



BUDDHA SERIES

(Unit Wise Solved Question & Answers)

Course – B.Sc Bio 5th Semester

College – Buddha Degree College

(DDU Code-859)

Department: Science

Subject: Plant Physiology, Metabolism and
Biochemistry

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Unit - 1

1) Loss of water from plants in the form of water vapour is called _____

- a) Surface tension
- b) Cohesion
- c) Ascent of sap
- d) Transpiration

Ans- Transpiration

2) Name the specialized pores from where guttation takes place.

- a) Stomata
- b) Hydathodes
- c) Guard cell
- d) Lenticels

Ans- Hydathodes

3) Most effective light for stomatal opening is

- (a) Red
- b) Blue
- (c) Green
- d) Yellow

Ans- Blue

4) Name the term which is given for the movement of water through a semipermeable membrane?

- a) Diffusion
- b) Osmosis
- c) Tonicity
- d) Transpiration

Ans - Osmosis

5) Water potential of pure water will be:

- a) Less than 0
- b) More the 0
- c) Only 0
- d) Only 1

Ans- only 0

6) The unit of water potential is

- a) Pascal
- b) Psi
- c) Moles/ liter
- d) None of the above

Ans- Pascal

7) Brown heart disease is due to deficiency of

- a) Molybdenum
- b) Potassium
- c) Iron
- d) Boron

Ans - Boron

8) Water available to the plant is

- a) runoff water
- b) gravitational water
- c) Hygroscopic water
- d) Capillary water

Ans - Capillary water

9) Premature leaf fall is due to deficiency of

- a) Sodium
- b) Potassium
- c) Zinc
- d) Phosphorus

Ans- Phosphorus

10) Plants require sulphur for

- a) ATP Synthesis
- b) Protein synthesis
- c) Glucose Synthesis
- d) DNA replication

Ans- Protein synthesis

11) If a plant cell is placed in a hypertonic solution, what happens to its water potential?

- a) Increases
- b) Decreases
- c) Remains the same
- d) Becomes equal to the external solution

Ans- Decreases

12) What is the typical water potential of a healthy plant cell?

- a) Positive
- b) Zero
- c) Negative
- d) Variable

Ans- Negative

13) Which factor has the most significant impact on the solute potential of a solution?

- a) Temperature
- b) pH level
- c) Concentration of solutes
- d) Volume of the solution

Ans- Concentration of solutes

14) What is the main driving force behind the process of transpiration?

- a) Root pressure
- b) Capillary action
- c) Water potential
- d) Cohesion and adhesion of water molecules

Ans- Cohesion and adhesion of water molecules

15) Which environmental factor is most directly associated with increased rates of transpiration?

- a) High humidity
- b) Low temperature
- c) High temperature
- d) Low light intensity

Ans- High temperature

16) What is transpiration?

- a) Absorption of water by roots
- b) Loss of water vapor from aerial parts of plants
- c) Nutrient transport in plants
- d) Photosynthesis process

Ans- Loss of water vapor from aerial parts of plants

17) Which part of the plant primarily facilitates transpiration?

- a) Roots
- b) Stems
- c) Leaves
- d) Flowers

Ans- Leaves

18) What are stomata?

- a) Root hairs
- b) Openings on leaf surfaces for gas exchange
- c) Specialized cells for photosynthesis
- d) Structures that store water

Ans- Openings on leaf surfaces for gas exchange

19) Which type of plant typically exhibits a lower rate of transpiration?

- a) Xerophytes
- b) Mesophytes
- c) Hydrophytes
- d) Annuals

Ans- Xerophytes

20) Guttation is most commonly observed in which type of plants?

- a) Desert plants
- b) Aquatic plants
- c) Herbaceous plants
- d) Cacti

Ans- Herbaceous plants

21) What structures in plants are responsible for guttation?

- a) Stomata
- b) Hydathodes
- c) Lenticels
- d) Roots

Ans- Hydathodes

22) Which of the following elements is considered essential for all plants?

- a) Cobalt
- b) Calcium
- c) Sodium
- d) Silicon

Ans- Calcium

23) Which of the following elements is known for its role in chlorophyll formation?

