AGRICULTURE REVIEW

Soil Science (Soil Genesis, Classification, and Survey) Reviewer

1. Which of the following staple crops is a classic example of a C3 plant?

- **A.** Corn
- **B.** Sugarcane
- **C.** Rice
- **D.** Sorghum

2. Which of the following crops utilizes the C4 photosynthetic pathway, making it highly efficient in hot climates?

- **A.** Wheat
- **B.** Soybean
- **C.** Corn
- **D.** Barley

3. Plants that open their stomata during the night to minimize water loss are classified as:

- **A.** C3 plants
- **B.** C4 plants
- **C.** CAM plants
- **D.** C2 plants

4. The primary plant hormone responsible for the ripening of climacteric fruits is:

- **A.** Auxin
- **B.** Gibberellin
- **C.** Cytokinin
- **D.** Ethylene

5. Which plant hormone is primarily responsible for promoting cell division and rapid stem elongation?

- **A.** Abscisic acid
- **B.** Ethylene
- **C.** Gibberellin
- **D.** Cytokinin

6. Apical dominance, which inhibits the growth of lateral buds in favor of the main shoot, is maintained by which hormone?

- **A.** Auxin
- **B.** Ethylene
- **C.** Gibberellin
- **D.** Jasmonic acid

7. In C3 plants, the first stable product of carbon fixation is a 3-carbon compound known as:

- **A.** Oxaloacetate
- **B.** 3-Phosphoglyceric acid (3-PGA)
- **C.** Malate
- **D.** Phosphoenolpyruvate (PEP)

8. What is the primary enzyme responsible for CO2 fixation in the Calvin cycle of C3 plants?

- **A.** PEP carboxylase
- **B.** Malic enzyme
- **C.** RuBisCO
- **D.** Pyruvate kinase

9. In C4 plants, the initial fixation of carbon dioxide occurs in the:

- **A.** Bundle sheath cells
- **B.** Mesophyll cells
- **C.** Epidermal cells
- **D.** Guard cells

10. Which plant hormone is widely used in agricultural propagation to induce rooting in stem cuttings?

- **A.** Ethylene
- **B.** Gibberellin
- **C.** Auxin
- **D.** Salicylic acid

11. The traditional Filipino practice of smudging mango trees induces off-season flowering due to the smoke's production of:

- **A.** Ethylene
- **B.** Auxin
- **C.** Gibberellin
- **D.** Cytokinin

12. Pineapple, agave, and cacti are typical examples of plants that utilize which photosynthetic pathway?

- **A.** C3
- **B.** C4
- **C.** CAM
- **D.** Calvin-Benson

13. The structural adaptation in the leaves of C4 plants characterized by prominent, chloroplast-rich bundle sheath cells is called:

- **A.** Bulliform cells
- **B.** Kranz anatomy
- **C.** Spongy mesophyll
- **D.** Aerenchyma

14. Which of the following is the most abundant naturally occurring auxin in plants?

- **A.** 2,4-Dichlorophenoxyacetic acid (2,4-D)
- **B.** Naphthaleneacetic acid (NAA)
- **C.** Indole-3-acetic acid (IAA)
- **D.** Indole-3-butyric acid (IBA)

15. The 'bakanae' or foolish seedling disease of rice, which causes abnormal and excessive stem elongation, led to the discovery of which hormone?

- **A.** Auxin
- **B.** Gibberellin
- **C.** Ethylene
- **D.** Cytokinin

16. A major disadvantage of C3 plants in hot, dry environments is the loss of energy and carbon due to a process called:

- **A.** Transpiration
- **B.** Photorespiration
- **C.** Guttation
- **D.** Plasmolysis

17. Which of the following is a synthetic auxin commonly used as a selective systemic herbicide against broadleaf weeds?

- **A.** Ethephon
- **B.** 2,4-D
- **C.** Gibberellic acid (GA3)
- **D.** Kinetin

18. In C4 plants, carbon dioxide is temporarily fixed into a 4-carbon organic acid called:

- **A.** Oxaloacetate
- **B.** 3-Phosphoglycerate
- **C.** Ribulose bisphosphate
- **D.** Glyceraldehyde 3-phosphate

19. How do CAM plants separate the initial CO2 fixation from the Calvin cycle?

- **A.** Spatially (different cells)
- **B.** Temporally (by day and night)
- **C.** By organelle differentiation
- **D.** They do not separate them

20. Ethephon is a commercially applied agricultural chemical that decomposes in plant tissues to release which active hormone?

