

M.Sc. 1st Semester Examination-2023**MICROBIOLOGY****Paper – MCB 104****(Microbial Physiology & Metabolism)****Full Marks: 40****Time : 2 Hours**

The Figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Unit: MCB 104.1 (Microbial Physiology)**Group-A**

Answer any two questions from the followings: (2 x 2=4)

1. What is generation time of bacteria? How it is related with growth rate?
2. What is pure culture?
3. What do you mean by oxidative stress?
4. Differentiate between selective media and enrichment media.

Group-B

Answer any two questions from the followings: (2 x 4=8)

5. What do you mean by realized niche? Write down the general criteria for adaptational dominance. 2+2
6. What do you mean by direct and indirect measurement of microbial growth? Write in brief about any one method of direct measurement of bacterial growth. 2+2
7. Write short note on: (i) moist heat sterilization, (ii) lyophilization 2+2
8. Classify microorganisms on the basis of oxygen requirement.

Group-C**Answer any one question from the followings:****(1 x 8=8)**

9. 'Mac-Conkey media is both selective and differential in nature'-justify. What is continuous growth? Write down the adaptation of cell membrane in extremophiles. 2+2+4
10. What is quorum sensing? State its significance. Explain the two-component system of bacteria with suitable diagram. 2+2+4

Unit: MCB 104.2 (Microbial Metabolism)**Group-A****Answer any two questions from the followings:****(2 x 2=4)**

11. Mention the significance of transamination reaction in physiological system?
12. Define photoheterotroph with example
13. What is Pasteur effect?
14. What are the precursor molecules of denovo synthesis of purine?

Group-B**Answer any two questions from the followings:****(2 x 4=8)**

15. 'TCA cycle is a central metabolic pathway and has both anabolic and catabolic role'-justify.
16. Write the significance of pentose phosphate pathway. State the allosteric regulation of phosphofructokinase-1. 2+2
17. Write short note on: (i) GOGAT, (ii) Oxidative phosphorylation 2-2
18. How PHB serves as the energy reserve materials for microbes? Which enzymes are associated with the biosynthesis of PHB? 2+2

Group-C**Answer any one question from the followings:****(1 x 8=8)**

19. What is nitrogenase complex? State the mechanism of nitrogen fixation by mentioning the role of enzymes of nitrogenase complex. State the significance of Entner-Daudoroff pathway. 2+4+2
20. State the role of fatty acid synthase complex? How ATP is generated from NADH and FADH₂? Write the metabolic importance of 5'-phosphoribosyl 1-pyrophosphate (PRPP). Briefly state the regulatory mechanism of purine biosynthesis. 2+2+2+2