MCH-001

P.G. DIPLOMA IN ANALYTICAL CHEMISTRY

Term-End Examination

June, 2011

00033

MCH-001 : BASIC ANALYTICAL CHEMISTRY

Time : 3 hours   *Maximum Marks : 75*

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

1. (a) What do you mean by "classical methods of analysis" ? Describe briefly any one of them.   5

   (b) Discuss the important factors taken into account for obtaining reliable data on environmental quality.   5

   (c) What is the significance of "Redox Potentials" ? Explain with an example.   5

2. (a) The rate constant of a pseudo first order reaction is $0.156 \ s^{-1}$. Its rate of disappearance is $2.80 \times 10^{-4} \ Ms^{-1}$ after 10 minutes. What will be its initial concentration ?   5

   (b) Give the characteristics of a solution used for washing the precipitate.   5

   (c) Explain the "4d" Rule.   5

3. (a) What are different types of hazardous materials ? Discuss any one of them.   5

   (b) Give any two applications of complexometric titration.   5

   (c) Describe first order or second order reaction.   5

4. (a) Mention the difficulties encountered during precipitation titration.   5

   (b) Explain with the help of a titration curve the titration of a weak acid versus strong base.   6

   (c) With the help of examples show that iodine can be used for the determination of oxidising as well as reducing agents.   2+2=4

5. Write short notes on *any three* of the following :
   (a) Representative sampling for food materials.
   (b) Gaussian distribution of data.
   (c) Electrochemical cell   3x5=15
   (d) Volhard titration equilibrium

6. (a) When are we compelled to use nonaqueous medium for redox titrations ?   6

   (b) What are the general uses of flame photometer ?   4

   (c) Calculate the $[OH^-]$ in a 0.2 M sodium hypochlorite solution. The dissociation constant of $HOCl$ is 2.8×10^{-8}.   5

7. (a) Give any five safety aspects to be taken care of a functional chemical laboratory.   5

   (b) Calculate the median for the data : 15.1, 14.8, 15.3, 14.6, 14.4 and 14.5.   5

   (c) Show that for the complexation of Cd^{2+} and NH_3, $\beta_4 = k_1 \times k_2 \times k_3 \times k_4$.   5

8. (a) Describe different methods for minimizing coprecipitation.   5

   (b) What are basic requirements for a substance to be primary standard ?   5

   (c) Mention any ten "Don'ts" that one must remember as a code of practice in a laboratory.   5