GAIL DAV Public school

Assignment CLASS XII

Chemistry Chapter 1 (SOLUTION)

MULTIPLE CHOICE QUESTIONS (1 MARK)	
1	K_H value for Ar(g), CO_2(g), HCHO (g) and CH_4(g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility. a) HCHO < CH_4 < CO_2 < Ar b) HCHO < CO_2 < CH_4 < Ar c) Ar < CO_2 < CH_4 < HCHO d) Ar < CH_4 < CO_2 < HCHO
2	When a non-volatile solid is added to pure water it will: a) boil above 100°C and freeze above 0°C b) boil below 100°C and freezeabove 0°C c) boil above 100°C and freeze below 0°C d) boil below 100°C and freezebelow 0°C
3	Water- HCl mixture I. shows positive deviations II. forms minimum boiling azeotrope III. shows negative deviations IV. forms maximum boiling azeotrope a) I and II b) II and III c) I and IV d) III and IV
4	An azeotropic solution of two liquids has boiling point lower than either of themwhen solute solvent interactions are: a) Equal to solute solute and solvent solvent interactions b) Stronger than solute solute and solvent solvent interactions c)Weaker than solute solute and solvent solvent interactions d)None of the above
5	Molarity of a solution at 60°C is--------- than molarity at 30°C a) More b) less c) same d) no effect of temperature
6	For isotonic solutions which of the following is not equal a) concentration b) temperature c) osmotic pressure d) vapour pressure
7	For non-electrolyte solute value of Van't Hoff factor is a)0 b) 1 c) >1 d) <1
8	In reverse osmosis: a) a pressure greater than osmotic pressure is applied on pure water side b) a pressure lesser than osmotic pressure is applied on pure water side c)a pressure greater than osmotic pressure is applied on salt water side d)a pressure lesser than osmotic pressure is applied on salt water side
9	Which of the following salt will have same value of Van't Hoff's factor (i) as that of $K_4[Fe(CN)_6]$ (a) $Al_2(SO_4)_3$ (b) NaCl (c) $Al(NO_3)_3$ (d) Na_2SO_4

10	Pure benzene has vapour pressure three times that of pure toluene. They form nearly ideal solution. What would be the ratio of their mole fractions in the vapourphase of a solution having equal mole fractions of benzene and toluene. a)1 b) 2/3 c) 3 d) 1/3
	ASSERTION REASON TYPE QUESTIONS (1 MARK) (a) Assertion and reason both are correct statements and reason is the correctexplanation for assertion. (b) Assertion and reason both are correct statements but the reason is not acorrect explanation for assertion. (c) Assertion is a correct statement but the reason is the wrong statement. (d) Assertion is a wrong statement but the reason is a correct statement
11	**Assertion:** When methyl alcohol is added to water, the boiling pointof water decreases. **Reason:** When a volatile solute is added to a volatile solvent elevation in boilingpoint is observed.
12	**Assertion**: Cooking time in pressure cooker is reduced **Reason**: Boiling point inside the pressure cooker is raised
13	**Assertion**: Vapour pressure of a liquid is constant at a constant temperature **Reason:** At equilibrium rate of evaporation becomes equal to the rate ofcondensation.
14	**Assertion**: The components of azeotropic mixture can be separated by distillation **Reason**: At a particular composition azeotropic mixture boil at the same temperature.
15	**Assertion**: The shrinking of cells is called hemolysis. **Reason**: Hemolysis occurs when cell comes in contact with solution of lower osmotic pressure than that of cell
	VERY SHORT ANSWER QUESTIONS 1 mark Type: Q 1Give an example of a solid solution in which solute is a liquid Q 2 Suggest the most important type of intermolecular attractive interaction betweenmethanol and acetone Q 3 X and Y liquids on mixing produces cold solution. What type of deviation is shownby them? Q 4 Aquatic species are more comfortable in cold waters rather than in warm waters.Give reason. Q 5 If is **α** the degree of dissociation of Na_2SO_4, calculate Van't Hoff factor to determinethe molecular mass. Q 6 Give an example of a substance that can be used as a SPM.