- a) Magnesium
- b) Iron
- c) Manganese
- d) Copper

Ans- Magnesium

24) What is the primary role of nitrogen in plants?

- a) Water regulation
- b) Photosynthesis
- c) Protein synthesis
- d) Respiration

Ans- Protein synthesis

25) The essential elements for plants are typically categorized into which two main groups?

- a) Macronutrients and micronutrients
- b) Organic and inorganic
- c) Primary and secondary
- d) Essential and non-essential

Ans- Macronutrients and micronutrients

26. Glycolysis takes place in

- a) Cytoplasm
- b) Chloroplast
- c) Ribosome
- d) Mitochondria

Ans- Cytoplasm

27. Total ATP production during EMP Pathway is

- a) 24 ATP Molecules
- b) 8 ATP Molecules
- c) 38 ATP Molecules
- d) 6 ATP Molecules

Ans- 8 ATP Molecules

28. End product of Krebs cycle is

- a) Citric acid
- b) Pyruvic acid
- c) $\text{CO}_2 + \text{H}_2\text{O}$
- d) Lactic acid

Ans- C

29. Which is the product of aerobic respiration?

- a) Pyruvic acid
- b) Malic acid
- d) Lactic acid
- d) Ethyl alcohol

Ans- Malic acid

30. Krebs cycle occurs in

- a) Endoplasmic reticulum
- b) Chloroplast
- c) Mitochondria
- d) Dictyosomes

Ans- Mitochondria

31. R.Q is more than one in case the substrate is

- a) Fat
- b) Glucose
- c) Protein
- d) Organic acid

Ans- organic acid

32. Krebs cycle is also called as

- a) Glycolate cycle
- b) EMP pathway
- c) Glyoxylate cycle
- d) Citric acid cycle

Ans- citric acid cycle

33. Hexose monophosphate shunt is called

- a) Pentose Phosphate pathway
- c) Conversion of glucose into Pyruvate

- b) Total of metabolic reactions
- d) EMP pathway

Ans - Pentose Phosphate pathway

34. The number of carbons in pyruvic acid is

- a) 3
- c) 6

- b) 4
- d) 2

Ans - 3

35. Respiratory Enzymes are located in

- a) Matrix of Mitochondria
- c) Cristae

- b) Perimitochondrial space
- d) Outer membrane

Ans - Matrix of Mitochon

Unit -2

1. Nitrogen is an important constituent of

- a) Proteins
- b) lipids
- c) Carbohydrates
- d) Phospholipids

Ans - Proteins

2. Nitrogen absorbed by plants is

- a) Converted to nitrate
- b) Reduced to ammonia
- c) Changed to nitrite
- d) Combined with oxygen

Ans- Reduced to ammonia

3. The presence of large amount of nitrogen in the atmosphere is due to

- a) Decomposers
- b) Nitrites
- c) Nitrogen cycle
- d) Ammonia

Ans - Nitrogen cycle

4. Hydroponics is

- a) Water
- b) solution containing all the nutrients
- c) Greenhouse
- d) liquid

Ans - solution containing all the nutrients

5. How many protons are consumed in the conversion of NO_2 to ammonia ?

- a) 4
- b) 6
- c) 8
- d) 10

Ans - 8

6. Nitrates absorbed from soil by roots are stored in:

- a) Chloroplast
- b) Mitochondria
- c) Cytosol
- d) Vacuole

Ans -Vacuole

7. Fixation of one molecule of nitrogen needs how many ATPs?

- a) 8
- b) 12
- c) 16
- d) 36

Ans –16

8. Which of the following do not fix nitrogen ?

- a) Rhizobia
- b) Cyanobacteria
- c) Frankia
- d) Mycorrhiza

Ans –Mycorrhiza

9. Most of NO_2 reduction and amino acid synthesis takes place in:

- a) Root Nodules
- b) Root cortex
- c) Mesophyll
- d) Fruits

Ans –Mesophyll

10. The bulk of nitrogen in nature is fixed by

- a) Chemical industries
- b) Symbiotic bacteria
- c) lightning
- d) Denitrifying bacteria

