MARKING SCHEME

Senior Secondary School Examination TERM–II, 2022

CHEMISTRY (Subject Code–043)

[Paper Code: 56/6/1]

<table>
<tr><th>Q. No.</th><th>EXPECTED ANSWER / VALUE POINTS</th><th>Marks</th></tr>
<tr><td></td><td>SECTION—A</td><td></td></tr>
<tr><td>1.</td><td>(a) First order.
(b)<table><tr><th>Order</th><th>Molecularity</th></tr><tr><td>The sum of powers of the concentration of the reactants in the rate law expression is called the order of a reaction.</td><td>The number of reacting species (atoms, ions or molecules) taking part in an elementary chemical reaction.</td></tr><tr><td>Order of a reaction can be zero or fraction or negative.</td><td>The Molecularity of a reaction cannot be zero or fraction or negative.</td></tr></table>(Any one) or (any other correct difference)</td><td>1

1</td></tr>
<tr><td>2.</td><td>(a) Molar conductivity of a solution at a given concentration is the conductance of the volume V of solution containing one mole of electrolyte kept between two electrodes with area of cross section A and distance of unit length / Conductivity observed for one molar solution.
(b) S cm^2 mol^{-1}
(c) Λ_m decreases with an increase in concentration or increases with decrease in concentration.
(Any two)</td><td>1 X 2</td></tr>
<tr><td>3.</td><td>(a) $C_6H_5COOH < FCH_2COOH < NO_2CH_2COOH$
(b) Butanal / Butan-1-al</td><td>1
1</td></tr>
<tr><td></td><td>SECTION—B</td><td></td></tr>
<tr><td>4.</td><td>$\Lambda_m = \frac{\kappa \times 1000}{c}$
$= \frac{3.905\ X\ 10^{-5}\ X\ 1000}{0.001}$
= 39.05 S cm^2 mol^{-1}
(Deduct ½ marks if no or incorrect unit)
Degree of dissociation
$\alpha = \frac{\wedge_m}{\wedge_{m^\circ}}$
$= \frac{39.05}{390.5} = 0.1$</td><td>½

½

1

½

½</td></tr>
</table>

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5.	(a) The movement of colloidal particles under an applied electric potential. (b) Yes. (c) The process of settling colloidal particles is coagulation / The process of converting colloidal solution into precipitate.	 1 1 1
	OR	
5.	(a) Adsorption: The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption. (b) Lyophobic sol: The dispersed phase has little or no affinity for the dispersion medium / solvent-repelling sols. (c) Multimolecular colloid: On dissolution, a large number of atoms or smaller molecules of a substance aggregate together to form species having the size in the colloidal range (1–1000 nm).	1 x 3
6 (a)	(i) +3 (ii) Due to the poor shielding effect of d-electrons and increase in effective nuclear charge. (iii) V^{3+} : 2 unpaired electrons, Ti^{3+}: 1 unpaired electron.	1 1 ½ , ½
	OR	
6 (b)	(i) Ce^{3+} = [Xe] $4f^{1}$ = 1 unpaired electron $\mu = \sqrt{n(n+2)}$ $\mu = \sqrt{1(1+2)} = \sqrt{3}$ = 1.73 B M (ii) Copper in +2 oxidation state has incompletely filled d-orbital. (iii) Sc^{3+} has no unpaired electrons / no d-d transition / d^0 configuration whereas in Ti^{3+} with one unpaired electron shows d-d transition.	½ ½ 1 1
7 (a)	(i) Zero order (ii) -k (iii) mol L^{-1} s^{-1}	1 1 1
	OR	
7 (b)	$k = \frac{0.693}{24} = 0.0288\ min^{-1}$ $t = \frac{2.303}{k} \log \frac{a}{a-x}$ $t = \frac{2.303}{0.0288} \log \frac{100}{100-25}$ $t = \frac{2.303}{0.0288} \log \frac{4}{3}$ $t = 79.96\ (\log 4 - \log 3)$ $t = 79.96 \times 0.125$ $= 9.99\ min$ (Deduct ½ marks if no or incorrect unit) OR $k = \frac{0.693}{24}\ min^{-1}$ $\frac{0.693}{24} = \frac{2.303}{t} \log \frac{a}{a-x}$	½ ½ 1 1 ½ ½

