

Programme: B. Pharm

Course: Pharmaceutical Analysis – I

Course Code: BP102T

Enrolment no. _____

Full Marks: 75

Time: 3 Hrs.

| Q.No. | Questions | CO | Bloom Taxonomy Category | Marks |
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| Section I | | | | |
| 1 | Objective Type Questions | | | |
| | i. What is the role of the Standard Hydrogen Electrode in electrochemical measurements? a. Acts as a salt bridge b. Serves as a reference electrode c. Measures the pH of the solution d. Functions as an indicator electrode ii. What is the primary indicator used in acid-base titration? a. Phenolphthalein b. Methyl orange c. Bromothymol blue d. Litmus paper iii. The potential of a saturated calomel electrode (SCE) depends on the concentration of: a. Hydrogen ions b. Potassium chloride c. Mercury ions d. Sodium chloride iv. Which of the following is commonly used as a reference electrode in potentiometry? a. Platinum electrode b. Glass electrode c. Calomel electrode d. Silver wire electrode v. Which of the following is the correct oxidation number of oxygen in H ₂ O? a. +1 b. -1 c. -2 d. 0 vi. In the reaction $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, which element is oxidized? a. Hydrogen b. Oxygen c. Both are oxidized d. Neither is oxidized vii. The specific conductance (κ) of a solution depends on: a. The color of the solution b. The temperature of the solution c. The volume of the solution only d. The mass of the solute only viii. The term "end point" in titration refers to: a. The solution turns pink b. The amount of acid equals the amount of base c. The indicator changes color d. pH reaches 14 ix. The titration curve for a weak acid against a strong base will show a pH at the equivalence point: a. Less than 7 b. Equal to 7 c. Greater than 7 d. Cannot be determined x. Which of the following is a primary standard substance used in acid-base titrations? a. Sodium chloride b. Potassium permanganate c. Oxalic acid d. Acetic acid xi. Which solvent is commonly used in non-aqueous titration of weak bases? a. Water b. Acetic acid c. Acetonitrile d. Benzene xii. Which of these is commonly used in conductometric measurements? a. Calorimeter b. Conductivity cell c. Spectrometer d. Thermometer xiii. Which of the following is a redox reaction? a. $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ b. $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ c. $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$ d. $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ xiv. In the reaction $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$, which element is undergoing reduction? a. Hydrogen b. Oxygen c. Both are reduced d. Neither is reduced xv. In a calomel electrode, the calomel (Hg ₂ Cl ₂) is in contact with which solution? a. HCl b. NaCl c. KCl d. H ₂ SO ₄ | CO1 | Remember | 1 x 20 = 20 |

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|--|---|-----|------------|--------------------|
| | xvi. In a non-aqueous titration, which solvent is commonly used for dissolving the analyte? a. Water b. Acetone c. Ethanol d. Benzene xvii. The SHE consists of which gas bubbling over a platinum electrode? a. Oxygen b. Hydrogen c. Nitrogen d. Chlorine xviii. What is the standard potential of the Standard Hydrogen Electrode (SHE) at standard conditions? a. 1.0 V b. 0.0 V c. -1.0 V d. 0.059 V xix. What is the fundamental principle behind gravimetric analysis in pharmaceutical analysis? a. Measurement of volume b. Measurement of mass c. Measurement of absorbance d. Measurement of conductivity xx. What is the unit of measurement for titrant volume in titration? a. Liters (L) b. Moles (mol) c. Grams (g) d. Milliliters (mL) | | | |
| Section II | | | | |
| 2. Short Answer type questions. | | | | |
| a | Distinguish primary and secondary standards with the help of an example. | CO1 | Remember | 7 x 5 = 35 |
| b | List the affective factors on selection of analytical techniques. | CO1 | Remember | |
| c | Why is Usanovich's theory important? | CO2 | Understand | |
| d | Give examples of neutralization curve to explain titration. | CO2 | Understand | |
| e | State the classification of complexometric titration with example. | CO3 | Understand | |
| f | Discuss application of Nernst equation. | CO4 | Understand | |
| | or | | | |
| g | Explain Redox titration. | CO4 | Remember | |
| | Explain Ilkovic equation | CO5 | Understand | |
| | or | | | |
| | What is the purpose of salt bridge? | CO5 | Remember | |
| Section III | | | | |
| Long Answer Type questions | | | | |
| 3 | Design in detail the estimation of Sodium benzoate. | CO2 | Evaluate | 2 x 10 = 20 |
| | or | | | |
| | Design in detail the estimation of Ephedrine HCL. | CO2 | Create | |
| 4 | Draw a connection between Iodimetry, Iodometry and Iodatometry. | CO4 | Analyze | |
| | or | | | |
| | Formulate the below mentioned reaction in Nernst equation. $Mg_{(s)} + 2Ag_{(0.0001M)}^{+} \rightarrow Mg_{(0.130M)}^{2+} + 2Ag_{(s)}$ Calculate its E_{cell} if $E^{\circ}_{cell} = 3.17 V$. | CO4 | Create | |

Course Outcomes (CO):

CO1: Understood the basics of techniques of analysis, standard, errors during analysis and Pharmacopoeia.

CO2: Helps to develop the fundamentals of volumetric analytical skills.

CO3: Analyze the various types of titration by using different methods and applications.

CO4: Utilize the concept of reduction and oxidation process with different chemicals.

CO5: Peculates the basic knowledge in the principles of electrochemical analytical techniques