MARKING SCHEME

Senior Secondary School Examination TERM–II, 2022

CHEMISTRY (Subject Code–043)

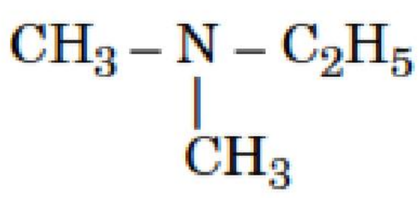
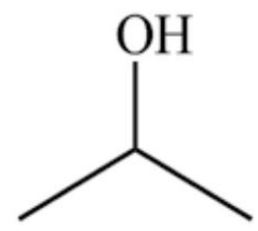
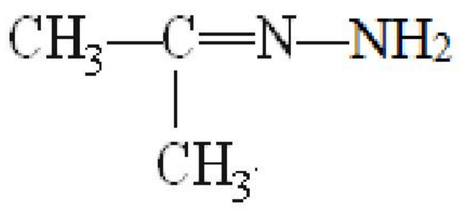
[Paper Code: 56/6/3] [SET-3]

<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) $CH_3COCH_3 < CH_3CH_2OH < CH_3COOH$
(b) 2-Hydroxybenzaldehyde / 2-Hydroxybenzenecarbaldehyde</td><td>1
1</td></tr>
<tr><td>2.</td><td>(a) Alternate current prevents the electrolysis so that the concentration of ions in the solution remains constant / AC current does not change the composition of the solution.
(b) The law states that limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte.
(c) Mg (s) | Mg^{2+} (aq.) || Cu^{2+} (aq.) | Cu (s)
(Any two)</td><td>1×2</td></tr>
<tr><td>3.</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>4.</td><td>(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.</td><td>1
1
1</td></tr>
<tr><td></td><td>OR</td><td></td></tr>
<tr><td></td><td>(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).</td><td>1
1
1</td></tr>
<tr><td>5 (a)</td><td>(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.</td><td>1
1
½ , ½</td></tr>
</table>

*These answers are meant to be used by evaluators

	OR	
5 (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
6 (a)	(i) Zero order (ii) -k (iii) mol L^{-1} s^{-1}	1 1 1
	OR	
6 (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 x 0.125 = 9.99 min (Deduct ½ marks if no or incorrect unit) OR $k = \frac{0.693}{24}\ min^{-1}$ $\frac{0.693}{24} = \frac{2.303}{t} \log \frac{a}{a-x}$ $= \frac{2.303}{t} \log \frac{100}{100-25}$ $t = \frac{2.303\ X\ 24}{0.693} \log \frac{4}{3}$ t = 79.75 (log 4 – log 3) t = 79.75 x 0.125 = 9.97 min (Deduct ½ marks if no or incorrect unit)	½ ½ 1 1 1 ½ ½ 1 1
7.	$\Lambda_m = \frac{\kappa \times 1000}{c}$ $= \frac{5.25\ X\ 10^{-5}\ X\ 1000}{2.5\ X\ 10^{-4}}$ = 210 S cm^2 mol^{-1} (Deduct ½ marks if no or incorrect unit) Degree of dissociation	½ ½ 1 ½

	$\alpha = \frac{\wedge_m}{\wedge_{m^\circ}}$ $= \frac{210}{400} = 0.525$	½
8.	(a)  (b) A = CH_3CONH_2 , B = CH_3NH_2	1 1,1
9.	(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) $C_2H_5NH_2 < (C_2H_5)_3N < (C_2H_5)_2NH$	1 1 1
10.	(a) Cr, due to half filled t_{2g}^3 configuration / stable d^3 configuration. (b) Cr, due to maximum number of unpaired electrons. (c) Zn.	1 1 1
	OR	
10	• Transition elements have partially filled or incompletely filled d-orbital in their ground state or in any of their oxidation states. • (i) They show variable oxidation states. (ii) They form complex compounds. (or any other characteristics)	1 1 x 2
11.	(a) Hybridization : sp^3d^2 Shape : Octahedral Magnetic behaviour : Paramagnetic (b) $[Co(NH_3)_5Cl]Cl_2$	1 ½ ½ 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  C = / Propanone hydrazone	1 1 1 ½ x 4

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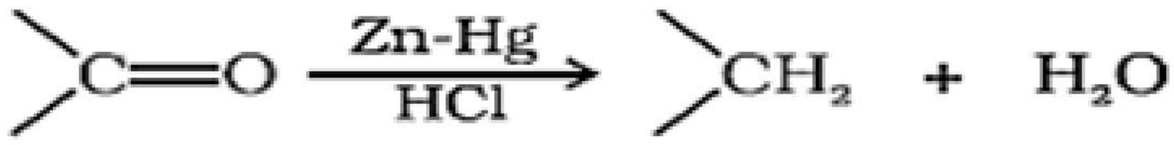
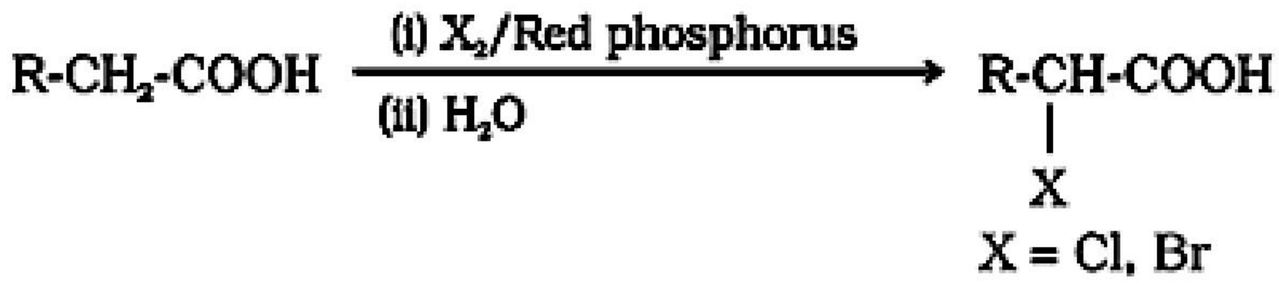
	D = CHI_3 / Iodoform **OR**	
	(d)(ii) (I)  (or any other suitable reaction) (II)  (or any other suitable reaction)	1 1

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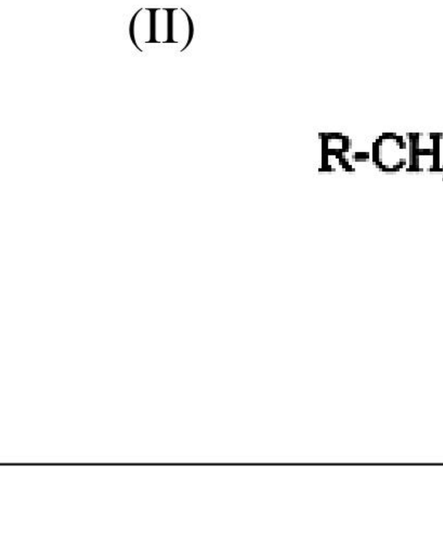

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