Enrollment No. _____

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot

Affiliated to Saurashtra University, Rajkot

SEMESTER END EXAMINATION NOVEMBER - 2017

M.Sc. Microbiology

16PMBCC11 – BASIC INSTRUMENTATION AND BIOPHYSICS

Duration of Exam – 3 hrs ***Semester – III*** ***Max. Marks – 70***

Part A (5x2= 10 marks)

Answer **ALL** questions

1. Define resolving power of a light microscope. Name the cell organelle in eukaryotic cells that can be easily detected by using light microscope, after staining.
2. Explain the terms: wavelength and absorption spectra using suitable diagrams.
3. Describe the advantages of thin layer chromatography (TLC) in comparison to paper chromatography.
4. What do you understand by density gradient centrifugation? List some materials used to prepare density gradients.
5. What is patch clamp technique? List its applications in neurobiology.

Part B (5x5= 25 marks)

Answer **ALL** questions

6a. What do you understand by fluorescence phenomenon? Describe principle, working and applications of fluorescence microscopy in cell biology.

OR

6b. Write a short note on Autoradiography and list its applications in microbiology.

7a. Write Beer's and Lambert's Laws of Light Absorption and list their limitations. Why do we prefer to record absorbance readings instead of percent transmittance, for routine colorimetric analysis?

OR

7b. What is Raman spectroscopy? Write its two applications in the field of biosciences.

8a. Draw a labelled diagram showing different components of typical HPLC system and write brief description about importance of different components.

OR

8b. GLC is used for separation and characterization of which type of compounds? Write applications of GLC in biological sciences.

9a. Define differential centrifugation and describe the scheme for isolation of cell organelles from eukaryotic cells/tissues.

OR

9b. Write a brief note on materials used in gel electrophoresis and their characteristics.

10a. Give comparative account of working and applications of CT scan v/s MRI.

OR

10b. Write a note on ECG and explain different wave components of a typical ECG using diagram.

***Part C** (5x7= 35 marks)*

Answer **ALL** questions

11a. Draw a labelled diagram showing different components of scanning electron microscope (SEM) and briefly describe working of SEM and sample preparation for SEM

OR

11b. Define different units of Radioactivity. Explain using suitable examples the radioactive decay by emission of alpha, beta and gamma radiations from radio isotopes and changes in atomic number and mass number of the isotopes.

12a. Discuss how UV spectrophotometers can be used to study DNA denaturation and renaturation kinetics and the melting temperature Tm of the DNA can be determined. Write the significance of Tm.

OR

12b. Differentiate atomic emission and atomic absorption spectroscopy and write their applications.

13a. Discuss principle, types and applications of ion exchange chromatography.

OR

13b. Discuss principle of affinity chromatography and explain how it is different from other conventional chromatographic techniques? Write applications of affinity chromatography.

14a. Describe native PAGE and SDS-PAGE. Explain giving suitable example, how combination of these two techniques can be used to study the quaternary structure of the proteins?

OR

14b. Draw labelled diagram showing different components of Analytical centrifuge. List different types of optics systems used in Analytical ultracentrifuge and discuss how analytical centrifuge can be useful in determination of molecular size of particles like ribosomes?

15a. Discuss how functional brain scans: fMRI or PET are different from structural scans like CAT and MRI? Explain the working and applications of PET scan.

OR

15b. Explain the electroencephalogram (EEG), describe alpha, beta, delta and theta waves. Write applications of EEG in diagnosis of different neurological problems.