

Subject Code—55620

B.Sc. EXAMINATION

(Main/Reappear) (Batch 2018 Onwards)

(Fifth Semester)

CHEMISTRY

CCL-503(ii) Paper I

Chemistry of Main Group Elements, Theories
of Acids and Bases—I

Time : 3 Hours

Maximum Marks . 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

1. (a) Define Bronsted Acid and Base. 2

(b) Write conjugate acids of OH^- , H_2O ,
 H_2PO_3^- and HCO_3^- . 2

- (c) What is the principle of zone refining ? 2
- (d) Name the method used for refining of Titanium and Lead. *zone* 2
- (e) When sodium burns in excess of air to form, what ? 2
- (f) List the carbonates of group 2 elements in order of increasing their stability. 2
- (g) Density of alkali metals is quite low. Justify. 2
- (h) Why are alkali metals strong reducing agents ? 2

Unit I

- 2. (a) What are Lewis acids and Lewis bases ? Discuss with suitable examples. 8
- (b) What are soft acids and bases ? Discuss their characteristic features. 8
- 3. (a) What do you understand by Levelling and Differentiating effect of a solvent ? Explain each with example. 5

(b) Discuss Lux-Flood concept of Acids and Bases. 5

(c) In each pair of acids, which is stronger acid and why ? 6

(i) H_2SO_4 and H_2SO_3

(ii) CH_3COOH and HCOOH

(iii) HF and HCl .

Unit II

4. Explain the following techniques which are employed for the purification of a metal : 16

(a) Electrolytic method

(b) Mond's process.

5. (a) Explain Mac Arthur and Forest's cyanide process for the extraction of gold. 6

(b) Explain the following : 10

(i) Ellingham diagram

(ii) Parting process.

Unit III

6. (a) Explain the anomalous behaviour of Beryllium. 6
- (b) What is meant by diagonal relationship ? Discuss diagonal relationship of Lithium with Magnesium. 6
- (c) Why do alkali metals and their salts give characteristic colour to the flame ? 4
7. (a) Describe different isotopes of sulphur. 4
- (b) Compare the s-block elements with p-block elements with regard to the following properties : 12
- (i) Electronegativity
 - (ii) Boiling points
 - (iii) Ionisation energies.

Unit IV

8. (a) Discuss Crown ethers and Cryptates. 6
- (b) Describe solubility of sodium metal in liquid ammonia. 6

(c) Discuss the structure of Basic beryllium acetate. 4

9. (a) How would you explain the following :

(i) Na_2CO_3 is easily soluble in water while CaCO_3 is sparingly soluble in water. 4

(ii) Thermal stability from BeCO_3 to BaCO_3 increases. 4

(iii) Li forms normal oxide, K forms superoxide. 4

(b) Explain the structure of Acetylacetonate complex of Na^+ . 4