3 Hours   **(Total marks: 80)**

N.B.   1. All questions are compulsory

        2. Figures to right indicate full marks.

        3. Draw neat labelled diagrams wherever necessary.

        4. Attempt answer of each main question on new page.

Q.1	A.	Explain the terms- - reducing agent and self-indicator	**(2)**
	B.	Balance following half-cell reactions-	**(2)**
		a) $HNO_2 \rightarrow NO$	
		b) $ClO^- \rightarrow Cl^-$	
	C.	Calculate the normality of 4.5 % w/v sulphuric acid solution. [Atomic weights: H:1, O:16, S:32]	**(2)**
	D.	Give reasons:	**(2)**
		i. In Volhard's method the precipitate of silver chloride needs to be protected with nitrobenzene.	
		ii. Adsorption indicators show colour change only at the end point	
	E.	Explain the terms : Back EMF and Faradic current	**(2)**
	F.	The ether-water partition coefficient for drug A is 5. 20mL aliquot of its solution was extracted with 10mL of ether. Calculate the percentage of drug found in both the layers.	**(2)**
	G.	Define following terms. i) Masking agent ii) Complexing agent	**(2)**
	H.	Define and classify various types of errors.	**(2)**
	I.	State Faraday's second law and explain how it is related to electrogravimetry?	**(2)**
	J.	Define: Primary standard and Normality.	**(2)**
Q. 2	A.	What is Karl Fischer reagent? How is it prepared and standardized?	**(4)**
	B.	What is solubility product? Explain Mohr's method of argentometric titration.	**(4)**
	C.	What are levelling and differentiating solvents? Explain with suitable examples.	**(4)**
Q. 3	A.	Draw a neat labelled diagram of the polarographic apparatus and explain the principle and working.	**(4)**
	B.	Compare and contrast iodometric and iodimetric methods of redox titrations.	**(4)**
	C.	Write principle, chemical reactions and end point determination involved in the assay of Soluble Aspirin Tablets.	**(4)**
Q. 4	A.	What are titration curves? Draw the neutralization curve depicting titration of a strong acid with strong base.	**(4)**
	B.	What is gravimetry? Discuss the importance of filtration and washing step.	**(4)**
	C.	i. Explain the role of Magnesium sulphate in assay of Calcium gluconate injection.	**(4)**
		ii. The dried aluminium hydroxide gel has to assayed using back titration, why?	
Q. 5	A.	i. Calculate the number of significant figures for, 90.7, 0.216, 8000 and 6.7 x 10^{-3}.	**(4)**
		ii. Calculate the mean and standard deviation for the following set of analytical results 15.67, 15.69 and 16.03.	
	B.	Discuss the principle and application of oxygen flask combustion technique.	**(4)**
	C.	Classify solvent extraction methods. Discuss the methods of continuous extraction.	**(4)**

Q. 6   A.   i.   Calculate the number of moles of Aspirin in its 10 ppm solution. [Atomic weights: C:12, H:1, O:16]   **(2)**

ii.   What volume of 0.5 M HCl solution would be required to neutralize 10 ml of 2 M NaOH?   **(2)**

B.   i.   Explain the significance of Kjeldhal's method.   **(2)**

ii.   What is an external indicator? Explain one application for analysis of one active pharmaceutical ingredient using an external indicator.   **(2)**

C.   i.   Enlist and define the problems/interference associated with gravimetric analysis.   **(2)**

ii.   Calculate gravimetric factor involved in gravimetric determination of Al as Al-oxinate. [Atomic weights: C:12, H:1, O:16, N:14, Al: 26.98, S:32]   **(2)**

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