

**M.Sc. BOTANY**  
**FOURTH SEMESTER**  
**BIOCHEMISTRY AND PLANT PHYSIOLOGY**  
**MSB-402 B**

(Use separate answer scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

**( PART-A : Objective )**

Time : 20 min.

Marks : 20

*Choose the correct answer from the following:*

1x20=20

1. Azimuthal quantum number actually represents:  
a. Shells  
b. Energy  
c. Subshells  
d. None
2. What is the maximum number of electrons that can be placed in the d orbital(s) in a given Principle Quantum level?  
a. 4  
b. 6  
c. 8  
d. 10
3. How many valence electrons does a Sulfur (S) atom contain?  
a. 2  
b. 4  
c. 6  
d. 8
4. Force of attraction which is more stronger than dipole forces is:  
a. London dispersion forces  
b. Inter molecular force  
c. Van der Waal forces  
d. Hydrogen bonding
5. In an open system, for maximum work, the process must be entirely:  
a. Irreversible  
b. Adiabatic  
c. Reversible  
d. None of the mentioned
6. The correct sequence of cytochrome carriers in respiratory chain is:  
a. Cyt b → Cyt c → Cyt c1 → Cyt aa3  
b. Cyt aa3 → Cyt b → Cyt c → Cyt c1  
c. Cyt b → Cyt c1 → Cyt c → Cyt aa3  
d. Cyt b → Cyt aa3 → Cyt c1 → Cyt c
7. Hydrolysis of ATP over ADP and AMP generates highest energy because:  
a. ATP on hydrolysis generates thermodynamically stable structure.  
b. Hydrolysis of ATP is pH dependent.  
c. ATP is highly unstable.  
d. Hydrolysis of ADP and AMP do not generate thermodynamically stable structure.
8. All the following correctly describe the active site of an enzyme except:  
a. It is small relative to the entire enzyme.  
b. Specificity is defined by arrangement of certain atoms.  
c. It is two dimensional in structure.  
d. It initially binds substrates by weak interactions.
9. The general name that is given for an enzyme that catalyze the transfer of a functional group from one position to another on the same molecule:  
a. Isomerase  
b. Mutase  
c. Transutase  
d. Pyruvate kinase



10. In the respiratory chain, only soluble cytochrome is:
- Cytochrome a
  - Cytochrome b
  - Cytochrome c
  - Cytochrome aa<sub>3</sub>
11. Carbon monoxide inhibits mitochondrial electron transport by:
- Inhibiting the electron transfer of complex I.
  - Blocking electron transport at the level of cytochrome b-cytochrome C complex.
  - Binding to the oxygen binding site of cytochrome oxidase.
  - Binding to haemoglobin in the erythrocytes and therefore blocking the transport of oxygen to tissues.
12. Fatty acids enter cellular respiration as:
- One carbon fragments
  - Two carbon fragments
  - Three carbon fragments
  - Long chain of 20 carbon fragments
13. Oxygen, which is a part of electron transport system, enters the mitochondria as an atom in:
- Glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)
  - Pyruvic acid (C<sub>3</sub>H<sub>4</sub>O<sub>3</sub>)
  - Carbon di Oxide (CO<sub>2</sub>)
  - Oxygen (O<sub>2</sub>)
14. Glyoxylate cycle is a modification:
- TCA cycle
  - Calvin cycle
  - Oxidative pentose phosphate pathway
  - Glycolate pathway
15. Which of the following statement is wrong?
- The chilling sensitive plants have lipid bilayer contains saturated fatty acid.
  - The chilling resistant plants have lipid bilayer contains saturated fatty acid.
  - Adaptation of heat stress is mediated by cytosolic calcium.
  - ABA is a stress hormone.
16. Transpiration is least in:
- Good soil moisture
  - High wind velocity
  - Dry environment
  - High atmospheric humidity
17. Which of the following statement is correct?
- Intercellular freezing takes place when temperature falls suddenly.
  - Adaptation is temporary resistance to stress.
  - Flooding causes elevation in ACC synthesis.
  - Hydrophytes are less resistant than land plants during flood.
18. Under water stress conditions, plants increase the synthesis of:
- Gibberellic acid
  - Auxin
  - Cytokinin
  - ABA
19. Hormone responsible for closing of stomata is:
- Gibberellin
  - Jasmonic acid
  - ABA
  - Ethylene
20. Malate-aspartate shuttle operates in:
- Lungs and liver
  - Heart and liver
  - Pancreas and liver
  - None of this

**( PART-B : Descriptive )**

Time : 2 hrs. 40 min.

Marks : 50

[ Answer question no.1 & any four (4) from the rest ]

- Discuss the physiological effects of water (drought) stress. 10
- Write short notes on: 5+5=10
  - Biosynthesis of starch.
  - Biosynthesis of any two disaccharides.
- Describe the various steps of β-oxidation of fatty acid? Why it is called as the most energy yielding process of biological oxidation, justify. 7+3=10
- Write short notes on: (any two) 5+5=10
  - Enzyme specificity.
  - Active site.
  - Allosteric enzymes.
- Discuss the biosynthesis of fatty acids and its regulation. 10
- Write down the different biochemical steps of oxidative photophosphorylation where ATP is generated. Explain why ATP is considered as the energy currency of the cell. 6+4=10
- What is pH? Discuss why the pH of pure water is 7? Why it is needed to maintain the pH of an enzymatic reaction? 2+6+2=10
- Discuss the physiological effects of biotic stress. 10

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