The West Bengal University of Health Sciences
B.Sc. in Medical Microbiology 2nd Semester September, 2023 Examination

Subject : Instrumentation

Time : 2 hrs. **Full Marks : 50**

*Attempt **all** questions*

1. Answer all the question : 10 x 1
   a) The use of pH meter is to check the concentrations of :
      i) O_2. ii) CO_2. iii) H^+. iv) NH_4^-.
   b) This instrument works according to the Beer-Lambert Law :
      i) Colorimer. ii) Microscope. iii) Centrifuge. iv) Autoclave.
   c) During taking OD of a purple-colored solution which filter can be selected for the absorption of light?
      i) Blue. ii) Green. iii) Yellow. iv) Red.
   d) If you are working with a 10X objective, then the magnification is :
      i) 10X. ii) 20X. iii) 40X. iv) 100X.
   e) Preferred mobile phase for the ion exchange chromatography is :
      i) Hexane. ii) Methanol. iii) Deionized water. iv) Buffer solution.
   f) The role of guard column is to protect the :
      i) Pump. ii) Sample. iii) Analytical column. iv) Detector.
   g) Which is required to work with a highly contagious microbes :
      i) BSL - I. ii) BSL - II. iii) BSL - III. iv) None of these.
   h) Autoclave is used for :
      i) Culture. ii) Sterilization. iii) Purification. iv) Detection.
   i) Colorimeter detect the OD of :
      i) Only colored sample. ii) Only non-colored sample.
      iii) Colored and non-colored sample iv) None of these.
   j) Application of BOD incubator includes working at :
      i) 0°C. ii) 20°C. ii) 80°C. iv) 100°C.

2. Answer ***any four*** of the following questions : 4 x 2
   a) What is "Molecular sieving"?
   b) What do you mean by "100% exhaust in a BSL"?
   c) Write the advantages of PAGE.
   d) Write the application of anerobic chamber.
   e) Write the use of dual-beam spectrophotometer.
   f) Why is 100X objective also known as oil-immersion objective?

3. Answer ***any four*** of the following questions. 4 x 4
   a) Write the basic principle of electrophoresis.
   b) Make a list of components/parts found in a HPLC machine.
   c) Make a design of a HEPA filter.
   d) Make a drawing on light path of spectrophotometer.
   e) Write the comparison between agarose gel and PAGE.
   f) Discuss the working principle of affinity chromatography.

4. Answer ***any two*** of the following questions :
   a) Explain centrifugal force. Describe the process of differential centrifugation to separate the cellular and sub-cellular fractions. 3+5
   b) Mention the types of incubators with their one each specific application. How does anaerobic chamber works? 5+3
   c) Describe the Beer-Lambert's law. Discuss the different types of spectrophotometers and their application. 3+5