REV-01
BMB/16/21

2023/12

SET A

B.Sc. MICROBIOLOGY
THIRD SEMESTER
MICROBIAL PHYSIOLOGY AND METABOLISM
BMB-301

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. In aerobic respiration, the terminal electron acceptor is:
   a. Oxygen b. Nitrogen
   c. Hydrogen d. Nitrate
2. Reverse electron flow is followed in which type of organism?
   a. Hydrogen oxidizing bacteria b. Chemolithotrophic bacteria
   c. Chemoautotrophic bacteria d. All
3. Which group of bacteria follows the mixed acid fermentation?
   a. Klebsiella, Erwinia, Enterobacter b. Escherichiae, Salmonella, Shigella
   c. Escherichiae, Klebsiella, Erwinia d. Klebsiella, Salmonella, Erwinia
4. During the carboxylation phase of the Calvin cycle, Carbon dioxide combines with:
   a. Ribulose1,5-bisphosphate b. Phosphoglyceraldehyde
   c. Pyruvic acid d. Oxaloacteic acid
5. Which of the following groups contains many unique co enzymes, such as coenzyme M and co enzyme F 420?
   a. Sulfate reducing bacteria b. Methanotrophs
   c. Methanogens d. Acetogens
6. Methanogens:
   a. Produce methane as a part of their energy metabolism b. Utilize methane as an energy source
   c. Aerobic archae that produce methane gas d. All of the above
7. The reaction, where small precursor molecules are assembled into larger organic molecules is referred as:
   a. Anabolism b. Catabolism
   c. Metabolism d. None
8. When acetate is the sole source of carbon for some microorganism the cycle which is used is called:
   a. Pentose phosphate pathway b. Glycolytic pathway
   c. Glyoxylate pathway d. Oxaloactate pathway
9. Find out the dilution factor when Flowrate is 10ml where volume of the vessel is 1000ml.
   a. 0.01L/h b. 10l/h
   c. 0.05l/h d. 20L/h

10. The enzyme involved in the conversion of 6 phosphogluconate to 2 keto-3 deoxy 6 phospho gluconate:
    a. Glucose 6 phosphate
    b. 6- Phospho gluconate hydratase
    c. 6- Phospho gluconate dehydratase
    d. 2 keto 3 deoxy 6 phosphogluconate aldolase

11. Which of the following is a part of structural component?
    a. N
    b. Ca
    c. P
    d. K

12. Nitrogen cannot travel in plants in form of.....
    a. Atmospheric nitrogen
    b. Inorganic ions
    c. Amino acids
    d. Ammonia

13. Statement A: Minerals are present in the soil in the form of charged particles.
    Statement B: Concentration of minerals is lower in root than in soil.
    a. Both the statements are true
    b. Both the statements are false
    c. Statement A is true but Statement B is false
    d. Statement B is true but Statement A is false

14. This enzyme catalyzes the transfer of a phosphoryl group from ATP to glucose:
    a. Hexokinase
    b. Phosphoglucose isomerase
    c. Aldolase
    d. Phosphoglucose mutase

15. The EMP pathway in eukaryotes usually takes place in:
    a. Nucleus
    b. Lysosome
    c. Golgi apparatus
    d. Cytosol

16. Which of the following step is the rate-limiting step of the pentose phosphate pathway?
    a. Transketolase
    b. Transaldolase
    c. Glucose-6-P dehydrogenase
    d. Phosphogluconate dehydrogenase

17. Which of the following is the correct sequence of electron acceptors in ETS for production of ATP?
    a. Cyt b, c, a, a3
    b. Cyt a, a, b, c
    c. Cyt c, b, a, a3
    d. Cyt b, c, a3, a

18. Which of the following sections of the mitochondria contains the electron transport system (ETS)?
    a. Inner membrane
    b. Outer membrane
    c. Matrix
    d. Stroma

19. Ubiquinone transfers electrons from one atom to another:
    a. Complex I
    b. Complex II
    c. Matrix
    d. Cyt c

20. Acetyl CoA is formed from pyruvate by..... reaction.
    a. Dehydration
    b. Reduction
    c. Oxidative decarboxylation
    d. Dephosphorylation

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

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

1. Explain the importance of glycolysis. Explain the process of glycolysis along with the enzymes involved in it. 2+8=10

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

3. a) Define methanogenesis. 5+5=10
   b) Describe the biosynthesis of methane gas with a proper diagram.

4. Define continuous and batch culture. Explain the kinetics of continuous culture with a neat diagram. 5+5=10

5. Explain the anaerobic respiration in bacteria with a neat diagram. 10

6. Explain the process of (a) Symport and (b) Antiport with a neat diagram. 5+5=10

7. Explain the process of TCA in detail. 10

8. What is other name of pentose phosphate pathway? Explain the process and mention its importance. 2+6+2=10

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