	Q 7. What happens when blood cells are placed in a solution containing more than 0.9%(mass/volume) sodium chloride? Q 8 People taking lot of salt experience puffiness or swelling of the body. Why ? Q 9 What are hypotonic solutions? Q 10 How can the direction of osmosis be reversed?
	VERY SHORT ANSWER QUESTIONS (2 MARKS)
1	a) Common salt and Calcium chloride are used to clear snow on the roads, bothare of almost same cost but sodium chloride is preferred. Why? How the freezing point changes when mercuric iodide is added to the aqueoussolution of potassium iodide?
2	a) Out of 1M and 2M sugar solutions which one has a lower boiling point? b) While performing practical it is directed that the bottle of liquid ammonia is to be cooled before opening the seal but Suman forgot to cool it before opening.What consequence she faced?
3	a) Write the expression for degree of dissociation of a weak electrolyte AxBy in terms of Van't Hoff factor. b)Name a substance that can be used in radiators of vehicles in places where thetemperature is less than zero.
4	a) What is the effect of temperature on the process when shrunk and driedvegetables are placed in water? b) The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolal solution of Y in water. Which one is undergoing dissociation in water
5	a) How the osmotic pressure of 5 % aqueous solution of glucose (π_1) is related tothat of 5 %aqueous solution of urea (π_2)? b) Why do salt water fish die when they are suddenly transferred to a fresh wateraquarium?
6	What is the unit of Ebullioscopic constant? Which type of deviation is shown by Carbon tetrachloride and chloroform mixture
7	a) Two 500 ml beakers were taken. One filled with 400ml water marked 'X' andanother with 400ml of 2M NaCl solution marked 'Y'. At the same temperature both were placed in closed containers of same material and same capacity, in which container the vapour pressure is less b) Out of 1M sucrose and 1M urea solution which has more osmotic pressure?
8	a) What is the significance of Henry's Law constant KH?

	b) How the colligative properties change if the solute undergo dissociation in solution?
9	a) Sia's father is suffering from high blood pressure but he is advised to consume less quantity of common salt. Why? b) Two solutions A and B are separated by semi-permeable membrane. If theliquid flows fromA to B then which solution is more concentrated?
10	a) Why the colligative property of an electrolyte solution is always greater than that of a non-electrolyte solution? b) Mohit wants to put an egg with outer shell removed in a bottle but he is unable to do so as mouth of bottle is slightly smaller. Suggest one method to help him putting the peeled egg in the bottle.
	SHORT ANSWER TYPE QUESTIONS (3 MARKS)
1	a) If the elevation in boiling point of a solution for which i = 1 in a solvent (K_f =x Kkg mol^{-1} and K_b=y K kg mol^{-1}) is z K,then calculate the depression in freezing pointof the same concentration. b)Give two examples of materials used for making semi permeable membrane for carrying out reverse osmosis.
2	a) State Henry's law. b) Which cold drink you prefer one chilled or other one at room temperature and why? c) At the same temperature hydrogen is more soluble in water than Helium. Which of them will have higher value of KH and why?
3	a) What is the degree of dissociation for 0.1M Ba $(NO_3)_2$ if i(Van't Hoff factor) is 2.74 b) Arrange the following solutions in increasing order of Van't Hoff factor. 0.1M $CaCl_2$, 0.1M KCl, 0.1M $C_{12}H_{22}O_{11}$, 0.1 M $Al_2(SO_4)_3$
4	a) Account for the reason, marine life like fish prefers to stay at lower level and stay away from the upper layer of water. b) Why freezing/melting point of a substance used as a criterion for testing the purity of a substance? c) Account for the reason for preservation of fruits against bacterial action by adding sugar.
5	a) Molal elevation constant for benzene is 2.52 K/m. A solution of some organic substance in benzene boils at 0.126°C higher than benzene. What is the molalityof the solution? b) b) What are the values of Van't Hoff factor for NaCl and K2SO4, respectively?
	LONG ANSWER TYPE QUESTIONS (5 MARKS)
1	a) If boiling point of an aqueous solution containing a non-volatile solute is 100.15oC. What is its freezing point? Given latent heat of fusion and vapourisation of water are 80cal/g and 540 cal/g respectively. b) Electrolyte A gives 4 ions and B is a non-electrolyte. If 0.1 molar

