

**P.G. DIPLOMA IN ANALYTICAL CHEMISTRY
(PGDAC)**

Term-End Examination

December, 2018

00742

MCH-001 : BASIC ANALYTICAL CHEMISTRY

Time : 3 hours

Maximum Marks : 75

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

-
-
1. (a) Give the classification of Electrical Methods of Analysis. On what basis is the above classification done ? 5
 - (b) What are errors ? Differentiate between personal and operational errors. 5
 - (c) Measurements of glucose level in a patient suffering from diabetes gave the following results : 5.108, 4.099, 5.002, 4.040, 3.010, 3.450 and 4.010 g/L. Calculate the 95% confidence interval. ($\sigma = 0.021$ g/L) 5

 2. (a) When is the chi-square test applied ? What do you mean by number bias and when is it observed ? 2+3=5

- (b) In replicate determination of nickel, the following results of percentage of nickel were obtained. Should any of the results be rejected ?
 % Ni : 61·30, 61·37, 61·40, 61·41 and 61·36. 5
- (c) What are the three main types of samples ? Explain them briefly. 5
3. (a) How should a sample containing phosphate be preserved ? After collection, when is it desirable to analyse the sample for phosphate ? 5
- (b) How should one select the sampling locations for air sampling ? 5
- (c) When should one wear rubber gloves in the laboratory and why is it advised not to wear them continuously ? 5
4. (a) Which is the most commonly used method to store chemicals in a laboratory ? Even though it is convenient, why should it be avoided ? 5
- (b) Describe the three ways of testing the performance of a kinetic method of analysis. 5
- (c) What is the proportional equations method for studying the reaction rates ? Give any four of its advantages. 5

5. (a) Draw and explain the titration curve of a weak acid vs. a strong base. Mark the buffer region and the region of greatest buffer capacity in the curve. 5
- (b) Explain with suitable examples, how one should select an indicator for any acid-base titration. 5
- (c) What are protophilic solvents ? How are they different from protogenic solvents ? 5
6. (a) Give the half reaction for the conversion of dichromate ions ($\text{Cr}_2\text{O}_7^{2-}$) to Cr^{3+} and henceforth derive its Nernst Equation. What factors will the potential depend on ? 5
- (b) Explain masking and demasking with respect to complexometric titration. 5
- (c) Enlist different instrumental methods of analysis and state the physical property that forms the basis of each of these. 5
7. (a) Why should we have to consider the dielectric constant when we select a solvent for a particular titration ? 5
- (b) Discuss the role of organic precipitating agents in gravimetric analysis highlighting their advantages and disadvantages. 5

- (c) Explain the method of back titration with the help of a suitable complexometric titration. 5

8. Write brief notes on any **three** of the following : $3 \times 5 = 15$

- (a) Drawbacks of Coprecipitation
 - (b) Normal Error Curve
 - (c) Arrhenius Theory of Acids and Bases
 - (d) Modern Quinoid Theory of Indicators
 - (e) Significance of Redox Potentials
-