

(7 pages)

Reg. No. : .....

Code No. : 5525

Sub. Code : WBOM 41

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Fourth Semester

Botany — Core

PLANT PHYSIOLOGY AND PLANT METABOLISM

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. What is the process by which plants adjust their water potential to maintain water balance?
  - (a) Osmosis
  - (b) Transpiration
  - (c) Stomatal regulation
  - (d) Water potential regulation

2. What is the term for the movement of water and minerals from the roots to the leaves through the xylem?
  - (a) Translocation
  - (b) Transpiration
  - (c) Osmosis
  - (d) Diffusion
3. What is the term for the process by which plants sense and respond to gravity?
  - (a) Gravitropism
  - (b) Phototropism
  - (c) Thigmotropism
  - (d) Chemotropism
4. What is the pigment responsible for absorbing light energy in photosystem II?
  - (a) Chlorophyll a
  - (b) Chlorophyll b
  - (c) Carotenoids
  - (d) Phycobiliproteins
5. What is the process by which light energy is converted into chemical energy in the form of ATP and NADPH?
  - (a) Light-dependent reactions
  - (b) Light-independent reactions
  - (c) photophosphorylation
  - (d) Carbon fixation

6. What is the term for the process by which plants convert  $\text{CO}_2$  into glucose using the energy from ATP and NADPH?
- (a) Carbon fixation
  - (b) Calvin cycle
  - (c) Krebs cycle
  - (d) Pentose phosphate pathway
7. What is the plant hormone responsible for promoting cell elongation and cell division?
- (a) Auxin
  - (b) Gibberellin
  - (c) Cytokinin
  - (d) Ethylene
8. What is the plant hormone responsible for inhibiting seed germination and promoting dormancy?
- (a) Abscisic acid
  - (b) Auxin
  - (c) Gibberellin
  - (d) Cytokinin
9. What is the plant hormone responsible for promoting fruit ripening and senescence?
- (a) Ethylene
  - (b) Auxin
  - (c) Gibberellin
  - (d) Cytokinin
10. What is the process by which plants break down glucose to produce energy in the form of ATP?
- (a) Aerobic respiration
  - (b) Anaerobic respiration
  - (c) Fermentation
  - (d) Photosynthesis
11. What is the term for the process by which plants produce energy in the absence of oxygen?
- (a) Aerobic respiration
  - (b) Anaerobic respiration
  - (c) Fermentation
  - (d) Photosynthesis
12. What is the term for the process by which plants break down glucose to produce lactic acid or ethanol?
- (a) Aerobic respiration
  - (b) Anaerobic respiration
  - (c) Fermentation
  - (d) Photosynthesis

13. What is the process by which plants shed their leaves or flowers?  
(a) Abscission (b) Senescence  
(c) Dormancy (d) Quiescence
14. What is the term for the physical or environmental factors that affect plant growth and development?  
(a) Stress (b) Strain  
(c) Pressure (d) Tension
15. What is the process by which fruits become sweeter and softer as they ripen?  
(a) Fruit ripening (b) Fruit senescence  
(c) Fruit abscission (d) Fruit dormancy

PART B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

16. (a) Discuss briefly on physical properties of water.  
Or  
(b) Briefly explain about transpiration.

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17. (a) Can you brief about C4 pathway.  
Or  
(b) Highlight about photorespiration.
18. (a) Critically comment on nitrogen fixation.  
Or  
(b) Elaborate on oxidative phosphorylation.
19. (a) Give an account on phytochrome.  
Or  
(b) Explain about biological Rythms.
20. (a) Can you explain about plant response to biotic stress.  
Or  
(b) Briefly discuss about fruit ripening.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

21. (a) Discuss about apoplast and symplast.  
Or  
(b) Elaborate on essential micronutrients.

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22. (a) Explain about chemiosmosis theory.

Or

(b) Briefly discuss about photo system I.

23. (a) Can you explain about significance of respiration in crop improvement.

Or

(b) Critically comment on TCA cycle.

24. (a) Elaborate on cytokinins.

Or

(b) Explain in detail about senescence.

25. (a) Explain about adaptive mechanism to various stress.

Or

(b) Briefly discuss about control of fruit ripening.

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