B.Sc. BIOTECHNOLOGY
SECOND SEMESTER
MICROBIAL AND PLANT PHYSIOLOGY
BBT-202

(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. Photosynthesis, a process of manufacture of organic compound is
   a. Anabolic process
   b. Catabolic process
   c. Both (a) and (b)
   d. None of the above

2. Which is the most effective wavelength of light for photosynthesis?
   a. Violet
   b. Red
   c. Green
   d. Yellow

3. During light phase of photosynthesis _____ is oxidized and _____ is reduced.
   a. CO_2 and Water
   b. Water and CO_2
   c. Water and NADP
   d. NADPH2 and CO_2

4. Which of the following is the correct sequence for the movement of electrons during the light-dependent reactions of plants?
   a. P_{700}, P_{680}, $NADP^+$, water
   b. P_{680}, water, P_{700}, $NADP^+$
   c. Water, P_{700}, $NADP^+$, P_{680}
   d. Water, P_{680}, P_{700}, $NADP^+$

5. Why light is required for light dependent reactions?
   a. It splits ATP molecules which generates the energy necessary to power the light independent reactions
   b. It is the source for electrons
   c. It splits the water molecules
   d. It energizes electrons in the reaction center

6. The hormone which promote apical dominance is
   a. Auxin
   b. Cytokinin
   c. Gibberlin
   d. ABA

7. Leaf senescence is delayed by
   a. Gibberellins
   b.) Auxins
   c. Ethylene
   d. Cytokinins

8. The type of reaction center that is involved in photophosphorylation in purple bacteria is
   a. Fe-S reaction center
   b. $Cytb_6f$ reaction center
   c. Pheophytin – quinine reaction center
   d. All of the above

9. Microorganism involved in biological nitrogen fixation from atmosphere is
   a. Azotobacter
   b. Anabena
   c. Rhizobium
   d. All of the above

10. The low temperature treatment to make plants flower is called
    a. Photosynthesis
    b. Vernalization
    c. Photorespiration
    d. All of the above

11. Which are the non-specific enzyme components?
    a. EIIA and HPr
    b. EIIB and HPr
    c. EII and EI
    d. EI and HPr

12. Which of the following is the correct statement?
    a. Ferrichrome is a hydroxamate produced by fungI
    b. Siderophore is an iron chelating agent
    c. Enterobactin is the catecholate formed by E. coli
    d. All of the above.

13. During one cycle, Na^+/K^+ binds and moves
    a. 1 Na^+ and 2 K^+
    b.) 2 Na^+ and 2 K^+
    c. 2 Na^+ and 3 K^+
    d. 3 Na^+ and 2 K^+

14. What is the source of energy used to power the Na^+/K^+ pump?
    a. Break down of ATP
    b. Formation of ATP
    c. Transport of ATP by the pump
    d. Breakdown of GTP

15. The transport of glucose inside the cell membrane in the form of glucose 6 phosphate is a
    a. Active transport
    b. Passive transport
    c. Group translocation
    d. None of the above

16. The Na^+/K^+ pump functions to pump
    a. Na^+ out of the cell and K^+ into the cell
    b. Na^+ into the cell and K^+ out of the cell
    c. Na^+ and K^+ into the cell
    d. Na^+ and K^+ out of the cell

17. Methanogens
    a. Produce methane as a part of their energy metabolism
    b. Utilize methane as an energy source
    c. Process and store methane as a part of their repair mechanism
    d. None of the above

18. The cytoplasmic proteins of Halobacterium are
    a. Highly acidic
    b. Highly basic
    c. Neutral
    d. Variable depending upon the species

19. The term facultative anaerobe refers to an organism that
    a. Doesn't use oxygen but tolerates it
    b. It is killed by oxygen
    c. Use oxygen when present or grows without oxygen when absent
    d. Requires less oxygen than is present in the air

20. The reservoir of nitrogen is
    a. The atmosphere
    b. Rocks
    c. Ammonium
    d. Nitrates

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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. Define methanogenesis. Describe the biosynthesis of methane gas with a proper diagram. 2+8=10

2. Define chemlithotropy. Explain the biosynthetic process of chemolithotropic microorganism with referring to reverse electron flow. 2+8=10

3. Define the process of antiport system with reference to Na^+/K^+ pump 2+8 =10

4. Describe the biosynthetic process of hydrogen oxidizing bacteria. 10

5. Define photophosphorylation and photosynthesis. Explain the process of non-cyclic photophosphorylation with the help of a schematic diagram. 4+6=10

6. Define phototperoidism, growth, redifferentiation and dedifferentiation. Write about the roles of auxins, cytokinins and gibberlic acids. 4+6 =10

7. Explain in details the whole process of CO_2 in C4 plants. Write a note on the process of biological nitrogen fixation in plants. 6+4=10

8. Explain the process of light reaction in green sulfur bacteria with a proper schematic diagram. Add a note on nitrification. 5+5 =10

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