Ans –Symbiotic bacteria

11. Fats are found in abundance in plants especially in

- a) reproductive tissues
- b) vegetative tissues
- c) meristematic tissues
- d) all of the above

Ans- reproductive tissues

12. In cells fats are stored in

- a) sphaerosomes
- b) lysosomes
- c) cytosol
- d) all of the above

Ans- sphaerosomes

13. Glyoxylate cycle is completed in

- a) glyoxysome
- b) glyoxysome and Mitochondrion
- c) glyoxysome, Mitochondrion and cytosol
- d) none of the above

Ans- glyoxysome, Mitochondrion and cytosol

14. Which of the following is not a Component of triglycerides?

- a) Glycerol
- b) long chain saturated fatty acid
- c) long chain unsaturated fatty acid
- d) long chain monohydric alcohol

Ans- long chain monohydric alcohol

15. Which of the following is not a phospholipid?

- a) lecithin
- b) cephalin
- c) Cardiolipin
- d) None of the above

Ans- None of the above

16. Reduction of NADP occurs in

- a) Oxidative photophosphorylation
- b) Cyclic photophosphorylation
- c) Non-cyclic photophosphorylation
- d) None of these

Ans- Non-cyclic photophosphorylation

17. Where does the light reaction take place?

- a) Grana
- b) Stroma
- c) Cytoplasm
- d) Endoplasmic reticulum

Ans- Grana

18. During Photosynthesis, Oxygen in glucose comes from

- a) Water
- b) CO₂
- c) Both water and CO₂
- d) From air

Ans-CO₂

19. The first acceptor of CO₂ in C₄ plants is

- a) Aspartic acid
- b) Malic acid
- c) Oxaloacetic acid
- d) Phosphoenolpyruvate

Ans- Phosphoenolpyruvate

20. The first product of C₄ pathway is

- a) PGA
- b) DHAP
- c) Oxaloacetate
- d) Phosphoenolpyruvate

Ans- Oxaloacetate

21. Which enzyme is responsible for the reduction of nitrate to nitrite during nitrate assimilation?

- A) Nitrate reductase
- B) Nitrite reductase
- C) Nitrogenase
- D) Glutamine synthetase

Ans- Nitrate reductase

22. Which of the following is a leguminous plant involved in symbiotic nitrogen fixation?

- A) Maize
- B) Wheat
- C) Soybean
- D) Sunflower

Ans- Soybean

23. Ammonia is assimilated into organic compounds mainly via:

- A) GS-GOGAT pathway
- B) Calvin cycle
- C) TCA cycle
- D) Glyoxylate cycle

Ans- GS-GOGAT pathway

24. The enzyme complex nitrogenase is highly sensitive to:

- A) Light
- B) Water
- C) Oxygen
- D) Nitrite

Ans - Oxygen

25. Which process involves the breakdown of fatty acids into acetyl-CoA units?

- A) β -oxidation
- B) Transamination
- C) Decarboxylation
- D) Glycolysis

Ans- β -oxidation

26. The glyoxylate cycle enables:

- A) Conversion of glucose to lipids
- B) Conversion of acetyl-CoA to sugars in germinating seeds
- C) Synthesis of chlorophyll
- D) Fixation of nitrogen

Ans - Conversion of acetyl-CoA to sugars in germinating seeds

27. Gluconeogenesis is crucial in germinating oil seeds because it:

- A) Converts nitrate to ammonia
- B) Produces ATP directly
- C) Converts lipids into sugars
- D) Enhances chloroplast development

Ans - Converts lipids into sugars

28. Which pigments are primarily responsible for capturing light energy in plants?

- A) Chlorophyll a and b
- B) Anthocyanins
- C) Xanthophylls only
- D) Lutein and zeaxanthin

Ans - Chlorophyll a and b

29. C4 photosynthesis is advantageous in:

- A) Cool, shaded environments
- B) High oxygen conditions
- C) Hot, dry environments with intense sunlight
- D) Waterlogged soils

Ans- Hot, dry environments with intense sunlight

30. The CAM pathway is an adaptation to:

- A) Prevent overproduction of glucose
- B) Enhance nitrogen fixation
- C) Minimize water loss in arid conditions
- D) Accelerate β -oxidation

Ans- Minimize water loss in arid conditions

Unit - 3

Q.1 Which hormone is responsible for the elongation of cells in the stem?