	solution of solute B produces an osmotic pressure 'p', then 0.02 molar solution of A will produce how much osmotic pressure?
2	a) 0.6 mL of acetic acid $CH3COOH$, having density 1.06 g/mL, is dissolved in 1 litre of water. The depression in freezing point observed for this strength of acid was0.0205°C. Calculate the van't Hoff factor and the dissociation constant of acid. Kf= 1.86 K kg /mol. b) How does Raoult's law become a special case of Henry's law?
	CASE BASED QUESTIONS (4 MARKS) **Read the passage given below and answer the following case-based questions:**
1	Boiling point or freezing point of liquid solution would be affected by the dissolved solids in the liquid phase. A soluble solid in solution has the effect of raising its boiling point and depressing its freezing point. The addition of non-volatile substances to a solvent decreases the vapor pressure and the added solute particles affect the formation of pure solvent crystals. According to many researches the decrease in freezing point directly correlated to the concentration of solutes dissolved in the solvent. This phenomenon is expressed as freezing point depression and it is useful for several applications such as freeze concentration of liquid food and to find the molar mass of an unknown solute in the solution. Freeze concentration is a high-quality liquid food concentration method where water is removed by forming ice crystals. This is done by cooling the liquid food below the freezing point of the solution. The freezing point depression is referred as a colligative property and it is proportional to the molar concentration of the solution (m), along with vapor pressure relative lowering, boiling point elevation, and osmotic pressure. These are physical characteristics of solutions that depend only on the identity of the solvent and the concentration of the solute. The characters are not depending on the solute's identity. A)What is the relation between vapour pressure of solid and liquid states at freezing point? b) Why freezing point of 0.1m solution of acetic acid in benzene is less than freezing point of 0.01m solution? c) Out of the following 0.10 m aqueous solutions, which one will exhibit the largest freezing point depression? KCl , $C_6H_{12}O_6$, $Al_2(SO_4)_3$, K_2SO_4 **OR** If Kf for water is 1.86 oC/m, explain why 1m NaCl in water does not have a freezing point equal to a) -1.86 oC b) -3.72oC
2	Henna is investigating the melting point of different salt solutions. She makes a salt solution using 10 mL of water with a known mass of NaCl salt. She puts the salt solution into a freezer and leaves it to freeze. She

	takes the frozen salt solution out of the freezer and measures the temperature when the frozen salt solution melts. She repeats each experiment. Assuming the melting point of pure water as 0oC, answer the following questions: (a) One temperature in the second set of results does not fit in the pattern. Which temperature is that? Justify your answer. 1 (b) Why did Henna collect two sets of results? 1 (c) In place of NaCl, if Henna had used glucose, what would have been the melting point of the solution with 0.6 g glucose in it? 2 OR What is the predicted melting point if 1.2 g of salt is added to 10 mL of water? Justify your answer.
3	Aarav Sharma is very fond of a special drink made by his grandmother using different fruits available in their hometown. It has an outstanding taste and also provides great health benefits of natural fruits. He thought of utilizing his grandmother recipe to create a new product in the beverage market that provide health benefits and also contain fizziness of various soft drinks available in the market. Based on your understanding of solutions chapter, help Aarav Sharma to accomplish his idea by answering following: (a) How he can add fizz to the special drink made by his grandmother? 1 (b) What is the law stated in the chapter that can help Aarav to make his drink fizzy? 1 (c) What precautions he should take while bottling so that his product does not lose fizz during storage and handling across long distances? 2 **OR** (c)The mole fraction of helium in a saturated solution at 20°C is 1.2 x 10-6. Find the pressure of helium above the solution. Given Henry's constant at 20°C is 144.97 kbar.
4	Boiling point or freezing point of liquid solution would be affected by the dissolved solids in the liquid phase. A soluble solid in solution has the effect of raising its boiling point and depressing its freezing point. The addition of non-volatile substances to a solvent decreases the vapor pressure and the added solute particles affect the formation of pure solvent crystals According to many researches the decrease in freezing point directly correlated to the concentration of solutes dissolved in the solvent. This phenomenon is expressed as freezing point depression and it is useful for several applications such as freeze concentration of liquid food and to find the molar mass of an unknown solute in the solution. Freeze concentration is a high-quality liquid food concentration method where water is removed by forming ice crystals, this is done by cooling the liquid food below the freezing point of the solution. The freezing point depression is referred as a colligative property and it is proportional to the molar concentration of the solution (m), along with

