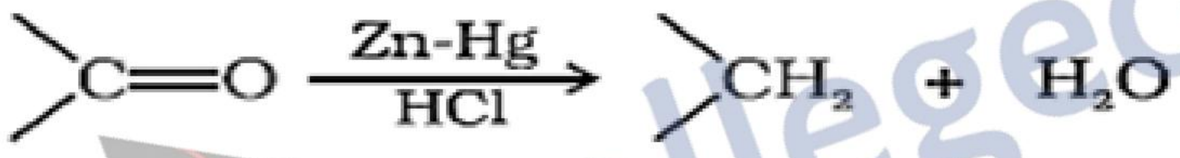
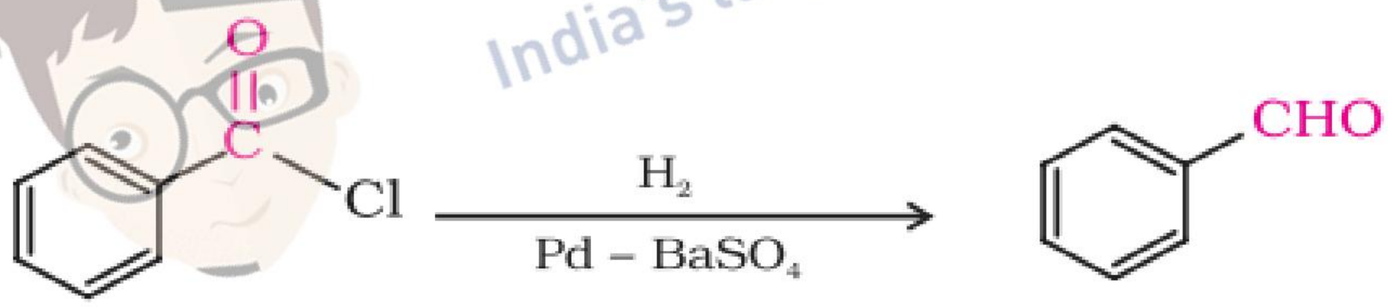
MARKING SCHEME

Senior Secondary School Examination TERM–II, 2022

CHEMISTRY (Subject Code–043)

[Paper Code: 56/B/6]

<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>(i) p-Nitroaniline < Aniline < CH_3-NH_2
(ii) $C_6H_5NH_2$ < $C_6H_5NHCH_3$ < $C_6H_5CH_2NH_2$
(iii) $C_6H_5NH_2$ < $(C_2H_5)_2NH$ < $C_2H_5NH_2$ (Any two)</td><td>1 x 2</td></tr>
<tr><td>2.</td><td><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>(or any other correct difference)</td><td>1 x 2</td></tr>
<tr><td>3.</td><td>(i)
 
(or any other suitable reaction)
(ii)
 
(or any other suitable reaction)</td><td>1

1</td></tr>
<tr><td>4.</td><td>(i) Variable or multiple oxidation state / ability to form complexes / they provide large surface area for adsorption / utilise (n-1)d and ns electrons for bonding
(ii) Cu^{2+} has unpaired electron while Cu^{+} has no unpaired electron / Cu^{2+} shows d-d transition whereas Cu^{+} does not.
(iii) Because Mn is more stable in +2 due to stable $3d^5$ configuration.</td><td>1

1

1</td></tr>
<tr><td>5. (a)</td><td>$k = \frac{2.303}{t}\log\frac{[Ro]}{[R]}$
$k = \frac{2.303}{40}\log\frac{1}{1/10}$
$k = \frac{2.303}{40}\log 10$
$k = 0.057\ s^{-1}$
(Deduct ½ marks if no or incorrect unit)</td><td>1

