 PG/IS/MCB/103.1 & 103.2/23

M.Sc. 1st Semester Examination, 2023

MICROBIOLOGY

(*Biophysical and Biochemical Principles*)

PAPER – MCB-103

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

UNIT –MCB-103.1

(*Biophysical & Instrumentation*)

GROUP – A

Answer any **two** questions : 2×2

1. What is a chromatogram ?

2. Why non-covalent bonds are considered as 'dance of life' ?

3. Name two fluorescent strains that are widely used for DNA staining.

4. What is limit of resolution ? What is resolving power of human eye ? 1 + 1

GROUP–B

Answer any **two** questions : 4 × 2

5. 'Water is an excellent solvent for polar molecules'–Justify the statement.

6. What are the applications of radioisotopes in biological sciences ?

7. Elucidate the Henderson-Hasselbalch equation for weak acid and base.

8. Write short note on : 2 + 2

(*i*) Bright field microscope

(*ii*) Affinity chromatography.

GROUP – C

Answer any **one** question : 8 × 1

9. Write note on Components of HPLC. Describe the principle of spectrophotometer highlighting the Beer-Lambert law. 4 + 4

10. Mention the basic components of a SEM. How does SEM changes the magnification of an image ? Briefly discuss the steps of sample preparation for SEM. Write down the differences between SEM and TEM. 2 + 2 + 1 +3

UNIT –MCB-103.2

(Fundamental Biochemistry)

GROUP–A

Answer any **two** questions : 2×2

11. Define epimer and enantiomer.

12. When one DNA containing 35% G, then what will be its % of A ?

13. Which amino acid has lowest PI value, and which have highest PI value ?

14. How temperature affected the functionality of an enzyme ?

GROUP–B

Answer any **two** questions : 4×2

15. Describe Ramachandran plot with suitable diagram.

16. Discuss the importance of Tm value of protein. A good enzyme is judged by having lower Km value—Justify the statement. 2 + 2

17. State the role of periplasmic binding protein in membrane transport.

18. Describe the factors that affected membrane fluidity.

GROUP—C

Answer any **one** question : 8 × 1

19. How proton motive force induced ATP synthesis by highlighting the role of ATP synthase ?

20. Compared competitive and non-competitive inhibition of enzyme activity with suitable example.

[Internal Assessment — 10 Marks]