SAINIK SCHOOL GOPALGANJ
SUB: CHEMISTRY
CLASS – XII

ASSIGNMENT- 3

ELECTRO CHEMISTRY

(Q1 – Q10) Given below are four options against each question. Choose the option which you consider the most appropriate as your answer.

Q1.A first order reaction is 10% complete in 20 minute. The time taken for 9% completion is

(a) 30 min (b) 40 min

(c) 50 min (d) none of these

Q2. For the reaction A+B→ C, it is found that doubling the concentration of A increases the rate by 4 times, and doubling the concentration of B doubles the reaction rate. What is the overall order of the reaction?

(a) 4 (b) 3/2

(c) 3 (d) 1

Q3. Rate constant of a reaction (k) is 175 sec^{-1}. What is the order of the reaction?

(a) first (b) second

(c) zero (d) none of these

Q4. A catalyst increases the rate of a reaction by:

(a) increasing the activation energy

(b) decreasing the activation energy

(c) increasing the average K.E. of the molecules

(d) increasing the number of active molecules

Q5. The half life period of the first order reaction is:

(a) half the specific rate constant

(b) is independent of the initial concentration

(c) always the same irrespective of the reaction

(d) directly proportional to initial concentration of the reactants

Q6. A redox reaction is spontaneous in a given direction if

(a) EMF is zero (b) EMF is negative

(c) EMF is positive (d) EMF has nothing to do with this

Q7. The products of electrolysis of aqueous solution of NaCl are:

(a) Na at cathode and Cl_2 at anode (b) H_2 at cathode and Cl_2 at anode

(c) H_2 at cathode and O_2 at anode (d) Na at cathode and O_2 at anode

Q8. The amount of electricity required to deposit 1 mol of aluminum from a solution of $AlCl_3$ will be:

(a) 0.33 Faraday (b) 1 Faraday

(c) 3 Faradays (d) 1 ampere

Q9. In an electrochemical cell

(a) Potential energy decreases

(b) Kinetic energy decreases

(c) Potential energy changes into electrical energy

(d) Chemical energy changes into electrical energy

Q10. The cell constant is

(a) l/A (b) A/l

(c) Ax l (d) K/R

Q11. A first order reaction has a rate constant $1.15x10^{-3}$ $s^{-1.}$ How long will 5 g of this reactant take to reduce to 3 g?

Q12. What is meant by Instantaneous rate of reaction? With the help of graph show how will we find its value in the terms of reactants and products?

Q13. Write the differences between molecularity and order of a reaction?

Q14. Calculate molality of 2.5 g of ethanoic acid in 75 g of benzene.

Q15. If the solubility of H_2S in water at STP is 0.195 m calculate Henry's law constant.

Q16 18 g of glucose is dissolved in 1 kg of water in a saucepan. At what temperature will water boil at 1.013 bars? K_b for water is 0.52 K kg mol^{-1} .

Q17. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 liter of water at 25^0C, assuming that it is completely dissociated.

Q18. Calculate the mass of a non- volatile solute (molar mass 40 g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.

Q19. How would you determine the standard electrode potential of the system $Mg2^+$/ Mg?

Q20. If a current of 0.5 ampere flows through a metallic wire for 2 hours, then how many electrons flow through the wire?

Q21. The conductivity of 0.20 M solution of KCl at 298 K is 0.0248 S cm^{-1}. Calculate its molar conductivity.

Q22. An aqueous solution of sodium chloride freezes below 273 K. Explain the lowering of freezing points of water with the help of a suitable diagram.

Q23. Find the boiling point of a solution containing 0.520 g of glucose ($C_6H_{12}O_6$) dissolved in 80.2g of water. (Given K_b for water is = 0.52 K/m).

Q24. Derive expression for Raoult's law when the solute is non-volatile.

Q25. Calculate the mass of Urea (NH_2CONH_2) required in making 2.5 kg of 0.25 molal aqueous solutions.

Q26. Define conductivity and molar conductivity for the solution of an electrolyte. Discuss their variation with concentration.

Q27 How much charge is required for the following reductions:

(i) 1 mol of Al^{3+} to Al

(ii) 1 mol of MnO_4^- to Mn^{2+}

Q28. A solution of Ni $(NO_3)_2$ is electrolyzed between platinum electrodes using a current of 5.0 ampere for 20 minutes. What mass of Ni is deposited at the cathode? (Atomic mass of Ni = 58.9 u)

Q29. A reaction is of first order in A and second order in B.

(i) Write the differential rate equation.

(ii) How is the rate affected on increasing the concentrations of B three times?

(iii)How is the rate affected when the concentrations of both A and B are doubled?

Q30. The following results have been obtained during the kinetic studies of the reaction:

$2A + B \rightarrow C + D$

Experiment	[A] mol L^{-1}	[B] mol L^{-1}	Initial rate of formation of D/mol L^{-1} $minute^{-1}$
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant of the reaction.

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