	vapour pressure lowering boiling point elevation, and osmotic pressure. These are physical characteristics of solutions that depend only on the identity of the solvent and the concentration of the solute. The characters are not depending on the solute's identity. (Source: Jayawardena, J. A. E. C., Vanniarachchi, M. P. G., & Wansapala, M. A. J. (2017). Freezing point depression of different Sucrose solutions and coconut water) a. Four samples BaCl2, NaCl, ZnCl2 and AICI3 of 0.5 M are being boiled Which of the among will show highest elevation in boiling point? b. How does sprinkling of salt help in clearing the snow-covered roads in hilly areas? c. The freezing point of nitrobenzene is 278.8 K. When 2.8 g of an unknown substance is dissolved in 100 g of nitrobenzene, the freezing point of solution is found 276.8 K. If the freezing point depression of nitrobenzene is 8.0 K kg mol-1, what is the molar mass of unknown substance? [Kf=8 KKgmol-1for nitrobenzene] **OR** A solution prepared by dissolving 2g of oil of wintergreen (methyl salicylate) in 100.0 g of benzene has a boiling point of 80. 31° C. Determine the molar mass of this compound. (B.P. of benzene - 80.10°C and Kb for benzene 2.520 C kg mol-1)

___Chapter 2 ELECTROCHEMISTRY

MULTIPLE CHOICE QUESTIONS (1 MARKS)

Q1. Which metal is used as electrode which do not participate in the reaction butprovides surface for conduction of electrons?

(a) Cu (b) Pt (c) Zn (d) Fe

Q2. An electrochemical cell can behave like an electrolytic cell when

(a) $E_{cell} = 0$ (b) $E_{cell} > E_{ext}$ (c) $E_{ext} > E_{cell}$ (d) $E_{cell} = E_{ext}$

Q3. 4. Which cell will measure standard electrode potential of copper electrode?

(a) Pt(s)| H_2 (g, 0.1 bar)| H^+ (aq., 1 M) | | Cu^{2+} (aq., 1M)| Cu(s)

(b) Pt(s)| H_2 (g, 1 bar) | H^+ (aq., 1 M) | | Cu^{2+} (aq., 2M)| Cu(s)

(c) Pt(s)| H_2 (g, 1 bar) | H^+ (aq., 1 M) | | Cu^{2+} (aq., 1M)| Cu(s)

(d) Pt(s)| H_2 (g, 1 bar) | H^+ (aq., 0.1 M)| | Cu^{2+} (aq., 1M)| Cu(s)

Q4. The positive value of the standard electrode potential of Cu^{2+}/Cu indicates that

(a) this redox couple is a stronger reducing agent than the H^+ /H_2 couple.

(b) this redox couple is a stronger oxidising agent than H^+ /H_2.

(c) Cu can displace H_2 from acid.
(d) Cu can displace H_2 from acid

Q5. On increasing temperature,
(a) ionic conductance increases and electronic conductance decreases.
(b) ionic conductance decreases and electronic conductance increases.
(c) both ionic and electronic conductance increase.
(d) both ionic and electronic conductance decrease.

Q6. The electrolyte used in the mercury cell is
(a) paste of NH_4Cl and $ZnCl_2$ (b) paste of HgO and carbon
(c) paste of KOH and ZnO (d) paste of PbO and H_2SO_4

Q7. A device that converts energy of combustion of fuels like hydrogen and methane directly into electrical energy is known as:
(a) dynamo
(b) Ni-Cd cell (c) fuel cell (d) electrolytic cell

Q8. Which one of the following is always true about the spontaneous cell reaction in agalvanic cell?

(a) E° cell > 0, ΔG° < 0, Q >KC (b) E° cell < 0, ΔG° < 0, Q <KC
(c) E° cell > 0, ΔG° > 0, Q >KC (d) E° cell > 0, ΔG° < 0, Q <KC

Q9. Charge carried by 1 mole of electrons is
(a) 6.023 × 1023 coulomb (b) 9.65 × 104 coulomb
(c) 1.6 × 10–19 coulomb (d) 6.28 × 1019 coulomb

Q10. To calculate the standard emf of the cell, which of the following options is correct if E° is reduction potential values?
(a) emf = $E°_{cathode} - E°_{anode}$ (b) emf = $E°_{anode} - E°_{cathode}$
(c) emf = $E°_{anode} + E°_{cathode}$ (d) None of these

ASSERTION REASON TYPE QUESTIONS(1MARKS)

Given below are two statements labelled as Assertion (A) and Reason (R)Select the most appropriate answer from the options given below:
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are true but R is not the correct explanation of A.
c. A is true but R is false.

d. A is false but R is true.

Q1. Assertion (A) : E_{cell} should have a positive value for the cell to function.

Reason(R) : $E_{cathode} < E_{anode}$

Q2. Assertion (A) : Copper sulphate cannot be stored in zinc vessel.

