

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

Duration: 3 Hrs.

Marks: 70

{ Part : A (Objective) = 20 }  
{ Part : B (Descriptive) = 50 }

[ PART-B : Descriptive ]

Duration: 2 Hrs. 40 Mins.

Marks: 50

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

1. Discuss physiological effects of water deficit in plants. (10)
2. Discuss the biosynthesis of fatty acid. (10)
3. Write short notes on: (2.5×4=10)
  - a) Coupled reactions.
  - b) ATP and its significance.
  - c) Concept of free energy.
  - d) Van der Waals attraction and Hydrogen bonding.
4. Discuss physiological effects of salt stress in plants. (10)
5. Discuss the various steps of  $\beta$ -oxidation. Why it is called as the most energy yielding process of biological oxidation justify. (7+3=10)
6. What are the differences of oxidative phosphorylation and photophosphorylation? Discuss the various steps of electron transport chain and how electron transport chain favours ATP formation? (2+8=10)
7. Describe briefly about enzyme immobilization. (10)
8. Define allosteric enzymes. Discuss the different models in support of mechanism of actions of allosteric enzymes. (2+8=10)

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[ PART-A : Objective ]

Choose the correct answer from the following:

1X20=20

1. Hydrolysis of ATP over ADP and AMP generates highest energy because
  - a. ATP on hydrolysis generates thermodynamically stable structure.
  - b. ATP is highly unstable.
  - c. Hydrolysis of ATP is pH dependent.
  - d. Hydrolysis of ADP and AMP do not generate thermodynamically stable structure.
2. Which of the following statement is correct?
  - a. Nonpolar gases are highly soluble in water.
  - b. Water is a nonpolar solvent.
  - c. During melting or evaporation the entropy of aqueous system increases.
  - d. Water forms ionic bonds with polar solutes.
3. Synthesis of glucose from fat is called
  - a. Glycolysis
  - b. Krebs cycle
  - c. Saponification
  - d. Gluconeogenesis
4. Weakest force is
  - a. Vander walls
  - b. Ionic bond
  - c. Hydrogen bonding
  - d. Covalent bond
5. Reactions with  $-\Delta G$  is
  - a. Exothermic
  - b. Endargonic
  - c. Endothermic
  - d. Both a and b
6. The actual free energy change of a given biochemical reaction carried out under standard conditions with 1M initial concentration of each of the reactants and products will be
  - a. Equal to zero.
  - b. Equal to standard free energy change for the reaction.
  - c. Less than standard free energy change for the reaction.
  - d. Greater than standard free energy change for the reaction.
7. Malonyl CoA is a direct inhibitor of which enzyme of fatty acid oxidation?
  - a. Carnitine Acyl Transferase I
  - b. Carnitine Acyl Transferase II
  - c. Thiokinase
  - d. None of the above

8. Which of the following supplies the 2 carbon units that are added to the elongation of fatty acid chain?
  - a. Acetyl CoA
  - b. Malonyl CoA
  - c.  $\beta$ -keto acyl CoA
  - d. Glucose
9. The active site of an enzyme is formed by a few of the enzymes
  - a. R group of the enzymes.
  - b. Carboxyl group of the amino acids.
  - c. Exposed sulphur bonds.
  - d. Amino groups of amino acids.
10. Of the following statements of the enzymes which is true?
  - i) Enzymes lack in nucleophilic groups.
  - ii) Enzymes are highly specific both in binding chiral substrates nand in catalyzing their reactions.
  - iii) Enzymes catalyze chemical reactions by lowering the activation energy.
  - iv) Pepsin is a proteolytic enzyme.
    - a. i & iv
    - b. i & iii
    - c. i only
    - d. ii, iii & iv
11. In each round of fatty acid oxidation
  - a. NADH and ATP is released.
  - b.  $\text{NADH}_2$  and ATP is released.
  - c.  $\text{NADH}_2$ ,  $\text{FADH}_2$  and Acetyl CoA is released.
  - d.  $\text{FADH}_2$  and Acetyl CoA is released.
12. An enzyme promotes chemical reaction by
  - a. Lowering the energy of activation.
  - b. Causing the release of heat, which acts as a primer.
  - c. Increasing the molecular motion.
  - d. Changing the free energy difference and product.
13. ATP synthesis occurs in
  - a. Chloroplasts
  - b. Mitochondria
  - c. Chloroplasts and mitochondria both
  - d. All cell organelles
14. The role played by ATP in biochemical reactions is that of
  - a. A reducing agent
  - b. A coenzyme
  - c. An energy donor substance
  - d. An energy donor substance or a coenzyme



15. DNA, RNA, ATP all are composed of

- a. Nucleotides
- b. Purines
- c. Nucleic acids
- d. Pentose sugars

16. Azide is the inhibitor in which step of electron transport chain?

- a. Blocks electron transport at complex I.
- b. Blocks electron transport at complex II.
- c. Blocks electron transport at complex IV.
- d. Blocks electron transport and proton pumping at complex III.

17. Iron containing compound that act as hydrogen acceptors in the respiratory chain are

- a. Flavoproteins
- b. Dehydrogenases
- c. Cytochromes
- d. Oxidases

18. Consider the following fatty acids

- i) Linolenic acid
- ii) Oleic acid
- iii) Palmitic acid
- iv) Stearic acid

Which of these is /are unsaturated fatty acids?

- a. i only
- b. i and ii
- c. iii and iv
- d. ii, iii, iv

19. During flood

- a. Anaerobic respiration increases.
- b. Nureient absorption increases.
- c. Cytokinin level increases.
- d. Blocking of ethylene biosynthesis.

20. Which of the following statement is wrong?

- a. Chilling stress increases cell membrane leakage.
- b. Unsaturated fatty acid level decrease in cell membrane in chilling stress.
- c. ABA activity increases in drought.
- d. Proline concentration increases in water stress.

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Course : .....

Semester : ..... Roll No : .....

Enrollment No : ..... Course code : .....

Course Title : .....

Session : 2016-17 Date : .....

Instructions / Guidelines

- The paper contains twenty (20) / ten (10) questions.
- The student shall write the answer in the box where it is provided.
- The student shall not overwrite / erase any answer and no mark shall be given for such act.
- Hand over the question paper cum answer sheet (Objective) within the allotted time (20 minutes / 10 minutes) to the invigilator.

Full Marks	Marks Obtained	Remarks
20		

Scrutinizer's Signature

Examiner's Signature

Invigilator's Signature