

2022

1st Semester Examination

MICROBIOLOGY

Paper : MCB 103

(Biophysical and Biochemical Principles)

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

MCB 103.1

(Biophysics & Instrumentation)

Answer any *two* questions of the following : $2 \times 2 = 4$

1. State the characteristics of hydrogen bond.
2. What do you mean by stable and unstable isotopes?
3. Name one positron emitter and negatron emitter.
4. What are the different types of column chromatography.

Answer any *two* questions of the following : $4 \times 2 = 8$

5. Why water is considered as an excellent solvent for polar molecule? State the alternation of the quantity of hydrogen bonds during its liquid and solid state.

P.T.O.

6. Deduce the Handerson-Hasselbalch equation.
7. Distinguish between strong and week acids. Why week acid is used for preparing acidic buffer? 2+2
8. Write the principle of HPLC.

Answer any *one* question of the following : $8 \times 1 = 8$

9. Give brief description of liquid scintillation counter. Describe why it is more preferred over GM counter. 6+2
10. Name different types of detectors used in HPLC. What is the role of column in HPLC analysis? What is retention time? 3+3+2

MCB 103.2

(Fundamental Biochemistry)

Answer any *two* questions of the following : $2 \times 2 = 4$

11. What are the characteristics of an allosteric enzyme?
12. State the limitations of MM plot of enzyme kinetics.
13. Draw the structure of aspartic acid with its ionic and zwitterionic form.
14. Write the structure of sphingophospholipids.

Answer any *two* questions of the following : $4 \times 2 = 8$

15. State the effect of competitive inhibitors on K_m and V_{max} .

16. Describe the titration curve of glycine.
17. Describe the artificial membrane systems.
18. Describe the phosphotransferase system (PTS) of bacteria.

Answer any *one* question of the following : $8 \times 1 = 8$

19. Write the components of electron transport chain. How electrons are transported through electron transport chain? 3+5
 20. Compare alpha helix and beta sheet of protein structure. Describe the structure of collagen. State the importance of Ramachandran plot. 3+3+2
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