Reason (R) : Zinc is less reactive than copper.

Q3. Assertion (A) : Current stops flowing when $E_{cell} = 0$.

Reason (R) : Equilibrium of the cell reaction is attained.

Q4. Assertion (A) : Conductivity of all electrolytes decreases on dilution.

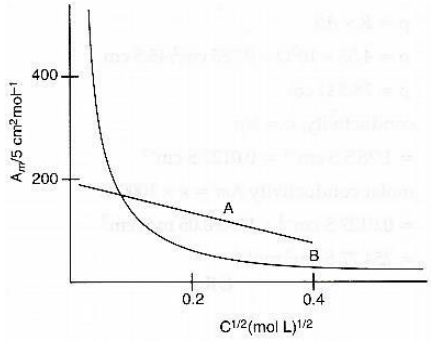
Reason (R) : On dilution number of ions per unit volume decreases.

Q5. Assertion (A) : Conductivity decreases for weak electrolyte and increases for strongelectrolyte with decrease in concentration.

Reason (R) : On dilution, the number of ions per unit volume that carry thecurrent decreases.

VERY SHORT ANSWER TYPE QUESTIONS (2 MARKS)

Q1. In the plot of molar conductivity (Λ_m) vs square root of concentration ($C^{1/2}$), followingcurves are obtained for two electrolytes A and B.



Answer the following:

(i) Predict the nature of electrolytes A and B.

(ii) What happens on extrapolation of Λ_m to concentration approaching zero for electrolytes A and B?

Q2. Calculate $\Delta_r G^\circ$ and $\log K_c$ for the following reaction at 298 K :

$$2Cr(s) + 3Fe^{2+}(aq) \longrightarrow 2Cr^{3+}(aq) + 3Fe(s)$$

Given: $E^0_{cell} = 0.30$ V

Q3. Three iron sheets have been coated separately with three metals A, B and C whose standard electrode potentials are given below. Identify in which rusting will takes placefaster when coating is damaged.

Metal	A	B	C	Iron
E^0	-0.46 V	-0.66 V	-0.20 V	-0.44 V

Q4. Can you store copper sulphate solutions in a zinc pot?

Q5. Suggest a way to determine the Λ^0_m value of water.

Q6. Why on dilution the Λ_m of CH_3COOH increases drastically while that of CH_3COONaincreases gradually?

Q7. (a) What is the role of $ZnCl_2$ in a dry cell?

(b) Unlike dry cell, the mercury cell has a constant cell potential throughout itsuseful life. why?

Q8. **(a)** Value of standard electrode potential for the oxidation of Cl^- ions is more positivethan that of water, even then in the electrolysis of aqueous sodium chloride, why is Cl^- oxidised at anode instead of water?
(b) How will the pH of brine (aq. NaCl solution) be affected when it is electrolysed?

Q9. (a) Which type of a metal can be used in cathodic protection of iron against rusting?

(b) Write the name of the electrolyte used in fuel cell

Q10. Depict the galvanic cell in which the reaction $Zn(s) + 2Ag^+(aq) \rightarrow Zn^{2+}(aq) + 2Ag(s)$takes place. Further show: (i) Which of the electrode is negatively charged?

(ii) The carriers of the current in the cell.

SHORT ANSWER TYPE QUESTIONS (3 MARKS)

Q1. (a) Calculate the cell emf and ΔG° for the cell reaction at 25°C for the cell :

$$Zn_{(s)}|Zn^{2+}(0.0004M) \parallel Cd^{2+}(0.2M)|Cd_{(s)}$$

E° values at 25°C: $Zn^{2+}/Zn = -0.763$ V $\quad Cd^{2+}/Cd = -0.403$ V;

$F = 96500 C mol^{-1}$; $\quad R = 8.314$ J K^{-1} mol^{-1}.

(b) If E° for copper electrode is 0.34 V, how will you calculate its emf value when the
solution in contact with it is 0.1M in copper ions? How does emf for copper electrodechange when concentration of Cu^{2+} ions in the solution is decreased?

Q2. The molar conductivity of sodium acetate, sodium chloride and hydrochloric acid are 83,127 and 426 mho cm^2mol^{-1} at 250°C respectively. Calculate the molar conductivityof acetic acid solution.

Q3. A strip of nickel metal is placed in a 1 molar solution of $Ni(NO_3)_2$ and a strip of silvermetal is placed in a 1 molar solution of $AgNO_3$. An electrochemical cell is created when the two solutions are connected by a salt bridge and the two strips are connected by wires to a voltmeter.

