

Photosynthesis in Higher Plants — Assignment 1

Class 11 Biology · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Photosynthesis as a Physicochemical Process

MCQ Questions (choose the correct option)

1. Photosynthesis converts light energy into
 - (A) chemical energy
 - (B) heat energy
 - (C) mechanical energy
 - (D) electrical energy
2. The pigment that absorbs light in green plants is
 - (A) chlorophyll
 - (B) haemoglobin
 - (C) melanin
 - (D) carotene only
3. The site of photosynthesis in the cell is the
 - (A) chloroplast
 - (B) mitochondrion
 - (C) ribosome
 - (D) nucleus
4. Photosynthesis is a ____ process.
 - (A) physicochemical
 - (B) purely physical
 - (C) purely chemical
 - (D) catabolic only

1 Mark Questions

1. Define photosynthesis.
2. Name the pigment that absorbs light in green plants.
3. Where in the cell does photosynthesis occur?

2 Mark Questions

1. Why is photosynthesis called a physicochemical process?
2. State the overall equation of photosynthesis.

3 Mark Questions

1. Describe photosynthesis as a physicochemical process.
2. Explain the role of chloroplasts in photosynthesis.

Light Reaction — Z-scheme

MCQ Questions (choose the correct option)

1. The light reaction occurs in the
 - (A) thylakoid membranes
 - (B) stroma
 - (C) cytoplasm
 - (D) mitochondria
2. Photosystem I absorbs light maximally at
 - (A) P700
 - (B) P680
 - (C) P660
 - (D) P760
3. In the light reaction, water is split in a process called
 - (A) photolysis
 - (B) hydrolysis
 - (C) glycolysis
 - (D) photorespiration
4. The products of the light reaction are
 - (A) ATP, NADPH and O₂
 - (B) glucose and O₂
 - (C) CO₂ and water
 - (D) ATP only

1 Mark Questions

1. Where does the light reaction occur?
2. What does P680 stand for?
3. Name the process by which water is split.

2 Mark Questions

1. State the products of the light reaction.
2. What is the Z-scheme?

3 Mark Questions

1. Describe the events of the light reaction.
2. Explain the Z-scheme with reference to the two photosystems.

Dark Reaction — Calvin Cycle (C3 Pathway)

MCQ Questions (choose the correct option)

1. The Calvin cycle occurs in the
 - (A) stroma
 - (B) thylakoid
 - (C) cytoplasm
 - (D) nucleus
2. The enzyme that fixes CO₂ in the Calvin cycle is

- (A) RuBisCO
 - (B) ATP synthase
 - (C) hexokinase
 - (D) pepsin
3. The first stable product of the Calvin cycle is
- (A) 3-PGA
 - (B) glucose
 - (C) pyruvate
 - (D) OAA
4. The Calvin cycle is also called the
- (A) C₃ pathway
 - (B) C₄ pathway
 - (C) CAM pathway
 - (D) glycolytic pathway

1 Mark Questions

1. Where does the Calvin cycle occur?
2. Which enzyme fixes CO₂ in the Calvin cycle?
3. What is the first stable product of the Calvin cycle?

2 Mark Questions

1. Why is the Calvin cycle called the C₃ pathway?
2. Name the three phases of the Calvin cycle.

3 Mark Questions

1. Describe the stages of the Calvin cycle.
2. Explain the role of RuBisCO in carbon fixation.

C₄ Pathway and Kranz Anatomy

MCQ Questions (choose the correct option)

1. The C₄ pathway is also called the
 - (A) Hatch-Slack pathway
 - (B) Calvin pathway
 - (C) CAM pathway
 - (D) Z-scheme
2. The first stable product of the C₄ pathway is
 - (A) OAA
 - (B) 3-PGA
 - (C) glucose
 - (D) pyruvate
3. Kranz anatomy is seen in
 - (A) C₄ plants
 - (B) C₃ plants
 - (C) all plants

- (D) CAM plants
4. A common C4 plant is
- (A) maize
 - (B) wheat
 - (C) rice
 - (D) potato

1 Mark Questions

1. What does C4 stand for?
2. Name one C4 plant.
3. What is Kranz anatomy?

2 Mark Questions

1. State two advantages of the C4 pathway.
2. Distinguish between C3 and C4 plants.

3 Mark Questions

1. Describe the C4 pathway and Kranz anatomy.
2. Explain why C4 plants are more efficient than C3 plants.

Photorespiration and Its Drawbacks

MCQ Questions (choose the correct option)

1. Photorespiration occurs when RuBisCO binds
 - (A) O₂
 - (B) CO₂
 - (C) N₂
 - (D) H₂O
2. Photorespiration is favoured by
 - (A) high O₂ and low CO₂
 - (B) high CO₂ and low O₂
 - (C) low light
 - (D) high humidity
3. In photorespiration
 - (A) no sugar is produced
 - (B) sugar is produced
 - (C) ATP is produced
 - (D) NADPH is produced
4. Photorespiration is a wasteful process because
 - (A) it consumes ATP without producing sugar
 - (B) it produces sugar
 - (C) it fixes nitrogen
 - (D) it stores energy

1 Mark Questions

1. What is photorespiration?
2. Which gas competes with CO₂ at the active site of RuBisCO?
3. Is photorespiration a productive process?

2 Mark Questions

1. When does photorespiration occur?
2. State two drawbacks of photorespiration.

3 Mark Questions

1. Explain photorespiration and its drawbacks.
2. How do C₄ plants avoid photorespiration?

Factors Affecting Photosynthesis

MCQ Questions (choose the correct option)

1. The most important external factor affecting photosynthesis is
 - (A) light
 - (B) CO₂
 - (C) temperature
 - (D) water
2. As light intensity increases, the rate of photosynthesis
 - (A) first increases then levels off
 - (B) always increases
 - (C) always decreases
 - (D) stays constant
3. The internal factor that limits photosynthesis is
 - (A) chlorophyll content
 - (B) wind
 - (C) soil
 - (D) altitude
4. A limiting factor in photosynthesis is
 - (A) the factor in shortest supply
 - (B) always light
 - (C) always CO₂
 - (D) always water

1 Mark Questions

1. Name two external factors affecting photosynthesis.
2. What is a limiting factor?
3. Name one internal factor affecting photosynthesis.

2 Mark Questions

1. State the law of limiting factors.
2. How does CO₂ concentration affect the rate of photosynthesis?

3 Mark Questions

1. Explain the factors affecting the rate of photosynthesis.
2. Describe the law of limiting factors with an example.