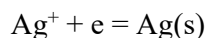


**Note : Answer all the questions**

**Q1/** Calculate the potential of a silver electrode in a solution that is saturated with silver iodide and has an iodide ion activity of exactly 1.00 ( $K_{sp}AgI = 8.3 \times 10^{-17}$ )



$$E^{\circ} = + 0.799 \text{ V}$$

**(20 marks)**

**Q2/** The acid HA has ionization constant of  $10^{-5}$ . If 50 ml 0.1 N HA is diluted to 200 ml and titrated with 0.1 N NaOH :

- 1-Find the pH before any base is added.
- 2-Find the pH when 25 ml of base has been added.
- 3-Find the pH at the equivalence point.
- 4-Find the pH when 75 ml of base
- 5- Select an indicator for the titration.

**(20 marks)**

**Q3/ A-**An impure sample of  $Na_2SO_4$  weighed 1.562 gm . A  $BaSO_4$  precipitate from this sample weighed 2.496gm. Calculate the percentage of sulfur and the percentage purity of the salt.

**B-** What factors must be considered in selecting an indicator for titration?

**(20 marks)**

**Q4/** Potassium dichromate ( $K_2CrO_4$ ) shows a maximum absorption in alkaline medium at 372 nm. If ( $3.0 \times 10^{-5} \text{ M}$ ) of its solution in alkaline medium has a transmittance percent ( $T\% = 71.6$ ) using (1 cm) cell, calculate:

- 1- The absorbance of the solution.
- 2- The molar absorptivity ( $\epsilon$ ) of  $K_2CrO_4$  at 372 nm .
- 3- The transmittance percent( $T\%$ ) of the same solution using (3 cm )cell. **(20 marks)**

**Q5/** A solution of sulfuric acid has a density of 1.250 gm per milliliter and contains 49.00 percent  $H_2SO_4$  by weight

- (a)How many milliliters of this acid are needed to prepare 250.0 ml 0.2000 N solution?
- (b) 250.0 ml of the concentrated acid is diluted to 2.000 liters. What is the normality of diluted solution ?

**(20 marks)**

**Additional information**

A.wt: H:1, O:16, Cr: 52 , N: 14, Na:23, C:12, S:32 ,K:39, Ag: 107.8, Ba: 137

**Good Luck**