- **A.** Gibberellin
- **B.** Auxin
- **C.** Ethylene
- **D.** Abscisic acid

21. Which plant hormone is applied to Thompson Seedless grapes to increase fruit size and spread the fruit cluster?

- **A.** Auxin
- **B.** Gibberellin
- **C.** Ethylene
- **D.** Zeatin

22. The unequal distribution of auxin in plant stems in response to directional light leads to bending known as:

- **A.** Gravitropism
- **B.** Thigmotropism
- **C.** Phototropism
- **D.** Hydrotropism

23. Which of the following C4 crops is widely grown in the Philippines for animal feed and sweet syrup?

- **A.** Rice
- **B.** Wheat
- **C.** Sorghum
- **D.** Mungbean

24. In CAM plants, malic acid synthesized during carbon fixation accumulates in the vacuoles primarily during the:

- **A.** Day
- **B.** Night
- **C.** Late afternoon
- **D.** Early morning

25. Which hormone is critical for breaking seed dormancy and mobilizing food reserves within the endosperm during germination?

- **A.** Auxin
- **B.** Ethylene
- **C.** Gibberellin
- **D.** Indole-3-acetic acid

26. The primary enzyme responsible for capturing CO_2 in C4 plants, which has no oxygenase activity, is:

- **A.** RuBisCO
- **B.** PEP carboxylase
- **C.** Malate dehydrogenase
- **D.** Pyruvate kinase

27. Which type of plants typically possess the highest water-use efficiency (WUE), making them highly adapted to desert climates?

- **A.** C3 plants
- **B.** C4 plants
- **C.** CAM plants
- **D.** C2 plants

28. Sugarcane is highly efficient in biomass production in tropical areas predominantly because it uses which photosynthetic pathway?

- **A.** C3
- **B.** C4
- **C.** CAM
- **D.** Both C3 and CAM

29. Bolting, defined as the rapid elongation of floral stalks in rosette plants like cabbage, is stimulated by the application of:

- **A.** Ethylene
- **B.** Auxin
- **C.** Gibberellin
- **D.** Cytokinin

30. The Triple Response of seedlings, which includes a thickening of the stem, inhibition of elongation, and horizontal growth, is a classic test for the presence of:

- **A.** Ethylene
- **B.** Auxin
- **C.** Gibberellin
- **D.** Brassinosteroids

31. Which essential amino acid serves as the primary biochemical precursor for the synthesis of indole-3-acetic acid (IAA) in plants?

- **A.** Methionine
- **B.** Tryptophan
- **C.** Phenylalanine
- **D.** Tyrosine

32. Which amino acid is the direct biological precursor for the biosynthesis of ethylene in higher plants?

- **A.** Tryptophan
- **B.** Methionine
- **C.** Lysine
- **D.** Glutamate

33. The optimum temperature for photosynthesis in C3 plants typically ranges between:

- **A.** 15-25°C
- **B.** 30-45°C
- **C.** 40-55°C
- **D.** 5-10°C

34. The optimum temperature for photosynthesis in C4 plants typically ranges between:

- **A.** 10-20°C
- **B.** 15-25°C
- **C.** 30-45°C
- **D.** 50-65°C

35. In C4 photosynthesis, where does the Calvin cycle specifically take place to avoid the oxygenase activity of RuBisCO?

- **A.** Mesophyll cells
- **B.** Bundle sheath cells
- **C.** Stomatal guard cells
- **D.** Xylem vessels

36. Which hormone is frequently applied in commercial transit to induce uniform ripening in harvested green bananas and tomatoes?

