

**(DCHE 21)**

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

Chemistry

**ANALYTICAL CHEMISTRY**

Time : Three hours

Maximum : 70 marks

**SECTION A — ( $4 \times 7\frac{1}{2} = 30$  marks)**

Answer any FOUR from the following questions.

1. Write the principle and applications of turbid metric titrations.
2. Write the qualitative and quantitative analysis of Iron.
3. Explain the principle and applications of flame photometry.
4. Write about the theory of Atomic Absorption Spectroscopy. What are the interferences of cations and anions in AAS?
5. Explain the principle and Theory of redox titrations.
6. Write the construction of Dropping Mercury electrode and the reactions at DME.

7. Explain synergism in solvent Extraction process.
8. Explain the mechanism of Ion - exchange process with examples.

SECTION B — (4 × 10 = 40 marks)

Answer ALL questions, choosing one from each unit.

UNIT I

9. (a) Describe the theory, instrumentation principle and applications of Nephelometry.

Or

- (b) Describe the determination of stability constants by spectrophotometrically.

UNIT II

10. (a) Explain the theory, principle and applications of Fluorimetry.

Or

- (b) Describe the theory, instrumentation. Principle and applications of flame emission spectroscopy.

UNIT III

11. (a) Describe the instrumentation, working principle and applications of polarography.

Or

- (b) Explain the working principle and applications of controlled potential electro-gravimetric analysis.

UNIT IV

12. (a) Explain the principle and Development methods in paper chromatography. Write the applications of paper chromatography.

Or

- (b) Describe the instrumentation, working principle and applications of Gas-Liquid chromatography (GLC).

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**(DCHE 22)**

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Second Year

Chemistry

INORGANIC CHEMISTRY

Time : Three hours

Maximum : 70 marks

SECTION A — ( $4 \times 7 \frac{1}{2} = 30$  marks)

Answer any FOUR questions.

1. Explain separation of Lanthanides.
2. Write magnetic properties of Lanthanides and Actinides.
3. Write a note on Data Collection.
4. Explain about Electronic absorption spectroscopy.
5. Write a note on Hyperfine splitting.
6. Write about Chemical shifts and explain spin-spin coupling.
7. Explain concept of essentiality and discuss role of essential elements.
8. Write a note on Haemoglobin.

9. SECTION B — ( $4 \times 10 = 40$  marks)

10. Answer ALL questions.

11.(a) How to extraction and separation of Lanthanides.

Or

12.(b) Explain comparision of Lanthanides and Actinides.

13.(a) Discuss basic instrumentation of Infrared spectroscopy and its applications.

Or

14.(b) Discuss principle and basic instrumentation of Raman spectroscopy.

15.(a) Explain

(i) Gouy's method.

16. (ii) Faraday method.

Or

17.(b) Explain principle and instrumentation of mass spectroscopy.

18.(a) Discuss metalloporphyrins and Haemocyanins.

Or

19.(b) Discuss about cytochromes and Nitrogenase.

**(DCHE 23)**

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

Chemistry

**ORGANIC CHEMISTRY**

Time : Three hours

Maximum : 70 marks

PART A – (4 × 7½ = 30 marks)

Answer any FOUR questions.

- 1.Explain Fieser – Woodward rules for conjugated dienes.
- 2.Write a note on overtones.
- 3.Discuss simplification of complex spectra nuclear magnetic double resonance.
- 4.Write a note on nitrogen rule.
- 5.Explain photo-fries rearrangement.
- 6.Discuss electrocyclic reactions and cyclo additions with examples.
- 7.Explain synthesis of menthol.
- 8.Explain synthesis of morphine.

9. PART B – (4 × 10 = 40 marks)

10. Answer ALL questions.

11. (a) Discuss ultraviolet spectra of aromatic and heterocyclic compounds.

Or

12.(b) Discuss about combination bands and Fermi resonance.

13. (a) Explain

(i) Hindered rotation

(ii) Contact shift reagents.

Or

14.(b) Discuss mass spectral fragmentation of organic compounds with respect to their structure determination.

15.(a) Explain Norrish type- I and Norrish type – II reactions with examples.

Or

16.(b) Write Woodward-Hoffmann selection rules with applications.

17.(a) Discuss stereochemistry and synthesis of atropine.

Or

18.(b) Explain

(i) Benzil – Benzilic acid rearrangement.

(ii) Beckmann rearrangement.

**(DCHE 24)**

M.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Second Year

Chemistry

ENVIRONMENTAL CHEMISTRY

Time : Three hours

Maximum : 70 marks

SECTION A — ( $4 \times 7\frac{1}{2} = 30$  marks)

Answer any FOUR of the following questions.

1. Explain Lithosphere in detail.
2. Write the Ion- Exchange properties of soils.
3. Explain the sources and emissions of oxides of nitrogen.
4. Write the analysis of hydrocarbons in Air samples.
5. Write the composition of sea water and the water quality parameters of drinking water.
6. Write the effects of arsenic and selenium with regard to water pollution.
7. How do you determine COD in water samples?

8. How do you determine suspended particulate matter in water samples?

9. SECTION B — (4 × 10 = 40 marks)

10. Answer ALL questions, choosing one from each unit.

UNIT I

11.(a) Write the determination of phosphorous and silicon in soil samples.

Or

12.(b) Discuss the effect of plants and animals on the principles of weathering.

UNIT II

13.(a) Discuss the sources, emissions and control of radioactive pollutants in Air.

Or

14.(b) Write the analysis of Carbon monoxide and Carbon dioxide in Air samples.

UNIT III

15.(a) Discuss the domestic water pollution due to thermal industries and shipping.

Or

16.(b) Discuss in detail about Hydrosphere.

#### UNIT IV

17.(a) Explain the continuous monitoring process of ozone and hydrogen sulphide.

Or

18.(b) Explain the water treatment techniques by reverse osmosis and flash distillation methods.