No. of Printed Pages : **2**

Sl. No.

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M.Sc. II Semester Degree Examination, September/October - 2022

INDUSTRIAL CHEMISTRY

DSC 8 : Instrumental Methods of Analysis
(New Syllabus)

Time : 3 Hours Maximum Marks : 70

Note : *Answer any* ***Five*** *of the following questions with question No.* ***1 (Q1) Compulsory****. Each question carries* ***equal*** *marks.*

1. (a) Explain the characteristics and advantages of different types of columns employed in Gas chromatography. **5+5+4**

(b) Discuss the principle and applications of HPLC in pharmaceutical industries.

(c) What is ion-exchange capacity of a resin ? Explain the procedure for its determination for cation exchange resins.

2. (a) Explain the construction and working of hollow cathode lamp. **5+5+4**

(b) Discuss the principle and procedure for the determination of potassium by flame photometric method.

(c) Discuss the different types and advantages of excitation sources employed in atomic emission spectroscopy.

3. (a) What is the principle of cyclic voltammetry ? Sketch the reversible and irreversible cyclic voltammograms and explain their characteristic features.

(b) What are reference electrodes ? Explain the working of saturated calomel electrode.

(c) Discuss the theory and instrumentation of electrogravimetry. **5+5+4**

4. (a) Discuss the principle and instrumentation of X-ray fluorescence spectrometer. **5+5+4**

(b) With a neat schematics, explain the principle and working of TEM.

(c) Explain the rules involved in the determination of Miller Indices with suitable examples.

5. (a) What is supercritical fluid ? Explain the properties and advantages as supercritical fluid employed in chromatography. **5+5+4**

(b) Explain the principle and applications of capillary zone electrophoresis.

(c) Discuss the mechanism and methodology involved in the field flow fractionation.

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6. (a) Sketch and explain the characteristics of the curves obtained for the following conductometric titrations : **5+5+4**

(i) Strong acid and strong base, and

(ii) Weak acid and strong base.

(b) Explain the principle, advantages and applications of Rapid scan polarography.

(c) What is plasma ? How it is obtained ? Mention its properties.

7. (a) Explain the principle and ionization process involved in photoelectron spectroscopy. **5+5+4**

(b) Discuss the principle and applications of X-ray absorption spectroscopy.

(c) With a neat schematics, explain the principle and working of electro-osmosis technique.

8. (a) Sketch and explain the various types of curves obtained in amperometric titrations. **5+5+4**

(b) Classify the electrophoretic techniques and explain the factors affecting electrophoretic mobility in electrophoresis.

(c) State and explain Koopman's theorem.

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