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MCH-001

00215

P.G. DIPLOMA IN ANALYTICAL CHEMISTRY

Term-End Examination

December, 2011

MCH-001 : BASIC ANALYTICAL CHEMISTRY

Time : 3 hours *Maximum Marks : 75*

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

1. (a) Calculate the pH of a 3.0×10^{-2} M solution of hydrochloric acid. 4

   (b) What are the modes of exposure to chemicals in a laboratory and how we can prevent the most dangerous route of chemical exposure into the body ? 6

   (c) Explain with a titration curve the titration of sodium carbonate versus strong acid. 5

2. (a) What are the instrumental methods of end point detection of complexometric titrations and briefly explain any one of them ? 5

   (b) Give the various ways of utilising electro chemical cells. 5

   (c) What are different methods of thermal analysis ? Discuss any one briefly. 5

3. (a) Give the recommendations for the safe storage of chemicals. 5

(b) 100.0 ml of a 0.20 M solution of weak acid, HB, $K_a = 1.0 \times 10^{-6}$, is mixed with 100 ml of 0.20 M NaOH. Calculate the pH of the resulting solution. 5

(c) Potassium permanganate is a powerfull and versatile oxidising agent. Explain. 5

4. (a) What is nucleation ? Mention the important experimental variables that influence the particle size during precipitate formation. 5

(b) Give the classification of nonaqueous solvents with examples. 6

(c) Discuss various procedure of sampling of food materials. 4

5. (a) Give examples to illustrate the difference between mean, median and mode. 2x3=6

(b) Discuss briefly different types of water samples. 4

(c) A solution of initial concentration of 0.020 M on first order reaction showed the rate constant as $0.0720 s^{-1}$. Calculate the concentration of reactant after 9.1 seconds. 5

6. Write short notes on ***any three*** of the following : 15

(a) Applications of precipitation titrations

(b) The F - test (test of significance)

(c) Redox indicators

(d) Buffer solution

(e) Mohr's titration

7. (a) What are the applications and limitations of complexometric titration ? 5

(b) What are advantages and disadvantages of organic precipitants ? 5

(c) What are the precautions to be observed while transporting large amounts of hazardous chemicals ? 5

8. (a) Discuss the absorption of gaseous pollutants in liquid solution. 5

(b) Explain main sources of determinate error. 5

(c) The quinoid form of both methyl orange and phenolphthalein are darker than the benzenoid form, why ? 5