- a) Gibberellin
- b) Cytokinin
- c) Auxin
- d) Absciscic acid

Ans. Auxin

Q.2 Which hormone is known as stress hormone?

- a) Gibberellin
- b) Auxin
- c) Absciscic acid
- d) Cytokinin

Ans. Absciscic acid

Q.3 Which hormone is responsible for the ripening of fruits?

- a) Cytokinin
- b) Gibberellin
- c) Ethylene
- d) Auxin

Ans. Ethylene

Q.4 Which hormone promotes seed germination?

- a) Gibberellin
- b) Auxin
- c) Ethylene
- d) Absciscic acid

Ans. Gibberellin

Q.5 Which hormone causes leaf fall during autumn?

- a) Gibberellin
- b) Cytokinin
- c) Ethylene
- d) Auxin

Ans. Ethylene

Q.6 Which hormone is involved in phototropism?

- a) Auxin
- b) Gibberellin
- c) Cytokinin
- d) Absciscic acid

Ans. Auxin

Q.7 Which hormone inhibits growth and induces dormancy in seeds?

- a) Gibberellin
- b) Auxin
- c) Cytokinin
- d) Absciscic acid

Ans. Absciscic acid

Q.8 During photosynthesis, oxygen in Glucose comes from

- a) water
- b) CO₂
- c) both water and CO₂
- d) from air

Ans- CO₂

Q.9 The first product of C₄ pathway is

- a) PGA
- b) DHAP
- c) Oxaloacetate
- d) Phosphoenolpyruvate

Ans- Oxaloacetate

Q10. Where does the light reaction take place?

- a) Grana
- b) Stroma
- c) Cytoplasm
- d) Endoplasmic reticulum

Ans- Grana

Q11. Which of the following Biomolecules simply refers to as “Staff of life”?

- (a) Lipids
- (b) Proteins
- (c) Vitamins
- (d) Carbohydrates

Ans- Carbohydrates.

Q12. Which of the following is the simplest form of carbohydrates?

- (a) Carboxyl groups
- (b) Aldehyde and Ketone groups
- (c) Alcohol and Carboxyl groups
- (d) Hydroxyl groups and Hydrogen groups

Ans- Aldehyde and Ketone groups.

Q13. Which of the following monosaccharides is the majority found in the human body?

- (a) D-type
- (b) L-type
- (c) LD-types
- (d) None of the above

Ans- D-type.

Q14. Which of the following is the most abundant biomolecule on the earth?

- (a) Lipids
- (b) Proteins
- (c) Carbohydrates
- (d) Nucleic acids.

Ans- Carbohydrates.

Q15. Which of the following is not a saturated fatty acid?

- a) Lauric acid
- b) Myristic acid
- c) Palmitic acid
- d) None of the above

Ans- None of the above

Q16. Which of the following are the major functions of Carbohydrates?

- (a) Storage
- (b) Structural framework
- (c) Transport Materials
- (d) Both Storage and structural framework

Ans- Both Storage and structural framework.

Q17. Which of the following is the simplest carbohydrate?

- (a) Gulose
- (b) Glucose
- (c) Dihydroxyacetone
- (d) Glyceraldehyde

Ans- Glyceraldehyde.

Q18. This is example of derived lipids .

- (a) Terpenes
- (b) Steroids
- (c) Carotenoids
- (d) All of the above

Ans- All of the above

Q19. The degree of un saturation of lipids can be measured as

- (a) Lodine number
- (b) Saponification number
- (c) Reichert- meissel number
- (d) Polenske number

Ans- Lodine number

Q20. The specific gravity of lipid is

- (a) 1.5
- (b) 1.0
- (c) 0.8
- (d) 0.2

Ans- 0.8

Q21. Which phytohormone is primarily responsible for cell elongation and apical dominance?

