



**NBV-003-010406**

Seat No. \_\_\_\_\_

**M. Sc. (Sem. IV) (CBCS) Examination**

**April / May - 2017**

**Chemistry : C(PA) & C(PM) - 402**

*(Advance Instrumental Techniques)*

*(New Course)*

**Faculty Code : 003**

**Subject Code : 010406**

Time :  $2\frac{1}{2}$  Hours ]

[ Total Marks : 70

- Instructions :** (1) All questions are compulsory.  
(2) All questions carry equal marks.

**1 Answer the following : (any seven) 14**

- (a) Explain polarimetry, polarized light and circular polarized light.
- (b) How will you analyze blood urea nitrogen by multilayer thin film analysis ?
- (c) Define and differentiate spectropolarimetry and saccharimetry.
- (d) Explain automated method of chemical analysis. How it differ from automatic method ? Give the advantages of it.
- (e) What do you mean by thermal methods of analysis ? Give the principles of TGA.
- (f) Explain role of running buffer and buffer additives in electrophoresis.
- (g) Explain total volume of gel bed and solvent volume inside the gel particles.
- (h) Explain electrophoresis and mention the type of electrophoretic method.
- (i) Briefly discuss electro dialysis.
- (j) How will you determine molecular weight by gel chromatography ?

**2** Answer the following : (any **three**) **14**

- (a) Explain the mechanism of multilayer thin film analysis. How will you determine blood sugar by this technique ?
- (b) Discuss the advantages and disadvantages of automated methods and chemical analysis. Mention steps involved in chemical analysis.
- (c) What is flow injection analysis ? Give principle and explain procedure with suitable examples.
- (d) How will you analyze elements of organic compounds by elemental analyzer ? Give principle and procedure with diagram.

**3** Answer the following : **14**

- (a) Write note on capillary isoelectric focusing.
- (b) Describe the principle and technique of gel chromatography in detail.

**OR**

- (a) Describe classical gel electrophoresis and high performance capillary electrophoresis in detail.
- (b) Mention the name of different gel chromatography and discuss in detail gel filtration chromatography.

**4** Answer the following : (any **two**) **14**

- (a) Define ORD and CD. Discuss with diagram ORD spectroscopy.
- (b) Define racemic mixture, optical purity and enantiomeric excess.
  - (i) (-)-2-butanol has a specific relation of  $-13.5^\circ$ . While the specific rotation of (+)-2-butanol is  $+13.5^\circ$ . Calculate the optical purity of a mixture containing (+) and (-)-2-butanol if the mixture has on observed rotation of  $-8.55^\circ$ . Does the mixture contain more (+) or more (-)-2-butanol ?
  - (ii) What is the enantiomeric excess of a mixture containing 25% (+) butanol and 75% (-)-2-butanol if the specific rotation of (+)-2-butanol is  $13.5^\circ$ .

- (c) Define optical activity, specific rotation, D, L and elliptically polarized light.

A 1.00 gm sample is dissolved in 20.0 ml ethanol 5.00 ml of this solution is placed in a 20.0 cm polarimeter tube at 25°C. The observed rotation is 1.25° counter clock find optical activity.

**5** Answer the following : (any **two**) **14**

- (a) Write note on capillary zone electrophoresis.
- (b) Write note on gel matrix used in gel chromatography.
- (c) Describe the factors affecting in TGA. Draw the TGA diagram.
- (d) Explain the principle of DTA. Give the instrumentation and factors affecting in measurement.
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