Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

B.Sc. Winter 2017-18 Examination

Semester: 1 **Date: 26/12/2017**
Subject Code: 11102101 **Time: 10:30 am to 1:00 pm**
Subject Name: Biophysics and Instrumentation **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Essay type **(08)**

What are the different paper chromatography techniques?

Q.1. B) Answer the following questions (Any two)

(a) Do as per the instructions.
1. Draw basic design of spectrophotometer. **(02)**
2. Sketch the optical path for the Bright field microscopy. **(02)**

(b) Write a short note on Flame photometry. **(04)**

(c) Explain Beer Lambert's law in Spectrophotometry. **(04)**

Q.2. A) Answer the following questions.

(a) Fill in the blanks.

1. Purification of enzymes and proteins is done using_____. **(02)**
2. Retardation factor is the ratio of _____. **(02)**

(b) Write short note on Agarose Gel Electrophoresis. **(04)**

Q.2. B) Answer the following questions (Any two)

(a) Multiple choice questions.

1. A technique which separates charged particles using electric field is **(01)**
   a) Hydrolysis
   b) electrophoresis
   c) protein synthesis
   d) protein denaturing
2. What is the maximum R_f value for any molecule in paper chromatography? **(01)**
   a) 0.1
   b) 1.0
   c) 10.0
   d) ∞
3. In chromatography, which of the following can be the mobile phase? **(01)**
   a) Solid or liquid
   b) Liquid or gas
   c) Gas only
   d) Liquid only

(b) How is the R_f value for a spot on a TLC plate calculated? **(03)**

(c) What are the parameters affecting the resolution of optical microscopy? **(03)**

Q.3. A) Essay type **(08)**

What is 2-D electrophoresis? Explain

Q.3. B) Answer the following questions (Any two)

(a) Brief note
1. Fluorescence **(02)**
2. Agarose **(02)**

(b) What are advantages and disadvantages of Gas Liquid Chromatography? **(04)**

(c) Describe the basic principle of Gel Filtration Chromatography **(04)**

Q.4. A) Answer the following questions.

(a) Brief note (Each of 02 marks)
1. Retention Time **(02)**
2. Molar absorption coefficient **(02)**

(b) Describe the differences between Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM) **(04)**

Q.4. B) Answer the following questions (Any two)

(a) Multiple choice questions.

1. In a mixture of the proteins listed below, which should elute last in size-exclusion (gel filtration) chromatography? **(01)**
   a. cytochrome c, Mr = 13,000
   b. immunoglobulin G, Mr = 145,000
   c. polymerase, Mr = 450,000
   d. serum albumin, Mr = 68,500
2. What type of microscopy allows for the visualization of live, unstained specimens? **(01)**
   a. Bright-field
   b. Flourescence
   c. Dark-field
   d. Electron microscopy
3. Which of the following is the application of ion exchange chromatography? **(01)**
   a. The softening of hard water
   b. The demineralisation of water
   c. The separation and determination of anions
   d. All of the mentioned

(b) Write the role of N, N, N', N'-tetramethylethylenediamine (TEMED), Ammonium persulphate (APS) and Bromophenol blue in gel electrophoresis. **(03)**

(c) Write the name of factors affecting the electrophoretic mobility. **(03)**