- A) Cytokinin
- B) Gibberellin
- C) Auxin
- D) Absciscic acid (ABA)

Ans- Auxin

Q22. Which phytohormone promotes seed dormancy and stress tolerance?

- A) Ethylene
- B) Auxin
- C) Absciscic acid (ABA)
- D) Gibberellin

Ans- Absciscic acid (ABA)

Q23. Short-day plants (SDP) flower when:

- A) Day length exceeds a critical duration
- B) Day length is shorter than a critical duration
- C) They receive continuous light
- D) Day length is exactly 12 hours

Ans- Day length is shorter than a critical duration

Q24. Phytochrome exists in two forms that interconvert in response to light:

- A) Pr (red-absorbing) and Pfr (far-red absorbing)
- B) P1 and P2
- C) Chlorophyll a and b
- D) NADP⁺ and NADPH

Ans- Pr (red-absorbing) and Pfr (far-red absorbing)

Q25. Vernalization is the process of:

- A) Breaking seed dormancy by cold treatment
- B) Rapid seed germination
- C) Photoperiodic flowering
- D) Plant hormone synthesis

Ans -Breaking seed dormancy by cold treatment

Q26. Ethylene is known to:

- A) Promote cell division
- B) Delay fruit ripening
- C) Induce fruit ripening and leaf senescence
- D) Stimulate root elongation

Ans -Induce fruit ripening and leaf senescence

Q27. Which disaccharide is commonly known as table sugar?

- A) Lactose
- B) Maltose
- C) Sucrose
- D) Cellulose

Ans- Sucrose

Q28. Cellulose is a:

- A) Storage polysaccharide
- B) Structural polysaccharide
- C) Monosaccharide
- D) Disaccharide

Ans- Structural polysaccharide

Q29. Mannitol is an example of:

- A) Monosaccharide
- B) Sugar alcohol
- C) Disaccharide
- D) Polysaccharide

Ans- Sugar alcohol

Q30. Phosphoglycerides are:

- A) Storage lipids
- B) Structural lipids forming biological membranes
- C) Polysaccharides
- D) Fatty acids only

Ans- Structural lipids forming biological membranes

Unit – 4

Q1. What is a bond between amino acids called?

- (a) Ionic bond
- (b) Acidic bond
- (c) Peptide bond
- (d) Hydrogen bond

Ans-Peptide bond

Q2. Which of the following statements is true about proteins?

- (a) Proteins are polymers of glucose
- (b) Proteins are polymers of amino acids
- (c) Proteins are polymers of peptide bonds
- (d) Proteins are polymers of disulfide bridges

Ans- Proteins are polymers of amino acids

Q3. Which of the following food products are high in protein content?

- (a) Tofu and eggs
- (b) Grains and legumes
- (c) Milk and milk products
- (d) All of the above

Ans-All of the above

Q4. The process of protein synthesis takes place in which of the following cell organelles?

- (a) Nucleus
- (b) Vacuoles
- (c) Cytoplasm
- (d) Mitochondria

Ans-Cytoplasm

Q5. Which of the following cell organelles is involved in the process of protein synthesis?

- (a) Vesicles
- (b) Ribosomes
- (c) Synchrotrons
- (d) Mitochondria

Ans-Ribosomes

Q6. A phosphodiester bond is present in

- (a) Nucleic acids in a nucleotide
- (b) Monosaccharides in a polysaccharide
- (c) Amino acids in polypeptide
- (d) Fatty acids in a diglyceride

Ans- Nucleic acids in a nucleotide

Q7. Uridine present in RNA is

- (a) nucleotides
- (b) pyrimidine
- (c) purine
- (d) nucleoside

Ans- nucleoside

Q8. Purine base found in RNA is

- (a) Cytosine
- (b) Thymine
- (c) Guanine
- (d) Uracil

Ans- Guanine

Q9. The sugar molecule present in nucleotide is

- (a) triose
- (b) tetrose
- (c) pentose
- (d) hexose

Ans- pentose

Q10. Nucleoside contains

- (a) base-sugar
- (b) base-phosphate
- (c) base-sugar-phosphate
- (d) sugar-phosphate

