

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, JUNE 2022

THIRD YEAR [BATCH 2019-22]

MICROBIOLOGY (HONOURS)

Paper : DSE4

Date : 15/06/2022

Time : 11 am – 1 pm

Full Marks : 50

1. Answer **any ten** questions of the following : [10×2]

- What is analytical centrifugation?
- What is PAGE? State one application of this method.
- Why is TLC named so?
- Why agarose is the preferred medium for electrophoresis?
- Write down the two factors that can affect the separation process on agarose gel electrophoresis.
- What do you mean by molecular marker?
- What is the role of ethidium bromide on agarose gel electrophoresis?
- Define the term Sedimentation rate.
- Name two enzymes that can be used as a marker for different tissue fractionation.
- What are the limitations of ultracentrifugation?
- What are the two layers in SDS PAGE?
- Why do we want the protein coated in negative charges on SDS PAGE?
- What are the basic column chromatography components?
- Define the term partition coefficient.
- Name two matrix materials that can be used as a stationary phase for chromatography.

Answer **any three** questions of the following : [3×10]

2.
 - How does the stacking layer do its job?
 - What does glycine's charge have to do with the stacking layer?
 - What happens to glycine zwitterion in the resolving layer?
 - What is Preparative Centrifugation? (2.5×4)

3.
 - What are the disadvantages of swing bucket rotor?
 - Define relative centrifugation force.
 - What is optical density?
 - Define sedimentation velocity.
 - What happens to the proteins in the resolving layer? (2×5)

4.
 - Write down the principle of differential centrifugation.
 - What is the role of utilizing SDS and urea in SDS page preparation?
 - Name two staining solution that can be used to stain protein on SDS PAGE. [3+(2+2)+(1.5+1.5)]

5. a) An optical filter passes only far red light with an average wavelength of $6500\text{\AA}$. Calculate
- i) the wavelength in nanometers and centimetres,
 - ii) the wave number in cm^{-1} and
 - iii) the frequency.
- b) Define molar extinction coefficient.
- c) Write down Lambert-Beer law. [(1+1)+(1.5+1.5)+2+3]
6. a) Write down the deviations of Lambert-Beer law.
- b) There is a substance in a solution (4 g/liter). The length of cuvette is 2 cm and only 50% of the certain light beam is transmitted. What is the extinction coefficient?
- c) Define term fluorescence quenching.
- d) Write down the principle of Ion-exchange chromatography.
- e) Name one extrinsic and one intrinsic fluor compound. (3+2+1+2+2)

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