

U.G. 2nd Semester Examination - 2022**MICROBIOLOGY****[HONOURS]****Course Code : MB-H-CC-L-04****(Instrumentation and Biotechniques)**

Full Marks : 40

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer any **five** questions of the following:

2×5=10

- i) What is spherical aberration?
- ii) What is blue shift?
- iii) What is the function of APS in PAGE?
- iv) What modification is required in light path of a typical darkfield microscope?
- v) What is partition coefficient?
- vi) What is meant by elution volume in Gel filtration chromatography?

vii) Why SEM-samples are needed to be coated with a metal-film?

viii) What is RCF?

2. Answer any **two** of the following: 5×2=10i) What is Lamber Beer's law? Mention the deviations of Lamber Beer's law. $2\frac{1}{2}+2\frac{1}{2}$

ii) What precautions are needed while loading samples in a centrifuge? Give proper justification. Write note on ultracentrifugation. 2+3

iii) How is the concept of fluorescence applied to visualize the sample after agarose gel electrophoresis? Discuss the working principle of Gel-electrophoresis. 2+3

iv) Distinguish between TEM and SEM. Mention their application in biological study. 3+2

3. Answer any **two** of the following: 10×2=20i) Write short notes on: $2\frac{1}{2} \times 4 = 10$

a) 2-D gel electrophoresis

b) Gas-liquid chromatography

c) Isoelectric focusing

d) Tracer technique

[Turn Over]

- ii) a) Write notes on confocal microscopy and its application.
- b) Write notes on density gradient centrifugation and its application. 5+5
- iii) Which light microscopy is preferred for viewing live bacterial cells? Give reasons. Discuss, how does this microscopy work? How is a typical fluorescent microscope designed to prevent possible eye damage to the viewer observing through eye piece?
1+2+4+3
- iv) What is stacking gel? How does it differ from resolving gel? Explain why usages of both of these are important in getting better resolution? What is the basis of separation in (a) native PAGE and (b) SDS PAGE? Justify your answer. 1+2+3+(1+1)+2
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