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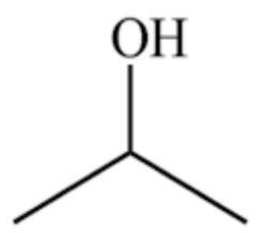
	$= \frac{2.303}{t} \log \frac{100}{100-25}$ $t = \frac{2.303\ X\ 24}{0.693} \log \frac{4}{3}$ $t = 79.75\ (\log 4 - \log 3)$ $t = 79.75 \times 0.125$ $= 9.97$ min (Deduct ½ marks if no or incorrect unit)	1 1
8.	(a) $CH_3CH_2\ NHCH_2CH_3$ (b) A = $C_6H_5NH_2$, B = $C_6H_5NHCOCH_3$	1 1 1
9.	(a) hexaamminecobalt(III) chloride (b) tetrachloridonicklate (II) (c) Potasssium hexacyanidoferrate (III)	1 1 1
10.	(a) Due to incompletely filled d-orbitals / due to the participation of both (n-1) d and ns electrons. (b) Due to high $\Delta_a H°$ and low $\Delta_{hyd} H°$. (c) Cr^{3+} is more stable in +3 oxidation state due to t_{2g}^3configutaion.	1 1 1
	OR	
10.	• The steady decrease in the atomic / ionic radii of the lanthanoid series with the increase in atomic number. • (i) 4d and 5d series elements have almost identical atomic radii. (ii) Difficulty in the separation of Lanthanoids. (iii) Similar physical and chemical properties. (iv) Basic character of the lanthanide hydroxides $M(OH)_3$ decreases with increase in atomic number. (Any two consequences)	1 1 x 2
11.	(a) Aryl halides do not undergo nucleophilic substitution with the anion formed by phthalimide. (b) In aniline, due to resonance lone pair of electrons on N is less available while it is easily available in alkyl amines due to electron donating nature (+I effect) of alkyl group / Due to electron withdrawing nature of the aryl group in aniline while electron donating nature of alkyl group in alkyl amine. (c) $C_2H_5NH_2 < (C_2H_5)_3 N < (C_2H_5)_2NH$	1 1 1
12.	(a) Ethanal (b) On heating with Tollens' reagent, propanal forms a silver mirror whereas propanone does not. (Or any other suitable chemical test) (c) PCC (d) (i)  A = / Propan-2-ol, B = CH_3COCH_3 / Propanone /Acetone	1 1 1

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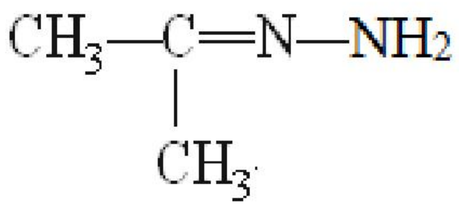
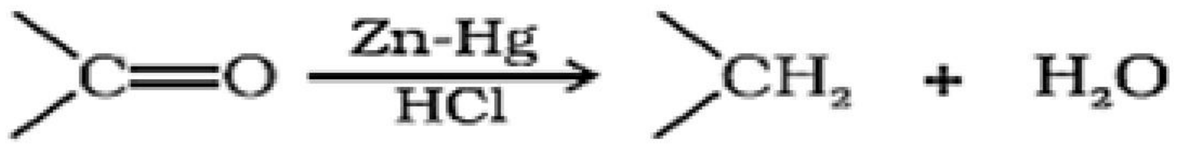
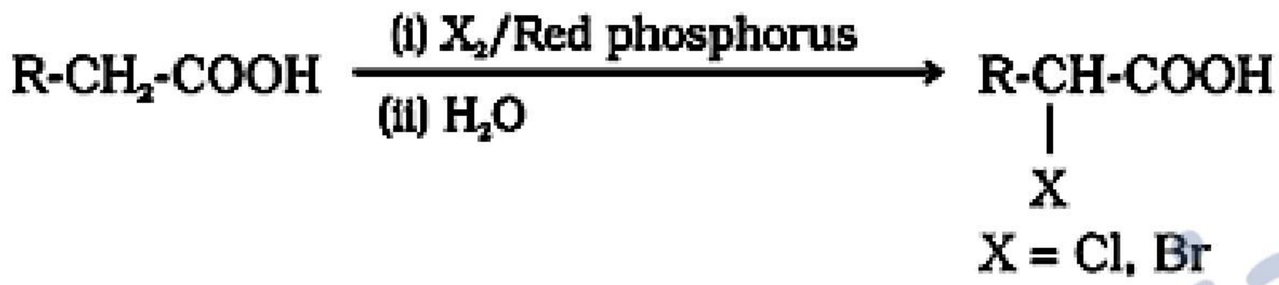
	 C = / Propanone hydrazone D = CHI_3 / Iodoform **OR**	½ x 4
	(d)(ii) (I)  (or any other suitable reaction) (II)  (or any other suitable reaction)	1 1

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