



# BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS  
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL  
PERIODIC TEST-II 2024-25  
BIOLOGY (044)



Date: 02/12/2024

MARKING SCHEME

Max. Marks: 25

## Section A

1. (b) Telophase-I and prophase-II 1
2. (a) Splitting of water molecules 1
3. (C) A is true but R is false. 1

## Section B

4. Respiratory quotient (RQ): 1+1
  - a) For carbohydrates (e.g., glucose):  $RQ = 1$
  - b) For fats:  $RQ < 1$
5. a) Light reactions vs. Dark reactions: 1+1

Light reactions require sunlight, occur in the thylakoid membranes, and produce ATP and NADPH.  
Dark reactions (Calvin cycle) occur in the stroma and use ATP and NADPH to fix carbon dioxide into glucose.

  - b) Cyclic vs. Non-cyclic photophosphorylation:  
Cyclic: Produces ATP only, involves only PSI, and electrons return to PSI.  
Non-cyclic: Produces ATP and NADPH, involves PSI and PSII, and electrons are transferred to  $NADP^+$ .
6. Cytokinesis in plants vs. animals: 1+1

Plant cells form a cell plate during cytokinesis.  
Animal cells form a cleavage furrow.
7. Mitosis maintains the chromosome number in daughter cells, making them genetically identical to the parent cell. 2
8. Respiratory substrates: 1+1

Molecules oxidized during respiration to release energy.  
Most common substrate: Glucose.

OR:

Main steps in aerobic respiration: Glycolysis, Krebs cycle, and Electron Transport Chain (ETC).  
Location: Cytoplasm (glycolysis), mitochondrial matrix (Krebs cycle), and inner mitochondrial membrane (ETC).

## Section C

9. Schematic representation of glycolysis: 3

Glucose  $\rightarrow$  Glucose-6-phosphate  $\rightarrow$  Fructose-6-phosphate  $\rightarrow$  Fructose-1,6-bisphosphate  $\rightarrow$  Glyceraldehyde-3-phosphate  $\rightarrow$  Pyruvate (ATP and NADH produced).

10. Electron Transport Chain (ETC):

3

Series of protein complexes on the inner mitochondrial membrane.

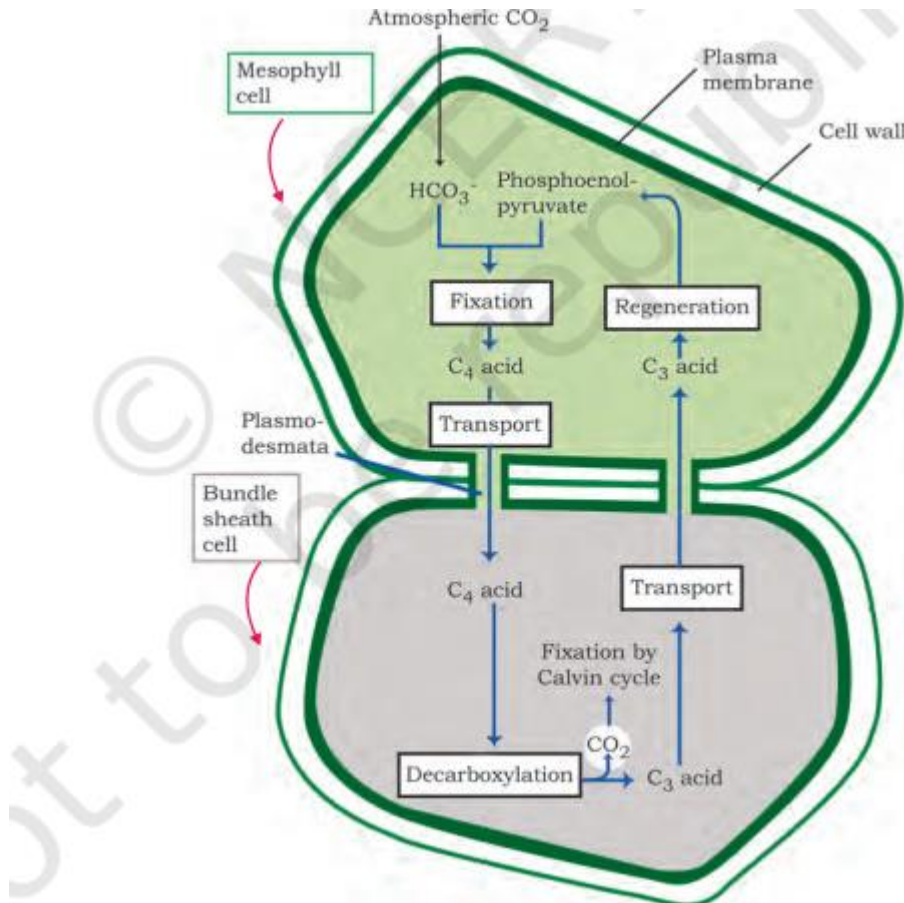
Transfers electrons from NADH and FADH<sub>2</sub> to oxygen, generating ATP via chemiosmosis.

11. Hatch and Slack pathway (C<sub>4</sub> pathway):

3

CO<sub>2</sub> fixation into oxaloacetate (4-carbon) in mesophyll cells.

Transport to bundle sheath cells, releasing CO<sub>2</sub> for the Calvin cycle.



12. i) DNA replication without cell division: Yes

1+1+1

ii) Significance of meiosis: Produces haploid gametes, introduces genetic variation.

iii) Chiasmata: Points where homologous chromosomes exchange genetic material during meiosis.

OR

iv) Synaptonemal complex: Protein structure that forms between homologous chromosomes during prophase I of meiosis, aiding in synapsis and recombination.