1

1</td></tr>
<tr><td></td><td>OR</td><td></td></tr>
</table>

*These answers are meant to be used by evaluators

5 (b)	Rate = k $[A]^1$ $[B]^0 \Rightarrow$ Rate = k [A] From experiment I, we obtain, 2.0×10^{-2} mol L^{-1} min^{-1} = k (0.1 mol L^{-1}) $\Rightarrow$ k = 0.2 min^{-1}. From experiment II, we obtain 4.0×10^{-2} mol L^{-1} min^{-1} = 0.2 min^{-1} [A] $\Rightarrow$ [A] = **0.2** From experiment III, we obtain Rate = 0.2 min^{-1} × 0.4 mol L^{-1}= **0.08 or 8 x 10^{-2}** From experiment IV, we obtain 2.0×10^{-2} mol L^{-1} min^{-1} = 0.2 min^{-1} [A] $\Rightarrow$ [A] = **0.1** **[Award full credit for the correct answers]**	1 x 3
6 (a).	(i) On dissolution, a large number of atoms or smaller molecules of a substance aggregate together to form species having size in the colloidal range. (ii) A colloid in which solid particles act as a dispersed phase and liquid acts as a dispersion medium. (iii) The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid.	1 1 1
	OR	
6 (b)	(i) I: Low pressure: $\frac{x}{m} = k\,p$ II: High pressure: $\frac{x}{m} = k$ (ii) • Due to decrease in residual forces of the surface / Decrease in the surface energy / Due to bond formation between adsorbate and adsorbent. • Adsorption decreases with increase in temperature.	½ ,½ 1 1
7.	• The elements with partially filled or incompletely filled d-subshell either in the ground state or in the oxidation state. • Due to large number of unpaired electrons, there is strong interatomic interaction. • Zn, due to absence of unpaired electrons.	1 1 ½ , ½
8.	(a) (i) sp^3d^2 , paramagnetic (ii) d^2sp^3 , diamagnetic (b) $[Co(NH_3)_6]Cl_3$	½, ½ ½, ½ 1
9. (a)	(i) $CH_3CHO \xrightarrow{LiAlH_4} CH_3CH_2OH$ (ii) $CH_3CHO \xrightarrow{\text{Dil. NaOH}} CH_3\text{-}CH(OH)CH_2CHO$ (iii) $CH_3CHO \xrightarrow{HCN} CH_3CH(CN)OH$	1 x 3
	OR	
9 (b).	(i) $CH_3COOH \xrightarrow[(2)\ H_2O]{(1)\ Cl_2 / \text{Red P}} CH_2(Cl)COOH$ (ii) $CH_3COCH_3 \xrightarrow{(1)\ CH_3MgBr} (CH_3)_3COH$	

