REV-01
BBT/41/46

2022/07

B.Sc. BIOTECHNOLOGY
SECOND SEMESTER
MICROBIAL & 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. Channel action illustrates _____mode of transport
   a. Active
   b Passive
   c. Facilitated
   d Both b) & c)

2. Facilitated diffusion requires
   a. ATP+ Carrier protein
   b. Concentration gradient
   c. Concentration gradient+ Carrier Protein
   d. Concentration gradient + energy

3. In passive transport
   a. Carrier proteins are required
   b. Carrier proteins are not required
   c. Carrier proteins sometimes required
   d. None of the above

4. In *E. coli* glycerol is transported through
   a. Passive transport
   b. Active transport
   c. Facilitated diffusion
   d. None of the above

5. Purple sulphur bacteria is
   a. Anaerobic photoautotroph
   b. heterotroph
   c. Aerobic photoautotroph
   d. Chemoautotroph

6. Which of the following is an organism that obtains its energy from the transfer of electrons originating from chemical compounds and its carbon from an inorganic source?
   a. Chemoautotrophs
   b. Chemoheterotrophs
   c. Photoheterotrophs
   d. Photoautotrophs

7. The optimum growth temperature for mesophile is
   a. 0° C
   b. 15° C or lower
   c. 20° C- 45° C
   d. 50-80 ° C

8. An obligate halophile requires high
   a. PH
   b. Salt
   c. Temperature
   d. Pressure

9. Organisms that spend their lives on land or on the surface of water are always subjected to a pressure of
   a. 1 atm
   b. 600 atm
   c. 1300 atm
   d. 5 atm

10. The temperature that allows for most rapid growths during a short period of time is known as
   a. Minimum temperature
   b. Maximum temperature
   c. Optimum temperature
   d. Growth temperature

11. 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

12. Light is necessary in the process of photosynthesis to
   a. Split CO_2
   b. Produce ATP and NADPH
   c. Release energy
   d. All of the above

13. Photosynthetic pigments are located in
   a. Stroma
   b. Grana
   c. Cytoplasm
   d. Chloroplast

14. 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

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

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

17. Conversion of nitrate to nitrite is carried out by
   a. Nitrobacter
   b. Nitrosomonas
   c. Clostridium
   d. All of the above

18. Oxidation of ammonia to nitrite is called
   a. Ammonification
   b. Denitrification
   c. Nitrification
   d. Nitrogen assimilation

19. Which of the following is not plant hormone?
   a. Corticosteroid
   b. Brassinosteroid
   c. Polyamines
   d. Salicylic acid

20. Which of the following phytocrome inhibits flowering in plants?
   a. P_R
   b. P_{FR}
   c. Both interchangeably
   d. None of the above

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PART-B : Descriptive

Time : 2 hrs. 40 min. **Marks :**

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

1. Define photosynthesis. Explain with the help of a pathway how plants prevent photorespiration in hot and arid regions? Explain the pathway of non-cyclic photophosphorylation. Why is cyclic photophosphorylation important for plants? Explain in brief the function of $cytb_6f$ complex. **1+4+3+ 1+1=10**

2. Discuss PEP group translocation with a suitable diagram. Differentiate between active and Passive transport. **7+3=10**

3. Explain how solute and water activity effects the classification of microorganism. Briefly describe classification and adaptations of microbes based on temperature requirements. **5+5=10**

4. Write a short note on chemolithotrophy. Describe briefly about the chemolithotrophic fueling process in aerobic and anaerobic chemolithotrophs. **3+7=10**

5. Define Facilitated transport with suitable diagram.Describe briefly about the Sodium Potassium Pump with suitable diagram. **3+7=10**

6. Explain the roles of antenna complex and reaction center. Explain how green sulphur bacteria performs light reaction. Explain with the help of reactions the fixation of carbon dioxide by C3 plants. What do you think will happen to plants when they close their stomata? **2+3+3+ 2=10**

7. What are the different ways a plant can fix nitrogen? Explain the process of reduction of nitrate in plants. Why nitrogen metabolism is important for plants? Explain the process of biological nitrogen fixation. **2+4+1+ 3=10**

8. Define growth, dedifferentiation and redifferentiation. Explain the functions of auxin and gibberellins. Explain sigmoid growth curve. Write in brief about vernalization. **3+3+2+ 2=10**

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