No. of Printed Pages : 4

MCH-001

P.G. DIPLOMA IN ANALYTICAL CHEMISTRY (PGDAC)

00506

Term-End Examination

June, 2014

MCH-001 : BASIC ANALYTICAL CHEMISTRY

Time : 3 hours *Maximum Marks : 75*

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

1. (a) List the important spectroscopic methods used for the determination of an analyte. Why are these methods called the optical methods ? *5*

(b) What are determinate errors ? Give the ways by which these can be minimised in a quantitative estimation. *5*

(c) Why is preservation of samples required ? Describe in brief the process of preserving a nutrient group. *5*

2. (a) Give any five advantages of initial rate method. *5*

(b) Draw and compare the pH titration curves for the titration of (i) a strong acid versus a strong base and (ii) a weak acid versus a strong base. *5*

(c) What is the conditional stability constant for a complexometric titration involving EDTA ? How does it help in selecting the suitable pH for such titrations ? 5

3. (a) Draw and explain a labelled "Normal Error Curve". 5

(b) Define coprecipitation and post precipitation and give two differences between these. 5

(c) Why is washing of precipitates important in gravimetric determination ? What precautions should be taken for washing of precipitates that oxidise during this process ? 5

4. (a) What are the different modes of direct human exposure to the chemicals ? Explain any one of these. 5

(b) Write any four requirements of a primary standard and give two examples for the same. 5

(c) Enlist any three oxidimetric reagents and give the applications of any one of these. 5

5. Write short notes on any ***three*** of the following : *3×5=15*

(a) Accuracy and Precision

(b) Standard deviation

(c) Segregation and grinding during sampling of solid wastes

(d) Hammett's acidity functions

6. (a) Write five requirements that must be met while designing a chemistry laboratory. *5*

(b) What are metallochromic indicators ? What is the principle of their action ? *5*

(c) Calculate the pH of a 0·1 molar solution of acetic acid ($K_a = 1{\cdot}82 \times 10^{-5}$). *5*

7. (a) What is suspended particulate matter ? Give any two types and their sources. *5*

(b) Describe in brief the modern quinonoid theory of indicators with the help of a suitable example. *5*

(c) Name any one analytical technique based on each one of the following principles : *5*

(i) Emission of radiations

(ii) Diffraction of radiation

(iii) Measurement of mass of substance deposited on electrode

(iv) Change in diffusion current with respect to potential

(v) Absorption of radiation

8. (a) Define 'order' of a reaction. Give any two differences between a first order and a second order reaction. *5*

(b) What is the role of masking and demasking in complexometric titrations ? *5*

(c) Iodine can be used for the determination of oxidising as well as reducing agents. Illustrate this statement with the help of examples. *5*