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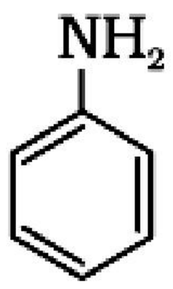
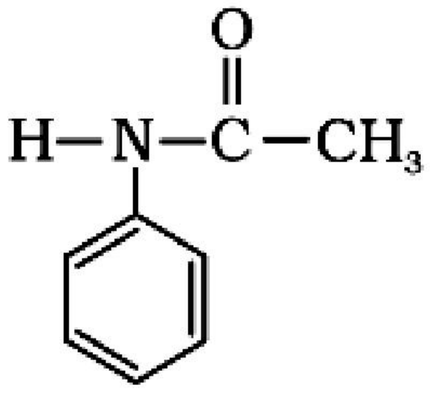
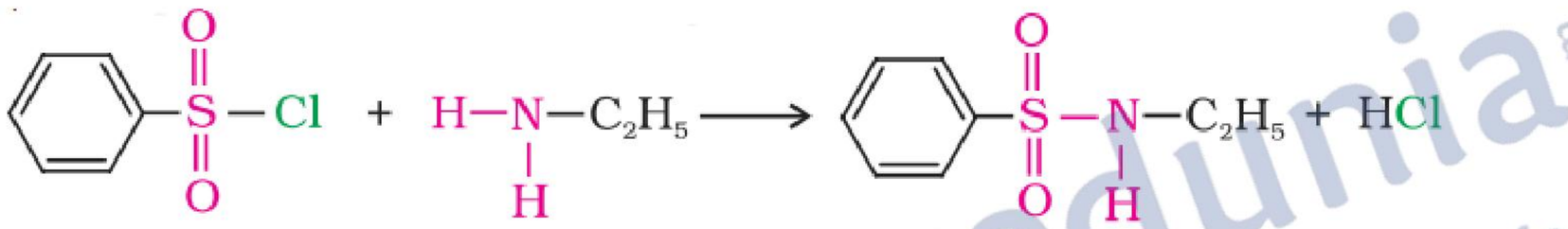
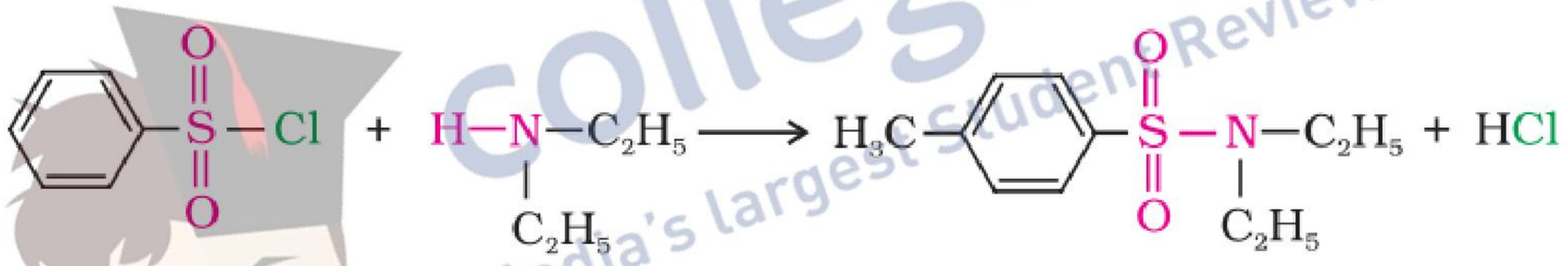
	(2) H_2O (iii) $CH_3 - CH = CH - CH_2 - CN \xrightarrow[2.\ H_2O]{1.\ DIBAL\text{-}H} CH_3 - CH = CH - CH_2 - CHO$	1 x 3
10. (a)	(i) Because aniline forms salt with the Lewis acid anhydrous $AlCl_3$. (ii) $R{-}NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat} R{-}NC + 3KCl + 3H_2O$ (or any other suitable reaction) (iii) A =  B = 	1 1 ½ , ½
	OR	
10 (b)	 (soluble in alkali)  **(Insoluble in alkali)** **Tertiary amines do not show any reaction with Hinsberg's reagent.** **Or** On adding Hinsberg's reagent (Benzene sulphonyl chloride) • Primary amines give product that is soluble in alkali. • Secondary amines give product that is insoluble in alkali. • Tertiary amines do not react.	1 1 **Or** 1 x 3
11.	(a) Butanone < Propanone < Propanal < Ethanal (b) Due to the absence of α-H atom. (c) Add iodine (I_2), and NaOH in both the compounds and heat. Pentan-2-one gives *yellow ppt.(CHI_3)* and Pentan-3-one will not.	1 1 1
12 .	(i) **Zn (s) | Zn^{2+} (aq.) || Cu^{2+} (aq.) | Cu (s)** (ii) Electrochemical cell starts working as electrolytic cell. (iii) Conductivity increases with increase in concentration whereas molar conductivity decreases with increase in concentration. (iv) (a) $\Delta_r G^\circ = -nFE^\circ_{cell}$ = -2 x 1.56 x 96500 $\Delta_r G^\circ$ = -301,080 J	1 1 1 ½ 1 ½

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	OR (b) $E_{cell} = E^{o}_{cell} - \frac{0.059}{n} \log \frac{[Zn^{2+}]}{[Ag^{+}]^2}$ $E_{cell} = 1.56 - \frac{0.059}{2} \log \frac{[0.1]}{[0.01]^2}$ $E_{cell} = 1.56 - 0.0295 \times 3 \log 10$ $E_{cell} = 1.56 - 0.0885$ $E_{cell} = 1.4715\ V$	½ 1 ½

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**These answers are meant to be used by evaluators*