- **A.** Auxin
- **B.** Gibberellin
- **C.** Ethylene
- **D.** Cytokinin

37. The phytohormone Gibberellic acid was discovered and first extracted from which of the following fungal pathogens?

- **A.** Gibberella fujikuroi
- **B.** Gibberella asiatica
- **C.** Gibberella chinensis
- **D.** Bacillus thuringiensis

38. Which photosynthetic pathway theoretically requires the greatest energy input in terms of ATP per molecule of CO_2 fixed?

- **A.** C3 pathway
- **B.** C4 pathway
- **C.** Glycolysis
- **D.** The energy requirement is identical for all

39. In the brewing industry, which hormone is applied to barley seeds to speed up the malting process by stimulating alpha-amylase production?

- **A.** Auxin
- **B.** Ethylene
- **C.** Gibberellin
- **D.** Abscisic acid

40. High concentrations of auxin can inhibit growth rather than promote it. This occurs because elevated auxin levels stimulate the synthesis of:

- **A.** Gibberellin
- **B.** Ethylene
- **C.** Cytokinin
- **D.** Abscisic acid

41. How do C4 plants functionally separate initial carbon fixation from the Calvin cycle?

- **A.** Temporally
- **B.** Spatially
- **C.** They do not separate them
- **D.** Through different developmental stages

42. Which of the following is considered a significant agricultural limitation of C3 crops like rice and wheat in tropical regions?

- **A.** Inability to grow in submerged conditions
- **B.** High rates of photorespiration under high temperature
- **C.** Requirement of specialized Kranz anatomy
- **D.** Extremely high water use efficiency

43. What atmospheric gas directly competes with carbon dioxide for the active site of the RuBisCO enzyme?

- **A.** Nitrogen
- **B.** Oxygen
- **C.** Methane
- **D.** Ethylene

44. To prevent the pre-harvest drop of fruits like citrus and apples, orchardists often spray low concentrations of which hormone?

- **A.** Ethylene
- **B.** Gibberellin
- **C.** Auxin
- **D.** Cytokinin

45. Which of the following hormonal processes directly accelerates the senescence and abscission of leaves and senescing flowers?

- **A.** Auxin transport
- **B.** Gibberellin biosynthesis
- **C.** Ethylene production
- **D.** Cytokinin accumulation

46. The transport of auxin in plants is uniquely polar. In stems, this means auxin predominantly moves:

- **A.** Acropetally (towards the apex)
- **B.** Basipetally (towards the base)
- **C.** Laterally (towards the epidermis)
- **D.** Systemically via xylem

47. Which of the following is an intermediate 4-carbon compound formed in the C4 cycle before it is transported to the bundle sheath cells?

- **A.** 3-Phosphoglycerate
- **B.** Malate
- **C.** Ribulose 1,5-bisphosphate
- **D.** Glyceraldehyde 3-phosphate

48. In the absence of light, plants grown in the dark become etiolated. Exposure to light causes de-etiolation, mediated in part by changes in the distribution of:

- **A.** Ethylene
- **B.** Auxin
- **C.** Gibberellin
- **D.** Jasmonate

49. Which of the following crops is a C3 plant that is an essential staple carbohydrate source in the Philippines?

- **A.** Corn
- **B.** Sugarcane
- **C.** Sweet Sorghum
- **D.** Rice

50. When environmental conditions become excessively dry, some CAM plants can modify their CO2 uptake, switching between pathways. This adaptability is known as:

- **A.** C3-C4 intermediacy
- **B.** Facultative CAM
- **C.** Obligate C4
- **D.** Kranz modification

ANSWER KEY

1.	C	14.	C	27.	C	40.	B
2.	C	15.	B	28.	B	41.	B
3.	C	16.	B	29.	C	42.	B
4.	D	17.	B	30.	A	43.	B
5.	C	18.	A	31.	B	44.	C
6.	A	19.	B	32.	B	45.	C
7.	B	20.	C	33.	A	46.	B
8.	C	21.	B	34.	C	47.	B
9.	B	22.	C	35.	B	48.	B
10.	C	23.	C	36.	C	49.	D
11.	A	24.	B	37.	A	50.	B
12.	C	25.	C	38.	B		
13.	B	26.	B	39.	C		