



**HDV-003-1103002** Seat No. \_\_\_\_\_

**M. Sc. (Chemistry) (Sem. III) (CBCS) Examination**

November / December – 2017

**CPA & CPM-302 : Electro Analytical Techniques**  
(*New Course*)

**Faculty Code : 003**

**Subject Code : 1103002**

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)

- (a) Explain the term electro analytical chemistry and classify it.
- (b) Give the principle of polarography and name of electrodes used in it.
- (c) What is electrogravimetric analysis ? How it is superior to classical gravimetric analysis ?
- (d) Define ion selective electrode and classify them.
- (e) An electric current of 0.5 ampere was passed through acidulated water for 30 minutes. Calculate the volume of hydrogen at NTP (Z for hydrogen 0.00001)
- (f) What is electrophoresis ? Give the type of electrophoretic method.
- (g) Explain the term reverse osmosis.
- (h) Give the advantages and disadvantages of dropping mercury electrode.
- (i) Explain running buffer and buffer additive used in electrophoresis.
- (j) Calculate the time required for a current of 0.10 ampere to deposit 160mg of Cu from a solution of  $\text{CuSO}_4$  (Eq. wt. Cu = 32).

- 2** Answer the following : (any **three**)
- (a) Discuss classical gel electrophoresis and high performance capillary electrophoresis in detail.
  - (b) Write note on capillary zone electrophoresis.
  - (c) Discuss electro-osmosis and give its important characteristics.
  - (d) Explain capillary isoelectric focussing in detail.

- 3** Answer the following :
- (a) What is coulometric method of analysis ? Explain constant current coulometric analysis and discuss internal generated analyte technique.
  - (b) Explain the faraday's second law of electrolysis and give it experimental verification.

**OR**

- (a) Write note on amperometric titrations.
  - (b) Describe constant potential electrogravimetric analysis. Mention the list of applications of electrogravimetric analysis.
- 4** Answer the following : (any **two**)
- (a) Discuss the methods of evaluation of qualitative results of polarography.
  - (b) Describe the theory of ion selective electrode.
  - (c) Describe with diagram anodic stripping voltammetry.

- 5** Answer the following : (any **two**)
- (a) Derive an expression for the ion-selectivity coefficient. Briefly discuss liquid ion exchange membrane electrode.
  - (b) Explain polarographic maxima and discuss different types of currents in polarography.
  - (c) Explain the Faraday's first law of electrolysis and give its experimental verification.
  - (d) Write note on oxygen interference in polarography.