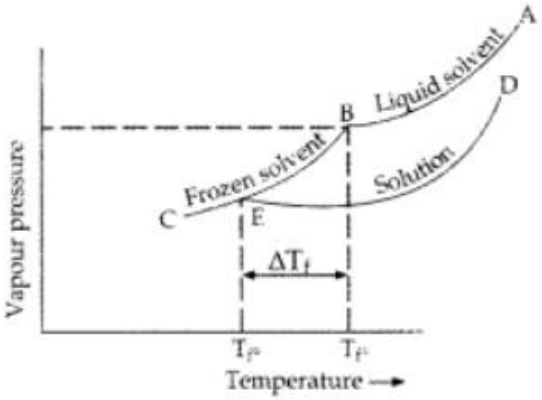
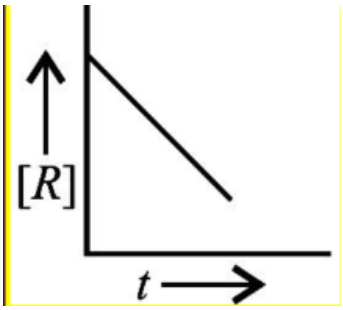
THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

Date:17/10/22 **GRADE: XII**	**MT3 EXAMINATION (2022-23)** **CHEMISTRY (043)**	**Max marks: 40** **Time: 2 Hour**

General Instructions:
(i) All questions are compulsory.
(ii) The question paper has five sections and 35 questions. All questions are compulsory.
(iii) Section–A has 10 questions of 1 mark each; Section–B has 4 questions of 2 marks each; Section– C has 4 questions of 3 marks each; Section– D has 2 questions of 5 marks each.

Qn. No	**Questions**	Marks allocated
	SECTION A	
1	Fused NaCl on electrolysis gives …….. on cathode. (a) Chlorine (b) Sodium (c) Sodium amalgam (d) Hydrogen	1
2	Express the relation among cell constant, resistance of the solution in the cell and conductivity of the solution.	1
3	Define 'order of a reaction'.	1
4	A and B liquids on mixing produce a warm solution. Which type of deviation from Raoult's law is there?	1
5	Cell reaction is spontaneous, when (a) E0red is negative (b) ΔG° is negative (c) E^0oxid is Positive (d) ΔG° is positive	1
6	Express the rate of the following reaction in terms of the formation of ammonia : $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$	1
7	On mixing liquid X and liquid Y, volume of the resulting solution decreases. What type of deviation from Raoult's law is shown by the resulting solution?	1
8	In the following questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.	1

	(a) Both assertion and reason are true and the reason is the correct explanation of assertion. (b) Both assertion and reason are true but the reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true. (e) Assertion and reason both are wrong. **Assertion**: Molarity of a solution in liquid state changes with temperature. **Reason**: The volume of a solution changes with change in temperature.	
9	Write the unit of rate constant for a zero order reaction.	1
10	For a reaction R → P, half-life ($t_{1/2}$) is observed to be independent of the initial concentration of reactants. What is the order of reaction?	1
	SECTION B	
11	Differentiate between average rate and instantaneous rate of a reaction.	2
12	Explain the graph with respect to lowering of freezing point.  	2
13	What is the necessity to use a salt bridge in a Galvanic cell?	2
14	Represent the galvanic cell in which the reaction $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$ takes place.	2
	SECTION C	
15	A reaction is of second order with respect to a reactant. How is its rate affected if the concentration of the reactant is (i) doubled (ii) reduced to half?	3
16	How is the vapour pressure of a solvent affected when a non-volatile solute is dissolved in it?	3
17	(a) For a reaction A + B → P, the rate law is given by, $r = k[A]^{1/2}[B]^2$. What is the order of this reaction? (b) A first order reaction is found to have a rate constant k = $5.5 \times 10^{-14}\ s^{-1}$. Find the half-life of the reaction.	3

18	For a chemical reaction R → P, the variation in the concentration [R] vs. time (t) plot is given as (i) Predict the order of the reaction (ii) What is the slope of the curve? 	3
	SECTION D	
19	(a) Following reactions occur at cathode during the electrolysis of aqueous silver chloride solution : $Ag^+(aq) + e^- \rightarrow Ag(s)$ $E° = +0.80$ V $H^+(aq) + e^- \rightarrow 12H_2(g)$ $E° = 0.00$ V On the basis of their standard reduction electrode potential (E°) values, which reaction is feasible at the cathode and why? (b) Define limiting molar conductivity. Why conductivity of an electrolyte solution decreases with the decrease in concentration?	5
20	A) Explain why aquatic species are more comfortable in cold water rather than in warm water. B) Positive deviation is shown by a mixture of ethanol and acetone, why? Explain & What will be the effect on ΔHmix & ΔVmix ? C) Calculate the boiling point elevation for a solution prepared by adding 10 g of CaCl2 to 200 g of water. (Kb for water = 0.512 K kg mol−1, molar mass of CaCl2= 111 gmol−1)	5
	THE END	

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