

**P.G. DIPLOMA IN ANALYTICAL CHEMISTRY
(PGDAC)****Term-End Examination****December, 2012**

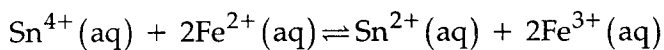
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MCH-001 : BASIC ANALYTICAL CHEMISTRY*Time : 3 hours**Maximum Marks : 75*

Note : Answer any five questions. All questions carry equal marks.

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1. (a) Name various classical and modern methods of separation. Describe briefly the method involving a stationary phase and a mobile phase. 5
 - (b) What are the various types of errors ? Describe them briefly. 5
 - (c) Briefly describe the t - test. 5
 2. (a) What is chemical adsorption ? Describe briefly characteristics of adsorbents and the factors influencing adsorption. 5
 - (b) Write a short note on Radioactive substances and carcinogens. 5
 - (c) What are conjugate acid - base pairs ? Identify the base and conjugate acid in the following reactions : 5
- $$\text{NH}_3 + \text{CH}_3\text{OH} \rightleftharpoons \text{NH}_4^+ + \text{CH}_3\text{O}^-$$
- $$\text{CH}_3\text{OH} + \text{HNO}_2 \rightleftharpoons \text{CH}_3\text{OH}_2^+ + \text{NO}_2^-$$

3. (a) Give the differential and integrated rate laws (one each) for 2nd order reaction. What are pseudo first order reactions? 5
- (b) Briefly explain colour change of an acid-base indicator as per Ostwald's theory. 5
- (c) What are aprotic solvents? Explain with the help of suitable examples. 5
4. (a) Write a short note on potassium dichromate as an oxidimetric reagent. 5
- (b) Define and differentiate between accuracy and precision. 5
- (c) Explain the use of back titration in complexometric determination of metal ions. 5
5. (a) Illustrate the use of adsorption indicators with the help of a suitable example. 5
- (b) What are the differences in co-precipitation and post precipitation? 5
- (c) Write a short note on atomic absorption spectroscopy as an analytical technique. 5
6. (a) Calculate the equilibrium constant of the following reaction and predict the direction of the reaction : 5



$$\text{Given } \epsilon^0 \frac{\text{Sn}^{4+}}{\text{Sn}^{2+}} = 0.14\text{V}; \epsilon^0 \text{Fe}^{3+}/\text{Fe}^{2+} = 0.77\text{v}$$

- (b) What is meant by 'sampling' ? Describe different types of water sampling in brief. 5
- (c) What are the advantages and limitations of ASTM filter soiling method ? 5
7. (a) Write a note on first aid measures to be taken in case of ingestion of chemicals. 5
- (b) The percent alcohol content in a blood sample was : 0.084, 0.089 and 0.079. Calculate the 95% confidence limit for the mean assuming $t = \pm 4.30$ for two degrees of freedom and 95% confidence. 5
- (c) EDTA is a versatile complexing agent. What are its limitations ? 5
8. (a) Define Turbidimetry and Nephelometry. 5
- (b) Calculate the concentration of the species in a 0.1 M H_2SO_4 , $K_2 = 1.2 \times 10^{-2}$ 5
- (c) Write a note on factors affecting stability of Metal - Ligand complexes. 5
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