

2017

3rd Semester

CHEMISTRY

PAPER—C5

(Honours)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Core Paper-V

1. Answer any *five* questions : 5×1
- (a) Write down the possible structures of Hyponitrous acid.
 - (b) What is Marshall's acid?
 - (c) Arrange in order of increasing acid strength. BCl_3 , BF_3 , BBr_3 .
 - (d) "Aqueous solution of NH_4Cl is acidic" – Why?

(Turn Over)

- (e) Write the conjugate acid and base of H_2O .
- (f) Which one is stronger acid : H_3PO_4 , H_3PO_2 and H_3PO_3 .
- (g) Give an example where SO_2 acts as a base.
- (h) What is Freons?

2. Answer any five questions : 5×2

- (a) What is amphiboles? Give example.
- (b) Draw the structure of P_4O_6 and P_4O_{10} .
- (c) Hydroxyl amine can act both as an oxidizing and reducing agent. Give relevant reactions.
- (d) What do you mean by pseudohalogens? Give examples.
- (e) SF_6 is known but SH_6 is not known—Why?
- (f) NaN_3 is more stable than HN_3 —Explain.
- (g) Write down Drago-wayland equation.
- (h) " NH_2-NH_2 acts as both oxidizing and reducing agent"—Why?

3. Answer any three questions : 3×5

- (a) (i) Draw the structure of basic beryllium acetate. 2
- (ii) " HSO_3^- may be considered as both an acid and a base" - Explain. 2
- (iii) What is carborundum? 1

- (b) (i) Write a brief note on polythiazyl compounds. 3
- (ii) SF_6 is inert but TeF_6 is very active. Give reasons with reactions. 2

- (c) (i) The hydrolysis products of NCl_3 and PCl_3 are different. Write the reactions and give reasonable explanations. 3

- (ii) NO_2 dimerises to N_2O_4 but ClO_2 does not though both of these molecules contain one impaired electron each. 2

- (d) (i) What is borazole? How borazole is prepared? 3

- (ii) Compare the structure of Borazole with Benzene. 2

- (e) (i) What are Silicones? How they are prepared? 3

- (ii) State the important applications of Silicones. 2

4. Answer any one question : 1×10

- (a) (i) What is inert pair effect? Explain with respect to group-14 elements. 3

- (ii) Diamond is non conductor of electricity but graphite is electrical conductor. Explain. 2

- (iii) Suggest a preparatory method and draw the structure of Hydrazine and Diborane. 2½×2

- (b) (i) Compare the acid strength of hydrides of group-15 elements. 2
- (ii) The solubility of BeO increases in presence of BeSO₄ in an aqueous solution. Explain. 3
- (iii) Acid strength of Boric acid increases in presence of glycerol. Explain. 3
- (iv) Calculate the pH of 10⁻⁸(M)HCl Solution. 2
- (c) (i) Write down the Usanovich concept of acid base theory. 3
- (ii) "HI is stronger acid than HCl"—Why? 2
- (iii) Calculate the pH of a buffer solution containing 0.1(M) acetic acid and 0.2(M) sodium acetate. K_a = 1.8 × 10⁻⁵. 2
- (iv) Discuss about HSAB principle. 3
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