Roll No. ..... Total Pages : 4

MDE/M-20 **6965**

LAB TECHNIQUES IN MICROBIOLOGY
Paper : MBY-201

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Select *one* question from each section. All questions carry equal marks.

Compulsory Question

1. (a) Name various types of condensers used in Compound microscope. Write their characteristics. 2

(b) Important limitations of Electron microscope. 2

(c) Write down the principle of ELISA Test. 2

(d) Explain the principle of microarray. 2

(e) Define PAGE. Explain how does SDS bind to proteins. Write various uses of PAGE. 2

(f) Write and explain the principle of HPLC. 2

(g) Discuss in detail Sedimentation velocity and Sedimentation equilibrium. 2

(h) Discuss the theory of differential centrifugation. 2

SECTION–A

2. (a) What do you understand by Confocal microscopy ? Write down the principle, theory and working of confocal microscope. 6

(b) Write important applications of Confocal microscopy. What are the advantages of Confocal microscopy over Fluorescent microscopy ? 6

(c) What do you understand by Flow cytometry ? Write and discuss important characteristics that are measured in flow cytometry. Also mention the important disorders that can be measured by this technique. 4

3. (a) What important factors led to the discovery of Electron microscope ? Name various types of Electron microscopes. 4

(b) Differentiate between TEM and SEM, REM and STEM. 4

(c) Discuss in detail general procedure for preparation of sample in electron microscope. Also write disadvantages and applications of electron microscope. 8

SECTION–B

4. (a) Name various types of ELISA techniques. Write in detail procedure of Sandwitch ELISA and Competitive ELISA. Also write important advantages of Sandwitch and Competitive ELISa. Also write applications of ELISA. 8

(b) Discuss in detail one- and two-dimensional electro-immunodiffusion technique. 4

(c) Name various immunodiffusion principles and their applications. 4

5. (a) Write down the detailed structure, principle and working of ELISA Reader Instrument. 6

(b) Write in detail principle and procedure of Radio immuno-array (RIA). 4

(c) Discuss in detail important applications of Microarray. 4

SECTION–C

6. (a) Explain in detail method used in Native PAGE. 4

(b) Ion exchange chromatography is considered a typical technique. Why ? Discuss about various separating protiens in this technique. 6

(c) What do you understand by Batch and Column set up in affinity chromatography ? Write important uses of this technique. Discuss its role in immuno-affinity, immobilized metal ion affinity chromatography, recombinant proteins and lectins. 6

7. (a) Discuss in detail principle, background production of Chromatogram. How will you proceed if the substances are colourless ? 6

(b) Discuss in detail principle and protocol of SDS PAGE i.e. in protocol mention materials and reagents required, operating method, advantages and disadvantages. 10

SECTION–D

8. (a) Discuss in detail working principle and important applications of ultra-centrifugation. 6

(b) How will you prepare sample before undergoing differential centrifugation ? 4

(c) Write a short note on multi-dimensional and solid state NMR spectroscopy. Write and discuss various factors that reduce sensitivity of NMR spectroscope. 6

9. (a) Discuss in detail sample preparation, comparing to a reference and Fourier transform infrared (FTIR) in IR spectroscopy. 6

(b) Discuss in detail two-dimensional IR. 2

(c) Write and discuss in detail the principle and applications in ultraviolet-visible spectroscopy. 4

(d) Write short note on ultraviolet visible spectrophotometer and micro-spectrophotometry. 4