

## KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION

## PREBOARD EXAMINATION 2025-26

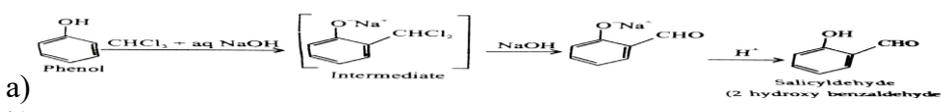
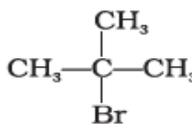
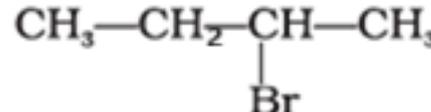
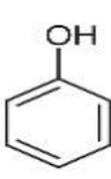
## SUBJECT: CHEMISTRY (043)

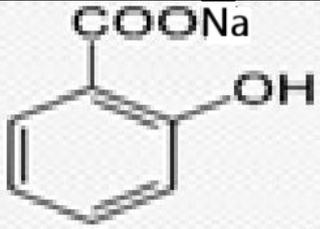
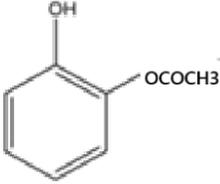
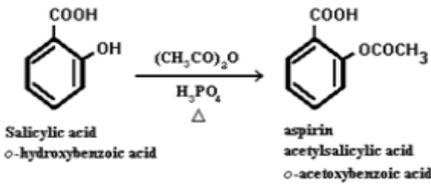
## ANSWER KEY

Max. Marks: 70

Time : 3 Hrs

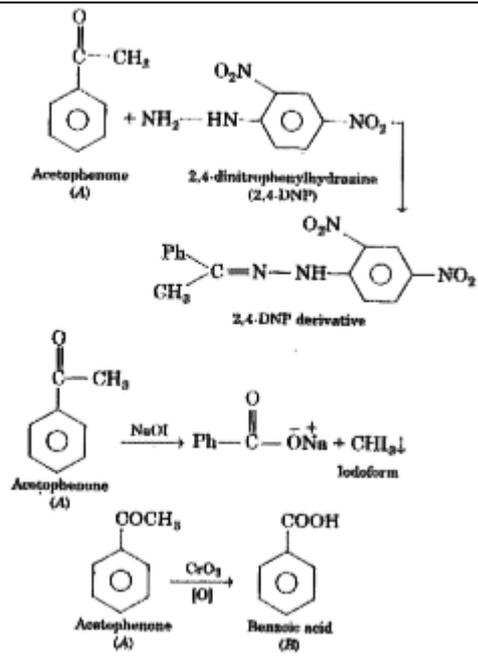
SECTION A		
Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.		
1	c	1
2	b	1
3	b	1
4	d	1
5	d	1
6	a	1
7	b	1
8	b	1
9	a	1
10	b	1
11	c	1
12	a	1
13	c	1
14	b	1
15	c	1
16	a	1
17	<p>A : a) equal ; <math>[\text{glucose}] = 3RT</math> <math>[\text{NaCl}] = 2 \times 1.5 RT</math></p> <p>b) Mass percentage of <math>\text{CCl}_4 = 122/144 \times 100 = 84.7 \%</math></p> <p style="text-align: center;"><b>OR</b></p> <p>B : <math>\Delta T_b = 0.88 \text{ K}</math></p> $\Delta T_b = K_b \times m$ $= \frac{2.53 \times 1.80 \times 1000}{0.88 \times 90}$ $= 57.5 \text{ g}$	<p><math>\frac{1}{2} \times 1</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p>
18	<p>a) i. Order is experimental quantity molarity is theoretical ii. Order can be zero and even fraction, molarity cannot be zero value (any two difference)</p> <p>b) <math>\text{Mol L}^{-1}\text{s}^{-1}</math></p>	<p>1</p> <p>1</p>
19	<p>a) <math>[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2</math></p> <p>b) Pentaammine nitrito-O-Cobalt (III) Chloride</p>	<p>1</p> <p>1</p>
20		

	 <p>a) <math>RX + RONa \rightarrow ROR + NaX</math></p>	1 1
21	A = $CH_3CHO$ B = $CH_3CH(OH)CH_2CHO$	1 1
22	$\Delta G^0 = -nFE^0_{cell}$ $= -2 \times 96500 \times 0.236$ $= -45.54 \text{ kJ/mol}$ $\log Kc = \frac{nE^0_{cell}}{0.059}$ $= \frac{2 \times 0.236}{0.059} = 7.9 \text{ (approximately 8)}$ $Kc = 10^8$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
23	<p>i) A is</p>  <p>B is</p>  <p>ii) B</p>	
24	<p>a) Henry's Law: The solubility of a gas in a liquid is directly proportional to the partial pressure of the gas above the liquid at constant temperature. Mathematically,</p> $p = k_H \cdot x$ <p>b) Solubility increases with increase in pressure. Solubility decreases with increase in temperature.</p> <p>c) When the bottle is opened, pressure above the liquid decreases, so the dissolved <math>CO_2</math> escapes as bubbles — hence, it fizzes.</p>	$\frac{1}{2} \times 2$ $\frac{1}{2} \times 2$ 1
25	<p>a) A</p> 	$\frac{1}{2} \times 4$

