder, alimentary canal and genital tract.
B. A striated muscle is a syncytium. (multinucleate)
C. The cytoplasm of striated muscle is called endoplasm.
D. The plasma membrane and ER of striated muscles are called sarcolemma and sarcoplasmic reticulum, respectively.
11. Which of the following is known as the 'Pacemaker' of the human heart? 1
A. Sino-atrial node (SAN)
B. Bundle of His
C. Purkinje fibres
D. Atrioventricular node (AVN)
12. In the resting state of a neuron, the axonal membrane is: 1
A. More permeable to K⁺ ions than to Na⁺ ions.
B. More permeable to Na⁺ ions than to K⁺ ions.
C. Impermeable to both Na⁺ and K⁺ ions.
D. Equally permeable to both Na⁺ and K⁺ ions.

Questions Nos. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

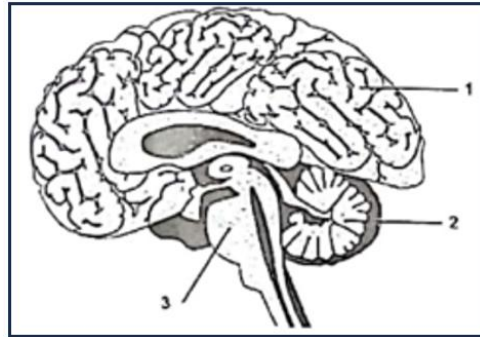
- (a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true

13. **Assertion (A):** Each haemoglobin molecule can carry a maximum of four molecules of oxygen. 1
Reason (R): Haemoglobin is an iron-containing protein that exists in a quaternary structure.
14. **Assertion (A):** In humans, the left lung has two lobes while the right lung has three lobes. 1
Reason (R): The left lung is smaller to accommodate the heart in the cardiac notch.
15. **Assertion (A):** ADH (Antidiuretic Hormone) helps in water reabsorption from the DCT and collecting duct. 1
Reason (R): ADH is released by the posterior pituitary in response to an increase in body fluid volume.
16. **Assertion (A):** The cerebral cortex has motor areas, sensory areas and association areas. 1
Reason (R): The association areas are responsible for intersensory association, memory and communication.

SECTION B

17. **Attempt either option A or B** 2
- A. Give reason:
- RER bear ribosomes on their surface.
 - Golgi apparatus remains in close association with the endoplasmic reticulum.
- OR**
- B. Differentiate between primary cell wall and secondary cell wall.
18. What is the significance of the G_0 (quiescent) stage in the cell cycle? Mention one type of cell that remains in this stage. 2
19. A. What is meant by the zwitterionic nature of amino acids? 2
 B. Represent the zwitterionic form of an amino acid with a neat, labelled diagram showing the charges on the functional groups.
20. **Attempt either option A or B** 2
- A. Differentiate between primary and secondary metabolites.
- OR**
- B. Describe the formation of the Enzyme-Substrate (ES) complex during a chemical reaction. Why is the formation of this complex considered a transient phenomenon?
21. **Attempt either option A or B** 2
- A. Differentiate between afferent neurons and efferent neurons.
- OR**
- B. The diagram given below is an external view of the human brain. Study the same and answer the questions that follow:

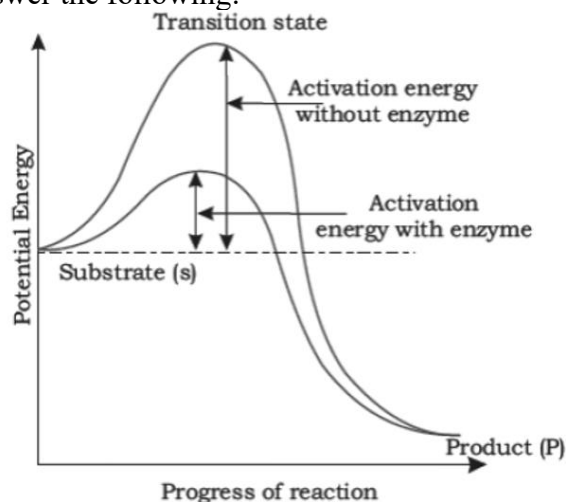
- i) Write the functions of the parts labelled as 1, 2 and 3.
- ii) Name the tract of nerve fibres that connects the two cerebral hemispheres in human beings.



SECTION C

22. Draw a neat labelled diagram of Mitochondria. Why is this organelle referred to as the 'Powerhouse of the Cell'? 3

23. Observe the graph and answer the following: 3

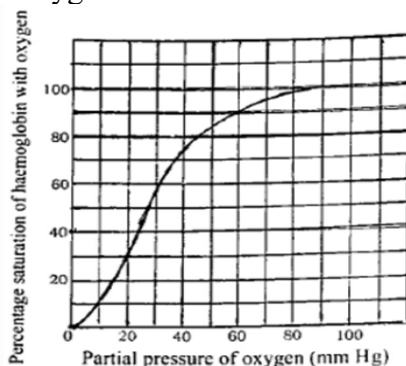


- A. Find out the role of the enzyme.
 - B. Mention any two factors that influence the activity of an enzyme and state their influence.
24. A. Write the name of the substage of Prophase I in which the following events take place: 3
 - i) Synapsis ii) Terminalisation of Chiasmata
 - B. Name the enzyme that catalyses crossing over.
 - C. What is the significance of crossing over?
25. A. Draw a neat and well-labelled diagram of a section of an alveolus with a pulmonary capillary. 3
 - B. Mention three layers that act as diffusion surfaces between alveoli and blood.
26. A. What is ECG? 3
 - B. Draw a standard ECG and explain the different waves in it.

