

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

**SET
A**

[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

(Objective)

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- In the growth equation: $n = 3.3 (\log_{10} N - \log_{10} N_0)$, n stands for _____
 - Total population
 - Initial population
 - Number of generations
 - Growth constant
- Which of the following bacteria is known as Knall gas bacteria?
 - Clostridium perfringens
 - Bacillus anthrax
 - Hydrogenobacter thermophilus
 - Nitrosomonas
- In group translocation system the non specific components are:
 - EII & EI
 - HPr & EI
 - HPr & EII
 - EI & EII
- The iron chelating compounds present in bacteria is known as:
 - Phenolates
 - Hydroxamates
 - Siderophores
 - Enterobactin
- In the passive diffusion, solute molecules cross the membrane as a result of:
 - Concentration difference
 - Pressure difference
 - Ionic difference
 - All of the above
- Hexose monophosphate pathway is also known as:
 - Phosphogluconate pathway
 - Oxaloactate pathway
 - Malate pathway
 - Fumarate pathway
- The enzyme involved in the conversion of 6 phosphogluconate to 2 keto-3 deoxy 6 phospho gluconate:
 - Glucose 6 phosphate
 - 6- Phospho gluconate hydratase
 - 6-Phospho gluconate dehydratase
 - 2 keto 3 deoxy 6 phosphogluconate aldolase
- When acetate is the sole source of carbon for some microorganism the cycle which is used is called:
 - Pentose phosphate pathway
 - Glycolytic pathway
 - Glyoxylate pathway
 - Oxaloactate pathway
- TCA cycle functions in:
 - Catabolic reactions
 - Anabolic reactions
 - Amphibolic reactions
 - None

10. ED pathway is found in:
 - a. Aerobic prokaryotic
 - b. Catabolism
 - c. Both (a) & (b)
 - d. None
11. Incorporation of atmospheric Nitrogen to Ammonia occurs via the process of:
 - a. Assimilatory nitrate reduction
 - b. Tranmination
 - c. Deamination
 - d. Nitrogen fixation
12. Reverse electron flow is followed in which type of organism?
 - a. Hydrogen oxidizing bacteria
 - b. Chemolithotrophic bacteria
 - c. Chemoautotrophic bacteria
 - d. All
13. The specific enzyme of the glyoxylate cycle is:
 - a. Isocitrate dehydrogenase
 - b. Isocitrate lyase
 - c. Malate synthase
 - d. Both (b) & (c)
14. 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
15. In aerobic respiration, the terminal electron acceptor is:
 - a. Oxygen
 - b. Nitrogen
 - c. Hydrogen
 - d. Nitrate
16. In anaerobic respiration the most terminal electron acceptor is:
 - a. Nitrate
 - b. Sulphate
 - c. Carbon dioxide
 - d. All of the above
17. In which of the following phase secondary metabolites are produced during growth?
 - a. Lag phase
 - b. Log/Exponential phase
 - c. Stationary phase
 - d. Death phase
18. During the carboxylation phase of the Calvin cycle, Carbon dioxide combines with:
 - a. Ribulose1,5-bisphosphate
 - b. Phosphoglyceraldehyde
 - c. Pyruvic acid
 - d. Oxaloacetic acid
19. 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
20. Methanogens:
 - a. Produce acetate as a part of their energy metabolism
 - b. Utilize methane as an energy source
 - c. Produce methane as a part of their energy metabolism
 - d. All of the above

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

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| 1. Define Chemolithotrophy. Explain the mechanism of Nitrobacter with a neat diagram. | 2+8=10 |
| 2. a) Define oxidative phosphorylation.
b) Explain the electron transport chain with a neat diagram. | 2+8=10 |
| 3. Define active transport system. Explain the group translocation system with a neat diagram. | 2+8=10 |
| 4. a) Define methanogenesis.
b) Describe the biosynthesis of methane gas with a proper diagram. | 2+8=10 |
| 5. a) Define continuous culture. Explain the process of continuous culture and batch mathematically with a neat diagram.
b) Find the dilution factor of a culture media when flow rate is 20ml/h with vessel volume is 100ml. | 2+8=10 |
| 6. Explain the anaerobic respiration in bacteria with a neat diagram. | 10 |
| 7. Explain the TCA cycle and ED pathway with a neat diagram. | 5+5=10 |
| 8. Describe the biosynthetic process of hydrogen oxidizing bacteria. | 10 |

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