(i) Write the balanced equation for the overall reaction occurring in the cell and calculatethe cell potential.

(ii) Calculate the cell potential, E, at 25°C for the cell if the initial concentration of

$Ni(NO_3)_2$ is 0.100 molar and the initial concentration of $AgNO_3$ is 1.00 molar.

[$E^0_{Ni^{2+}/Ni} = 0.25$ V, $E_{Ag^+/Ag} = 0.80$ V]

Q4. The electrochemical cell given alongside converts the chemical energy released during the redox reaction to electrical energy:

$Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$

It gives an electrical potential of 1.1 V when concentration Zn^{2+} and Cu^{2+} ions is unity.State the direction of flow of current and also specify whether zinc and copper are deposited or dissolved at their respective electrodes when:

(i) an external opposite potential of less than 1.1 V is applied.

(ii) an external potential of 1.1 V is applied.

(iii) an external potential of greater than 1.1 V is applied.

Q5. Explain redox potential. Reduction potentials of some ions are given below. Arrangethem in decreasing order of oxidizing power.

Ion	ClO_4^-	IO_4^-	BrO_4^-
Reduction potential E⊖/V	$E^0 = 1.19$ V	$E^0 = 1.65$ V	$E^0 = 1.74$ V

LONG ANSWER TYPE QUESTIONS (5 MARKS)

Q1. (i) State two advantages of H_2—O_2 fuel cell over ordinary cell.

(ii) Silver is electrodeposited on a metallic vessel of total surface area 500 cm^2 by passing a current of 0.5 amp for two hours. Calculate the thickness of silver deposited.[Given: Density of silver = 10.5 g cm^{-3}, Atomic mass of silver = 108 amu, F = 96,500 C mol^{-1}]

Q2. (i) Define limiting molar conductivity and fuel cell.

ii) Resistance of a conductivity cell filled with 0.1 mol L^{-1} KCl solution is 100 ohm. If theresistance of the same cell when filled with 0.02 mol L^{-1} KCl solution is 520 ohm, calculate the conductivity and molar conductivity of 0.02 mol L^{-1} KCl solution. The conductivity of 0.1 molL^{-1} KCl solution is 1.29×10^{-2} ohm^{-1} cm^{-1}.

CASE BASED QUESTIONS

Read the passage carefully and answer the questions.

Redox reactions play an important role in chemistry. Whenever a redox reaction takes place directly in a single beaker, chemical energy in the form of heat is produced. By suitable means, it is possible to bring about the redox reactions indirectly so as to convert the chemical energy into electrical energy. A device used to convert the chemical energy produced in a redox reaction into electrical energy is called an electrochemical cell. If a redox reaction is allowed to take place in such a way that oxidation half reactiontakes place in one beaker and the reduction half reaction in another beaker, theelectrons given out by the former will be taken by the latter and the current will ow. The two portions of the cell are called half cells. The values of standard redox potential (E^0) of two half cell reactions decides in which way the reaction will proceed. A redox reactionis feasible when the substance having higher reduction potential gets reduced and the one having lower reduction potential gets oxidised. For example, In Daniel cell, zinc goes into solution and copper gets deposited.

1. Formulate the galvanic cell for: $Zn(s) + 2Ag^+(aq) \longrightarrow Zn^{2+}(aq) + 2Ag(s)$

2. Is it safe to stir $AgNO_3$ solution with a copper spoon? Why or why not?
[$E^0_{Cu+2/Cu} = 0.34$ V, $E^0_{Ag^+/Ag} = 0.80$ V]

3. Two half-cell reactions of an electrochemical cell are given below:

$$MnO^-_4(aq) + 8H^+(aq) + 5e^- \longrightarrow Mn^{2+}(aq) + 4H_2O(l), \quad E^0 = +1.51 \text{ V}$$
$$Sn^{2+}(aq) \longrightarrow Sn^{4+}(aq) + 2e^-, \quad E^0 = +0.15 \text{ V}$$

Construct the redox reaction from the two half-cell reactions and predict if this reaction favours formation of reactants or products shown in the equation.

OR

(i) State the factors affecting cell potential of: $Mg(s)|Mg^{2+}(aq) \parallel Ag^+(aq)|Ag(s)$

(ii) Can E^0cell or $\Delta_r G^0$ for cell reaction ever be equal to zero?