27. A. What is the Juxtaglomerular Apparatus? 3
 B. Name the enzyme secreted by the Juxtaglomerular cells.
 C. What is the significance of JGA in kidney function?
28. A. The important findings in the case sheet of two patients, A and B, show that both are 3
 suffering from disorders of the skeletal system.
 i. Patient A is suffering from inflammation of joints due to the accumulation of uric acid crystals.
 ii. Patient B shows decreased bone mass and decreased level of estrogen. Identify the disorders or diseases of A and B.
 B. An athlete met an accident on the field. His thigh bone slipped off from the girdle.
 i. Write the name of the above-mentioned girdle.
 ii. Identify the type of joint that slipped off.

SECTION D

29. The pressure of oxygen (pO_2) and the percentage saturation of haemoglobin with oxygen are 4
 represented by a sigmoid (S-shaped) curve. This curve is essential for understanding how the body transports and delivers oxygen. In the alveoli, where (pO_2) is high, factors such as low pCO_2 , low H^+ concentration (higher pH), and lower temperature favour the formation of oxyhaemoglobin.
 Conversely, in the tissues, where (pO_2) is low, the environment is characterised by high pCO_2 , high concentration, and higher temperature. These conditions favour the dissociation of oxygen from haemoglobin. Under normal physiological conditions, every 100 ml of oxygenated blood can deliver around 5 ml of oxygen to the tissues.



- A. Describe the shape of the oxygen-haemoglobin dissociation curve. Why is this specific shape significant for the binding of oxygen to haemoglobin?
 B. List the specific physiological factors present in the **alveoli** that favour the formation of oxyhaemoglobin.

Attempt either subpart C or D.

- C. Blood transports CO_2 from tissues to lungs by various means. Mention any 2 of these methods.

OR

- D. Asthma and emphysema are two disorders of the respiratory system. Mention one cause each of asthma and emphysema.

30. Blood typing involves identifying specific antigens on the surface of red blood cells. While the ABO system is the most well-known, the Rh (Rhesus) factor is equally critical in clinical settings. An individual is Rh-positive if their red blood cells carry the Rh antigen and Rh-negative if they do not. Unlike the ABO system, where antibodies are naturally occurring, Rh-negative individuals only develop anti-Rh antibodies after being exposed to Rh-positive blood, such as through a mismatched transfusion or during pregnancy. If an Rh-negative woman is pregnant with an Rh-positive foetus, then during pregnancy or delivery, some foetal RBCs may enter the mother's bloodstream and stimulate the production of anti-Rh antibodies. In a subsequent Rh-positive pregnancy, these antibodies may cross the placenta and affect the foetus. 4

- A. What is the Rh factor? In which animal was it first discovered?
B. Why is it essential to perform blood grouping and cross-matching before any clinical transfusion?

Attempt either subpart C or D.

- C. How does the Rh system differ from the ABO blood group system with respect to antibodies?

OR

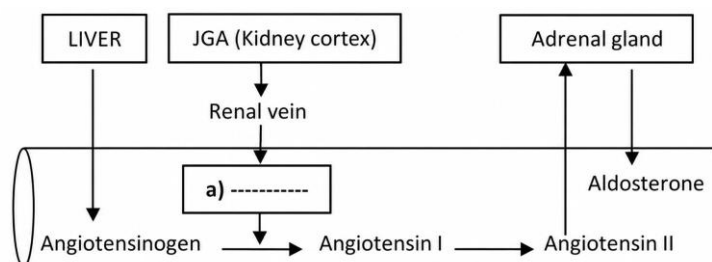
- D. Name the disorder caused by Rh⁺ and Rh⁻ incompatibility during pregnancy. How can it be controlled?

Section-E

31. Attempt either option A or B.

5

- A. i) How does the countercurrent mechanism help to maintain the concentration gradient in the medullary interstitium?
ii) Observe the schematic diagram showing the mechanism for regulating blood volume.



- a. Fill the gap (a) given in the diagram.
b. Illustrate how this system regulates blood volume.

OR

- B. i) Explain the process of urine formation in the human kidney. Discuss the three main steps: Glomerular Filtration, Selective Reabsorption, and Tubular Secretion.
ii) A patient is suffering from kidney failure. Suggest a way to keep him active till the kidney transplantation and briefly explain the principle behind it.

32. Attempt either option A or B.

5

- A. Explain the Sliding Filament Theory of muscle contraction. Detail the sequence of events from the arrival of a neural signal at the neuromuscular junction to the formation and breaking of cross-bridges. Draw a neat labelled diagram to support your answer.

OR

B.

- i. Describe the structure of a contractile protein with the help of a diagram.
- ii. Explain the role of Calcium ions and ATP in the regulation of skeletal muscle contraction.
- iii. How do you distinguish between a skeletal muscle and a cardiac muscle?

33. Attempt either option A or B.

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A.

- i. Explain the process of impulse conduction across a chemical synapse with the help of a neat, labelled diagram.
- ii. The flow of nerve impulses is unidirectional. Give a reason.

OR

B.

- i) How is an action potential achieved during impulse conduction through an Axon? Explain.
- ii) Explain the structure of a multipolar neuron with a neat, labelled diagram.

All the best!