

SAMPLE 1 PERIODIC TEST SET 2 CHEMISTRY

UNIT- I, II & III (SOLUTIONS, ELECTROCHEMISTRY & CHEMICAL KINETICS)

SUBJECT: CHEMISTRY

TIME: 90 MIN.

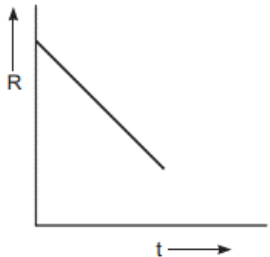
CLASS: XII

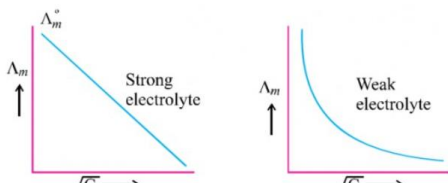
MAX. MARKS: 40

Note: There are **19** questions in this question paper.

1. Q. No. 1-5 consist of multiple-choice questions carrying 1 mark each.
2. Q. No. 6-9 consist of Assertion and Reason questions carrying 1 mark each.
3. Q. No. 10-13 consist of very short answer questions carrying 2 marks each.
4. Q. No. 14-16 consists of short answer questions carrying 3 marks each.
5. Q. No. 17 consists of case- based questions carrying 4 (1+1+2) marks.
6. Q. No. 18-19 consists of long answer questions carrying 5 marks each.

S.No.	Questions	Marks
1.	What is an example of camphor in N ₂ gas? (a) Solid in gas solution (b) Gas in gas solution (c) Solid in liquid solution (d) Liquid in gas solution	1
2.	Which of the following does not belong in the category of electrochemical cells? (a) Voltaic cell (b) Photovoltaic cell (c) Electrolytic cell (d) Fuel Cell	1
3.	Which of the following assertions about the main cell is correct? (a) An example of a primary cell is a mercury cell (b) An example of a primary cell is a nickel-cadmium storage cell (c) The electrode reactions can be reversed (d) It can be recharged	1
4.	Plotting a graph between temperature and reaction rates can reveal the temperature dependence of reaction rates. (a) Concentration of reactants and temperature (b) Concentration of products and temperature (c) Rate constant and temperature (d) Rate of catalysis and temperature	1
5.	In 30 minutes, a first-order reaction is 50% complete. Calculate the amount of time it took to complete 87.5 percent of the reaction. (a) 30 minutes (b) 60 minutes (c) 90 minutes (d) 120 minutes	1
	In the following questions one mark each (Q. No. 6 - 9) a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices. (i) A and R both are correct statements and R is the correct explanation for A. (ii) A and R both are correct statements and R is not correct explanation for A. (iii) A is correct statement but R is wrong statement.	

	(iv) A is wrong statement but R is correct statement.	
6.	Assertion (A): If a liquid solute more volatile than the solvent is added to the solvent, the vapour pressure of the solution may increase i.e., $p_s > p_o$. Reason (R): In the presence of a more volatile liquid solute, only the solute will form the vapours and solvent will not.	1
7.	Assertion (A): Galvanised iron does not rust. Reason (R): Zinc has a more negative electrode potential than iron.	1
8.	Assertion: Rate constant of a zero-order reaction has the same unit as the rate of a reaction. Reason: Rate constant of a zero-order reaction does not depend upon the concentration of the reactant.	1
9.	Assertion: For the first order reaction the units of rate constant are time^{-1} . Reason: The rate of first order reaction, remains constant throughout.	1
10.	(i) Why are aquatic species more comfortable in cold water than in warm water? (ii) What happens when we place the blood cell in saline water solution (hypertonic solution)? Give reason.	2
11.	Calculate the time to deposit 1.5 g of silver at cathode when a current of 1.5 A was passed through the solution of AgNO_3 . (Molar mass of Ag = 108 g mol^{-1} , $1 \text{ F} = 96500 \text{ C mol}^{-1}$)	2
12.	Calculate E°_{cell} for the following reaction at 25°C : $\text{A} + \text{B}^{2+} (0.001 \text{ M}) \rightarrow \text{A}^{2+} (0.0001 \text{ M}) + \text{B}$ Given $E_{\text{cell}} = 2.6805$, $1 \text{ F} = 96500 \text{ C mol}^{-1}$	2
13.	For a chemical reaction $\text{R} \rightarrow \text{P}$, 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?	2
14.	3.9 g of benzoic acid dissolved in 49 g of benzene shows a depression in freezing point of 1.62 K. Calculate the Van't Hoff factor and predict the nature of solute (associated or dissociated). (Given: Molar mass of benzoic acid = 122 g mol^{-1} , K_f for benzene = $4.9 \text{ K kg mol}^{-1}$)	3
15.	(a) Following reactions occur at cathode during the electrolysis of aqueous silver chloride solution: $\text{Ag}^+ (\text{aq}) + \text{e}^- \rightarrow \text{Ag}(\text{s}) \quad E^\circ = +0.80 \text{ V}$ $\text{H}^+ (\text{aq}) + \text{e}^- \rightarrow 1/2 \text{ H}_2 (\text{g}) \quad E^\circ = 0.00 \text{ V}$ 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?	3
16.	(a) The rate constant of a first order reaction increases from 2×10^{-2} to 8×10^{-2} when the temperature changes from 300 K to 320 K. Calculate the energy of activation (E_a).	3

