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**PA—13—2024**

**FACULTY OF SCIENCE**

**B.Sc. (First Year) (First Semester) EXAMINATION**

**APRIL/MAY, 2024**

(New/CBCS Pattern)

**CHEMISTRY**

Paper—II

(Physical and Inorganic Chemistry)

**(Wednesday, 10-04-2024)**

**Time : 10.00 a.m. to 12.00 noon**

*Time—2 Hours*

*Maximum Marks—40*

**N.B. :—** (i) Attempt *all* questions.

(ii) Use of calculator and logarithmic table is allowed.

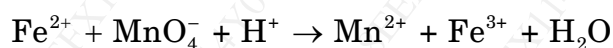
1. Answer any *three* of the following : 15

(a) Explain the basic strength of Hydroxides of alkali and alkaline earth metals.

(b) Write a note on formation of complexes of alkali metal with Salicylaldehyde and Acetyl cetone.

P.T.O.

- (c) Discuss in brief the formation of carbonate and bicarbonate of s-block elements.
- (d) Define oxidation, reduction, oxidizing agent and reducing agent according to oxidation number concept.
- (e) Balance the following equation by Ion-electron method :



2. Answer any *three* of the following :

15

- (a) Prove that,  $\text{pH} + \text{pOH} = 14$ .  
Calculate the pH of 0.025 M. HCl solution.
- (b) Derive an expression for critical constants in terms of van der Waals constants 'a' and 'b'.
- (c) Discuss the factors affecting adsorption.
- (d) State and explain the law of rational indices and write a note on 'Miller Indices'.
- (e) Explain the deviation of real gases from ideal behaviour.

3. Answer any *two* of the following : 10

- (a) State and explain the term 'Permutation'. Evaluate  ${}^{16}P_2$ .
- (b) Explain the determination of crystal structure of Potassium chloride (KCl) by Bragg's X-ray diffraction method.
- (c) What is adsorption isotherm ? Explain Freundlich adsorption isotherm.
- (d) Calculate the Root Mean Square (RMS) velocity of  $N_2$  and  $CO_2$  molecules at 300 K. (Given :  $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ )