

Time : 90 min

FIRST UNIT TEST

Max marks : 40

SUBJECT – CHEMISTRY, CLASS XII

- Q1. Concentration of that solution of sugar which has osmotic pressure of 2.46 atmosphere at 300K. (1)
- A) 0.1M
B) 0.4M
C) 0.84M
D) None of these
- Q2. Which of the following is dependent on temperature. (1)
- A) Molarity
B) Mole fraction
C) Molality
D) Weight percentage
- Q3. Which is not correct for osmosis (1)
- A) Semipermeable membrane is used.
B) It takes place from lower concentration to higher concentration.
C) It takes place from higher concentration to lower concentration.
D) It can be stopped by applying pressure.
- Q4. Mixture not showing positive deviation from Raoult's law at 35 degree celcius are (1)
- A) $\text{CCl}_4 + \text{Methanol}$
B) $\text{CS}_2 + \text{CH}_3\text{COCH}_3$
C) $\text{C}_6\text{H}_6 + \text{C}_6\text{H}_5\text{CH}_3$
D) Phenol + aniline
- Q5. How much charge is required for the reduction of 1mole of Cu^{++} to Cu (1)
- A) 193000 C
B) 96500 C
C) 93132 C
D) None of these
- Q6. The unit of molar conductivity (1)
- A) $\text{S m}^2 \text{mol}^{-1}$
B) $\text{S m}^2 \text{mol}$
C) $\Omega^{-1} \text{m mol}^{-1}$
D) mol L^{-1}
- Q7. The quantity of charge required to obtain one mole of alluminium from Al_2O_3 (1)
- A) 1F
B) 6F
C) 3F
D) 2F
- Q8. Molar conductivity of ionic solution depends on (1)
- A) Distance between electrodes.
B) Concentration of electrolytes in solution.

- C) Surface area of electrodes.
- D) None of these.

Q9. Which of the following statement is not correct about the order of a reaction? (1)

- A) The order of reaction can be fractional number.
- B) Order of reaction is experimentally determined quantity.
- C) The order of reaction is always equal to sum of stoichiometric coefficients of reactions in balanced chemical equation for a reaction.
- D) The order of reaction is the sum of the power of molar concentration of the reactants in the rate law expression.

Q10. When initial concentration of a reactant is doubled in a reaction, the half life period is not affected. The order of reaction is (1)

- A) Second
- B) More than zero but less than first
- C) Zero
- D) First

OR

For the first order reaction, the time taken to reduce the initial concentration by a factor of $1/4$

is 20 minutes. The time required to reduce the initial concentration by a factor of $1/16$ is

- A) 20 minutes
- B) 10 minutes
- C) 80 minutes
- D) 40 minutes

Q11. When the catalyst increases the rate of chemical reaction, the rate constant (1)

- A) Remains constant
- B) Increases
- C) Decreases
- D) May increase or decrease depending on the order of reaction.

Q12. State Henry's law and explain one its application. (2)

Q13. Calculate the concentration of that solution of sugar which has osmotic pressure of 2.46 atmosphere at 300K (Molar mass of sugar = 342 g/mol) (2)

Q14. The freezing of a solution containing 50 cm³ of ethylene glycol in 50 gm water is found to be - 34 degree celcius. Assuming ideal behavior, calculate the density of ethylene glycol (kf for water = 1.86 K kg/mol). (2)

Q15. In of the following questions, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the (6)

correct answer as

- A) If both the assertion and reason are true , and reason is true explanation of assertion.
- B) If both assertion and reason are true , but reason is not true explanation of assertion.
- C) If assertion is true but reason is false.
- D) If both assertion and reason are false.

- I. **Assertion.** The electrolyte of aqueous solution NaCl gives hydrogen at the cathode and chlorine at the anode.

Reason. Chlorine has higher oxidation potential than water.

- II. **Assertion.** According to Kohlrausch law , molar conductivity of a strong Electrolyte at infinite dilution is sum of molar conductivities of its ion.

Reason. The current carried by cation and anion is always equal.

- III. **Assertion.** The Daniell cell becomes dead after some time.

Reason. Oxidation potential of zinc anode decreases and that of copper increases.

- IV. **Assertion.** Rate constant of zero order reaction has the same units as those of the rate of reaction.

Reason. For zero order reaction, Rate = Rate constant.

- V. **Assertion.** Half – life of reaction is independent of initial concentration of reactant.

Reason. Half – life of a reaction is independent of the order of reaction.

- VI. **Assertion.** According to collision theory, rate of reaction does not depend on total number of collisions.

Reason. The overall rate of reaction depends upon the number of effective collisions.

Q16. The conductivity of 0.20M solution of KCl at 298 K is 0.0248 S cm^{-1} . (3)

Calculate its molar conductivity.

Q17. Explain variation of molar conductivity with: (2 +3)

- A) Concentration (With strong and weak electrolyte) with diagram.
- B) Calculate the emf of the cell in which the following reactions take place



Given [$E^0_{\text{cell}} = 1.05 \text{ V}$]

Q18. Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. (3)

If the decomposition is a first order reaction calculate the rate constant of the reaction.

Q19. Write the expression for rate constant for (3)

- A) Zero order reaction.
- B) Write unit of rate constant for first order reaction.
- C) Mention one factor which affect rate of chemical reaction.

Q20. Ideal solution of two liquid is a solution in which each component obeys Raoult's (3)

law which states that the vapour pressure of any component in the solution depends on the mole fraction of that component in the solution and the vapour pressure of that component in the pure state. However, there are many solutions which do not obey Raoult's law.

i) Which of the following mixture do you expect will not show positive deviation from Raoult's law ?

- (a) Benzene - Chloroform
- (b) Benzene - Acetone
- (c) Benzene - Ethanol
- (d) Benzene - Carbon tetrachloride

ii) An azeotropic two liquids has boiling point lower than either of the two liquids when it

- (a) Show's no deviation from Raoult's law
- (b) Show's a positive deviation from Raoult's law
- (c) Show's the negative deviation from Raoult's law.
- (d) is saturated.

iii) a solution has 1 : 4 mole ratio of pentane to hexane. Pressure of the pure hydrocarbon at 20 degree Celsius are 440 mm of Hg and 120 mm of HG for hexane. The mole fraction of pentane in the vapour phase would be.

- (a) 0.200
- (b) 0.478

(d) 0.549

(e) 0.768