Time Allowed: 45 Minutes   **Maximum Marks: 20**
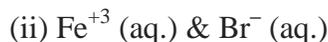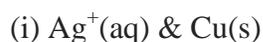
General Instructions:

    i)   All 11 questions in this paper are compulsory to attempt.

    ii) Marks are indicated against each question.

Q.1.   Analysis shows that FeO has a non-stoichiometric composition with formula $Fe_{0.95}O$. Give reason. (1)

Q.2.   Write the equation showing the relationship between molar conductance & concentration of strong electrolyte. (1)

Q.3.   What are the products of electrolysis of molten & aqueous sodium chloride. (1)

Q.4.   Tungsten crystallises in body-centered cubic unit cell. If the edge of the unit cell is 316.5 pm. What is radius of tungsten atom? (1)

Q.5.   What is the van't Hoff factor for a compound which undergo tetramerisation in an organic solvent?(1)

Q.6.   Predict if the reaction between the following is feasible – (2)

    (i) Ag^+(aq) & Cu(s)   (ii) Fe^{+3} (aq.) & Br^- (aq.)

    Given standard electrode potential –

    $E^0_{Ag^+/Ag} = +0.80V$ $E^0_{Fe^{+3}/Fe^{+2}} = +0.77V$

    $E^0_{Cu^{+2}/Cu} = +0.34V$ $E^0_{Br_2/Br^-} = +1.09V$

Q.7.   What is the formula of a compound in which the element Y forms hcp lattice & atoms of X occupy $2/3^{rd}$ of tetrahedral voids? (2)

Q.8.   Calculate the boiling point of solution when 2 g of Na_2SO_4 (M = 142 g mol^{-1}) was dissolved in 50 g of water, assuming Na_2SO_4 undergoes complete ionisation. (2)

    (K_b for water = 0.52 K kg mol^{-1})

Q.9.   (a) The conductivity of 0.20 mol L^{-1} solution of KCl is 2.48×10^{-2} S cm^{-1}. Calculate its molar conductivity and degree of dissociation (α). Given λ^0 (K^+) = 73.5 S cm^2 mol^{-1} and λ^0 (Cl^-) = 76.5 S cm^2 mol^{-1}.

    (b) What type of battery is mercury cell ? Why is it more advantageous than dry cell? (3)

Q.10. 19.5 g of CH_2FCOOH is dissolved in 500 g of water. The depression in the freezing point observed is 1.0^0C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid. K_f for water is 1.86 K kg mol^{-1}. (3)

Q.11. What is meant by negative deviation from Raoult's law ? Give an example. What is the sign of Δ_{mix} H for negative deviation? (3)