	(log 2 = 0.301, log 3 = 0.4771, log 4 = 0.6021) (b) Write the expression of half-life for (i) zero order reaction and (ii) first order reaction.									
17.	<p>Case study-based question</p> <p>The conductivity or specific conductivity of an electrolytic solution varies with the concentration of the solutions of different electrolytes. For comparing the conductances of the solutions of different electrolytes, it is essential that the solutions should have equal volumes and they must contain definite amount of the electrolytes which give ions carrying the same total charge. The conducting power of an electrolytic solution can be expressed in terms of equivalent conductance and molar conductance. The equivalent conductance of a solution does not vary linearly with concentration and it is related with specific conductance. The effect of equivalent conductance can be studied by plotting values against the square root of the concentration. Following two figures show the behaviour of strong and weak electrolytes with change of concentration.</p> <div style="text-align: center;">  </div> <p>Answer the following questions:</p> <ol style="list-style-type: none"> Write the relationship between specific conductance and equivalent conductance? What is the effect of decreasing concentration on the molar conductivity for a weak electrolyte? As seen from the graph the value of limiting molar conductivity cannot be determined graphically. How can this value be obtained? 	4								
18.	<p>(a) State Raoult's law for a solution containing volatile components. Name the solution which follows Raoult's law at all concentrations and temperatures.</p> <p>(b) Calculate the boiling point elevation for a solution prepared by adding 10 g of CaCl₂ to 200 g of water. (K_b for water = 0.512 K kg mol⁻¹, Molar mass of CaCl₂ = 111 g mol⁻¹)</p> <p>OR</p> <p>(a) Define the following terms: (i) Azeotrope (ii) Osmotic pressure (iii) Colligative properties</p> <p>(b) Calculate the molarity of 9.8% (w/w) solution of H₂SO₄ if the density of the solution is 1.02 g mL⁻¹. (Molar mass of H₂SO₄ = 98 g mol⁻¹)</p>	(5)								
19.	<p>For the hydrolysis of methyl acetate in aqueous solution, the following results were obtained:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>t/s</td> <td>0</td> <td>30</td> <td>60</td> </tr> <tr> <td>CH₃COOCH₃</td> <td>0.60</td> <td>0.30</td> <td>0.15</td> </tr> </table> <p>(a) Show that it follows pseudo first order reaction, as the concentration of water remains constant.</p> <p>(b) Calculate the average rate of reaction between the time interval 30 to 60 seconds.</p>	t/s	0	30	60	CH ₃ COOCH ₃	0.60	0.30	0.15	(5)
t/s	0	30	60							
CH ₃ COOCH ₃	0.60	0.30	0.15							

	<p>OR</p> <p>(a) Define the following terms:</p> <p>(i) Collision frequency (Z)</p> <p>(ii) Rate constant (k)</p> <p>(iii) Activation energy of a reaction (E_a)</p> <p>(b) A first order reaction takes 30 minutes for 50% completion. Calculate the time required for 90% completion of this reaction. ($\log 2 = 0.3010$)</p>	
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