

## Paper II – Botany

36. Which plant hormone is primarily responsible for cell elongation?
- Cytokinin
  - Gibberellin
  - Absciscic acid
  - Ethylene
37. The main site of photosynthesis in a C<sub>4</sub> plant is:
- Palisade mesophyll
  - Spongy mesophyll
  - Bundle sheath cells
  - Epidermis
38. Which of the following is a CAM plant?
- Maize
  - Wheat
  - Pineapple
  - Rice
39. Which mineral is essential for the opening and closing of stomata?
- Calcium
  - Potassium
  - Magnesium
  - Iron
40. Which of the following changes would most likely occur in a plant if the blue light photoreceptors (cryptochromes) are mutated?
- Delayed flowering in long-day plants
  - Increased auxin production
  - Enhanced stomatal opening
  - Reduced photosynthetic efficiency
41. In a drought-stressed plant, the abscisic acid level increases to reduce water loss. Which is the **correct pathway** involved in ABA-induced stomatal closure?
- ABA → Increase in Ca<sup>2+</sup> → K<sup>+</sup> influx → Turgor increase
  - ABA → Decrease in Ca<sup>2+</sup> → Cl<sup>-</sup> efflux → Guard cell expansion
  - ABA → Increase in Ca<sup>2+</sup> → K<sup>+</sup> efflux → Turgor loss
  - ABA → Increase in ATP → Stomatal opening
42. If a gene is located close to the centromere of a chromosome, it will most likely:
- Have a higher recombination frequency
  - Be inherited independently
  - Show complete dominance
  - Show reduced recombination
43. A recombination frequency of 17% is observed between two genes. What can be inferred?
- Genes are on different chromosomes
  - Genes are linked but not tightly
  - Genes are unlinked
  - Genes are tightly linked
44. A test cross is used to determine the:
- Genotype of an individual
  - Phenotype of an individual
  - Number of genes
  - Linkage
45. If two genes are completely linked, the recombination frequency is:
- 50%
  - 0%
  - 25%
  - 75%
46. In which phase of meiosis does crossing over occur?
- Prophase I
  - Metaphase I
  - Anaphase I
  - Telophase I
47. The system of classification given by Bentham and Hooker is:
- Natural
  - Artificial
  - Phylogenetic
  - Molecular
48. Which family is known for nitrogen fixation?
- Poaceae
  - Fabaceae
  - Asteraceae
  - Solanaceae
49. In the Engler and Prantl system, the placement of Gymnosperms before Angiosperms was based on:
- Molecular data
  - Vascular tissue complexity
  - Evolutionary primitiveness
  - Economic importance

50. Which of the following ecosystems has the **highest net primary productivity (NPP)** per unit area?
- Desert
  - Open Ocean
  - Tropical rainforest
  - Grassland
51. In a stable ecosystem, the relationship between species richness and ecosystem productivity follows a:
- Linear curve
  - Bell-shaped curve
  - Inverse relationship
  - Exponential curve
52. The **Shannon-Wiener index** is a measure of:
- Niche overlap
  - Biodiversity
  - Trophic level
  - Carbon fixation
53. Peroxisomes and mitochondria are similar in that:
- Both are involved in protein synthesis
  - Both originate from the Golgi body
  - Both are single-membraned
  - Both generate reactive oxygen species
54. Which cytoskeletal element is primarily involved in **intracellular transport** via motor proteins?
- Actin filaments
  - Microtubules
  - Intermediate filaments
  - Collagen fibers
55. The **N-terminal signal peptide** of a protein directs it to:
- Nucleus
  - Mitochondria
  - ER membrane
  - Golgi
56. Which checkpoint prevents the onset of anaphase until all chromosomes are attached to spindle fibers?
- G1
  - G2
  - Spindle assembly checkpoint (SAC)
  - Restriction checkpoint
57. Colchicine halts cell division by:
- Blocking DNA replication
  - Inhibiting spindle fiber formation
  - Damaging the nuclear envelope
  - Promoting cytokinesis
58. Cytokinesis in plant cells differs from animal cells due to:
- Presence of contractile ring
  - Absence of centrioles
  - Formation of cell plate from Golgi vesicles
  - Direct cleavage of cytoplasm
59. The Pyramid of Energy is always:
- Upright
  - Inverted
  - Irregular
  - None of the above
60. Primary succession on a bare rock is known as:
- Xerosere
  - Hydrosere
  - Mesosere
  - Lithosere
61. Ecological niche refers to:
- The habitat of an organism
  - The food habits of an organism
  - The role of an organism in its environment
  - Geographic distribution
62. Ribosomes are made up of:
- DNA and proteins
  - RNA and proteins
  - Lipids and RNA
  - DNA and lipids
63. Which of the following is found only in plant cells?
- Mitochondria
  - Lysosomes
  - Plastids
  - Ribosomes
64. If megaspore mother cell fails to undergo meiosis, the result will be:
- No embryo sac formed
  - Haploid embryo sac
  - Diploid embryo sac
  - Triploid embryo sac
65. Which protein regulates the cell cycle?
- Hemoglobin
  - Cyclin
  - Actin
  - Myosin

66. Lenticels help in:
- A. Photosynthesis
  - B. Transpiration
  - C. Gaseous exchange
  - D. Conduction
67. Double fertilization is a characteristic of:
- A. Bryophytes
  - B. Pteridophytes
  - C. Gymnosperms
  - D. Angiosperms
68. Endosperm in Gymnosperm is generally:
- A. Diploid
  - B. Triploid
  - C. Haploid
  - D. Tetraploid
69. In dicot roots, the vascular bundles are:
- A. Conjoint and collateral
  - B. Radial with exarch xylem
  - C. Concentric with amphivasal xylem
  - D. Scattered
70. Bulliform cells in grasses are responsible for:
- A. Water conduction
  - B. Photosynthesis
  - C. Leaf rolling under water stress
  - D. Defense against herbivores

