M.Sc. (Part–II) Semester–III (CBCS) Examination
CHEMISTRY (OLD)
(Analytical Chemistry–I)
Paper–X
(Thermal and Electroanalytical Methods)

Time : Three Hours] [Maximum Marks : 80

Note :—(1) All questions are compulsory and carry equal marks.

(2) The use of log tables/calculator is permitted.

1. (a) In thermogravimetric analysis of 0.250 gm of calcium hydroxide, the loss in weight at different stages of temperature was as follows :

(a) 0.018 gm at 100-150°C is loss of hygroscopic water.

(b) 0.038 gm at 500-560°C is dehydration.

(c) 0.022 gm at 900-950°C is dissociation.

What should be the composition of calcium hydroxide ? 5

(b) What are different types of TG ? Explain. 5

(c) Explain advantages of DSC over DTA. 6

OR

(p) Explain the applications of DTA. 6

(q) What are thermogravimetric titrations ? Give its applications. 5

(r) What are the factors affecting DTA curve ? 5

2. (a) Explain coulometric titrations. State their advantages. 6

(b) Explain electrogravimetry method in separation of metals. 5

(c) Write a note on High frequency titration. 5

OR

(p) Explain principle and techniques in electrogravimetry. 5

(q) What are high frequency titration ? Give their advantages. 5

(r) Explain the technique used in electrolysis at constant current. 6

3. (a) What are ion selective electrodes ? Explain it by suitable example. 6

(b) Give the application of chemical sensors in food chemistry. 5

(c) Explain enzyme electrodes with suitable example. 5

OR

(p) Explain working of glass membrane electrode. 5

(q) Write brief note on solid state sensors with suitable examples. 5

(r) Give the advantages of ion selective electrode. 6

4. (a) Explain half wave potential with equation. 5

(b) Write brief note on polarographic maxima. 5

(c) Give advantages of pulse polarography over differential pulse polarography. 6

OR

(p) Explain principle and working of polarography with diagram. 6

(q) Explain reversible, quasi-reversible and irreversible electrode reaction. 5

(r) Discuss limitations of polarography. 5

5. (a) On the basis of cyclic voltammetry, how will you determine if an electrode process is reversible or not ? 5

(b) What is meant by stripping phenomenon ? Give principle of anodic stripping voltammetry. 6

(c) Explain mechanism of ASV in estimation of metal ions. 5

OR

(p) Write a brief on chronopotentiometry. 5

(q) Interpret cyclic voltammograms for irreversible redox systems. 5

(r) Explain principle of cathodic stripping voltammetry and give its limitations. 6