M.Sc. BOTANY
FOURTH SEMESTER
ADVANCED PLANT PHYSIOLOGY & BIOCHEMISTRY
MSB – 402B
(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. When two ice cubes are pressed over each other, they unite to form one cube. Which of the following forces is responsible to hold them together?
    a. van der Waals forces
    b. hydrogen bond formation
    c. ionic interaction
    d. covalent attraction

2. Electronic configuration of Carbon is
    a. $1S^2 2S^2 2p^2$
    b. $1S^2 2S^3 2p^2$
    c. $1S^2 2S^2 2p^3$
    d. $1S^1 2S^2 2p^2$

3. 'd' orbital has the shape of
    a. Circle
    b. Single dumbell
    c. Hyperbolic shaped
    d. Double dumbbell

4. The bond between two identical non metal atoms has a pair of electrons. The correct statement about this pair is
    a. Unequally shared between the two.
    b. Transferred fully from one atom to another
    c. Has identical spins.
    d. Equally shared between the atoms.

5. The melting of ice into liquid water is an example of tube _____ reaction.
    a. endergonic
    b. exergonic
    c. exothermic
    d. endothermic

6. In an open system, for maximum work, the process must be entirely
    a. irreversible
    b. reversible
    c. adiabatic
    d. None of the above

7. Second law of theromodynamics defines
    a. Heat
    b. Work
    c. Enthalpy
    d. Entropy

8. Whenever a system undergoes either a change in state or an energy or mass transfer at a steady state, it is said to undergo
    a. A change of state
    b. A process
    c. A steady state transfer
    d. An equilibrium

[1]

9. Match the following enzymes and its product-
   a. Succinyl thiokinase   1. Citrate
   b. Succinyl dehydrogenase   2. Isocitrate
   c. Aconitase   3. Fumerase
   d. Citrate synthase   4. succinate
   a. a – 3 b – 4 c – 2 d – 1   b. a – 4 b – 3 c – 1 d – 2
   c. a – 4 b – 3 c – 2 d – 1   d. a – 4 b – 2 c – 3 d – 1

10. What do inhibitors of complex III of electron transport system in oxidative phosphorylation do?
    a. Blocks the transfer of reducing equivalents from Fe-S to ubiquinone-Q
    b. Prevents transfer of electrons from cytochrome aa3 to molecular oxygen
    c. ETC takes place but inhibits phosphorylation
    d. Prevent transfer of electrons from cytochrome b to cytochrome C1

11. Which of the following supplies the two carbon units that are added to the elongation of fatty acids
    a. acetyl CoA   b. malonyl CoA
    c. β-keto-acylCoA   d. Pyruvate

12. Chemi-osmotic theory was first put forward by
    a. Peter Mitchell   b. John Walker
    c. Paul Boyer   d. all of the above

13. Glycolysis is also known as
    a. Warburg-Dickens pathway   b. Direct oxidation pathway
    c. EMP pathway   d. Glycolate pathway

14. What is the function of phosphorylase?
    a. Transfer inorganic phosphate   b. Transfer a carboxylate group
    c. Use H2O2 as the electron acceptor   d. Transfer amino group

15. ATP synthatase activity is associated with the mitochondrial enzyme complex
    a. Enzymes are adsorbed on the surface active support followed by intermolecular cross linking
    b. Functional groups are introduced on the support to react co-valently with enzymes
    c. Enzymes are cross linked intermolecularly
    d. Enzymes are cross linked intermolecularly

16. ATP synthatase activity is associated with the mitochondrial enzyme complex
    a. V   b. III
    c. IV   d. I

17. The following points are true for chilling stress except the one
    a. Disappearance of rough ER   b. Increase in permeability of plasmalemma
    c. Shrinking of chloroplast   d. Tonoplast injury

18. Which of the following are more prone to water stress
    a. Xerophytes   b. Mesophytes
    c. Hydrophytes   d. Both Mesophytes and Xerophytes

19. Presence of salt glands on leaf surfaces is characteristics of
    a. *Suaeda fruticosa*
    b. Tamarix pentandra
    c. *Atriplex spongiosa*
    d. None of the above

20. The halophytes which can resist a wide range of salt concentrations are called as
    a. Glycophytes
    b. None of the above
    c. Stenohaline
    d. Euryhaline

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PART-B :Descriptive

Time : 2 hrs. 40 min.   Marks : 50

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

1. Write the physiological effect of flood stress in plants   10

2   Write short notes on :   4×2.5
    a.   Van der Walls interaction   =10
    b.   Hydrogen bond
    c.   Hydrophobic interactions
    d.   Electrostatic bond

3. What is pH? Discuss why the pH of pure water is 7? Why it is   2+8=10
    needed to maintain the pH of an enzymatic reaction.

4. Write short notes on: 2+2+6
    a.   Enthalpy   =10
    b.   Entropy
    c.   Justify why ATP is regarded as the energy currency of the
         cell.

5. Discuss the mechanism of ATP production by aerobic digestion of   6+4=10
    glucose

6. Describe the various steps of β-oxidation of monounsaturated fatty   7+3=10
    acid? Why it is called as the most energy yielding process of
    biological oxidation justify.

7. Discuss the physiological effect of higher temperature stress in plants   10

8. What are different types of biotic stress? Discuss about the induced   3+7=10
    structural defence in plants in response to biotic stress.

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