Ans- base-sugar

Q11. Ribozymes are

- a. RNA acting as enzymes
- b. Ribose sugar acting as enzyme
- c. Antibodies acting as enzymes
- d. Protein acting as enzyme

Ans- RNA acting as enzymes

Q12. Holoenzyme is made of

- a. Apoenzyme and Zymogen
- b. Apoenzyme and Co-enzyme
- c. Co-enzyme and Prosthetic group
- d. Prosthetic group and Co-factor

Ans-Apoenzyme and Co-enzyme

Q13. Which of the following organelle is called 'Suicidal Bag'

- a. Mitochondria
- b. Endoplasmic reticulum
- c. Lysosome
- d. Ribosome

Ans-Lysosome

Q14. Bile salt _____ surface tension

- a. Increases
- b. Decreases
- c. Both a and b
- d. None of the above

Ans- Decreases

Q15. Most abundant blood cells in the human body are

- a. WBCs
- b. RBCs
- c. Platelets
- d. Plasma Cells

Ans- RBCs

Q16. Number of iron atoms in one haemoglobin molecule are

- a. 1
- b. 3
- c. 4
- d. 8

Ans- 4

Q17. Example of a Pro-enzyme

- a. Pepsinogen
- b. Trypsin
- c. Chymotrypsin
- d. Lysine

Ans- Pepsinogen

Q18. Abzymes are

- a. Proteins
- b. DNAs
- c. RNAs
- d. Antibodies

Ans- Antibodies

Q19. Which of the following is not a co-enzyme

- a. NAD
- b. NADP
- c. FAD
- d. Mn^{++}

Ans- Mn^{++}

Q20. Which enzymes do not require co-enzymes for their activity ?

- a. The extracellular enzymes
- b. The intracellular Enzymes
- c. The mitochondrial enzymes
- d. The Proenzymes

Ans- The extracellular enzymes

Q21. Which bond links amino acids in a protein chain?

- A) Hydrogen bond
- B) Peptide bond
- C) Ionic bond
- D) Disulfide bond

Ans- Peptide bond

Q22. The isoelectric point of a protein is:

- A) pH at which protein is fully denatured
- B) pH at which protein carries no net electric charge
- C) pH at which protein is most soluble
- D) pH at which protein gains maximum charge

Ans- pH at which protein carries no net electric charge

Q23. Which level of protein structure involves the three-dimensional folding of a single polypeptide chain?

- A) Primary
- B) Secondary
- C) Tertiary
- D) Quaternary

Ans - Tertiary

Q24. Which nitrogenous base is NOT found in DNA?

- A) Adenine
- B) Thymine
- C) Uracil
- D) Cytosine

Ans- Uracil

Q25. Denaturation of nucleic acids involves:

- A) Breaking phosphodiester bonds
- B) Separation of double strands into single strands
- C) Removal of nitrogenous bases
- D) Loss of ribose sugar

Ans- Separation of double strands into single strands

Q26. The active enzyme with its cofactor is called:

- A) Apoenzyme
- B) Holoenzyme
- C) Prosthetic group
- D) Coenzyme

Ans- Holoenzyme

Q27. Which theory explains enzyme-substrate interaction by conformational changes?

- A) Lock and key model
- B) Induced fit model
- C) Michaelis-Menten model
- D) Competitive inhibition

Ans - Induced fit model

Q28. Non-competitive inhibitors:

- A) Bind to the active site and compete with substrate
- B) Bind to an allosteric site and reduce enzyme activity
- C) Increase enzyme activity
- D) Are coenzymes

Ans - Bind to an allosteric site and reduce enzyme activity

Q29. Allosteric enzymes:

- A) Have multiple binding sites and are regulated by effectors
- B) Work only at low temperature
- C) Are only activated by cofactors
- D) Cannot be inhibited

Ans- Have multiple binding sites and are regulated by effectors

Q30 Which of the following is a natural antioxidant found in plants?

- A) Vitamin C
- B) Trans fat
- C) Saturated fatty acids
- D) Synthetic dye

Ans- Vitamin C