	<p>B</p>  <p>C =</p>  <p>D =</p>  <p>b)</p>  <p>Salicylic acid o-hydroxybenzoic acid</p> <p>aspirin acetylsalicylic acid o-acetoxybenzoic acid</p>	1
26	<p>a) The ability of oxygen to form multiple bonds with transition metals</p> <p>b) Strong metallic bonding due to the presence of unpaired electrons</p> <p>c) <math>\text{Sc}^{3+}</math> has no unpaired electrons (<math>3d^0</math> configuration), so it is colourless and diamagnetic.</p> <p>d) Due to variable oxidation states and ability to form complexes, they can provide an alternate reaction path with lower activation energy.</p>	1x3
27	<p>a) p-toluidine &lt; Aniline &lt; p-nitroaniline.</p> <p>b) <math>\text{C}_2\text{H}_5\text{NH}_2</math> will react with Hinsberg reagent to form a precipitate which dissolves in alkali while <math>\text{C}_2\text{H}_5\text{NHCH}_3</math> react with Hinsberg reagent to form a precipitate which is insoluble in alkali.</p> <p>OR Carbylamine test</p>	1 x 3

	c) Strong acidic medium protonate the amino group to form anilinium ion which is meta directive	
28	a) $2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 \rightarrow 2\text{K}_2\text{MnO}_4 + 2\text{H}_2\text{O}$ $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$ b) $5\text{Fe}^{2+} + \text{MnO}_4^- + 8\text{H}^+ \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O} + 5\text{Fe}^{3+}$ c) Orange coloured dichromate solution changes to yellow coloured chromate solution	$\frac{1}{2} \times 2$ 1 1
29	a) Overall reaction during discharge $\text{Pb} + \text{PbO}_2 + 2\text{H}_2\text{SO}_4 \rightarrow 2\text{PbSO}_4 + 2\text{H}_2\text{O}$  b) It is a secondary cell because it is rechargeable — the chemical reaction can be reversed by passing an external current. c) During discharge: $\text{H}_2\text{SO}_4$ is consumed, its concentration decreases, and water is formed. During charging: $\text{PbSO}_4$ converts back to $\text{Pb}$ and $\text{PbO}_2$ , regenerating $\text{H}_2\text{SO}_4$ , so its concentration increases again	1 1 2
30	a) Strength of ligand and $\Delta_o$ is directly proportional b) $[\text{Cu}(\text{H}_2\text{O})_4]^{2+} < [\text{Cu}(\text{NH}_3)_4]^{2+} < [\text{Cu}(\text{en})_2]^{2+} < [\text{Cu}(\text{CN})_4]^{2+}$ c) i) $2g^3eg^2$ ii) $sp^3d^2$	1 1 2
31	A I $\log \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left[ \frac{T_2 - T_1}{T_1 T_2} \right]$ $\log(1.5 \times 10^4 / 4.5 \times 10^3) = 60000 / 2.303 \times 8.314 \left( \frac{T_2 - 283}{283 T_2} \right)$ $(T_2 - 283) / T_2 = 283 \times 0.522 / 3133.62$ $T_2 = 283 / 0.95286 = 297 \text{ K}$ II i) Order of A is 0 Order of B is 1  ii) Pseudo first order reaction B I a) $r = k[\text{A}][\text{B}]^2$  b) The rate will become 9 times  c) The rate will become 8 times II	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1 $\frac{1}{2} \times 2$ 1 1 1

	$t_{75\%} = 2.303 / k \log ([R_0]/[R_0]/4)$ $= 2.303 / 30 \log 4 = 2.303 / 30 \times 0.6 = 4.62 \times 10^{-2} \text{ min}^{-1}$ $t_{1/2} = 0.693/k = 0.693/ 4.62 \times 10^{-2} = 15 \text{ min}$	$\frac{1}{2} \times 2$  1
32	<p>A</p> <p>I . The -CONH – bond between two or more amino acids in polypeptide and proteins . Glycosidic linkage is the oxide linkage between two or more monosaccharide units in polysaccharides</p> <p>II . Compounds which differ in orientation of -OH group in hemiacetal form of glucose on C-1 carbon atom is called anomers.</p> <p>III. <math>\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3</math></p> <p>IV Amino acids have acidic as well as basic group and forms internal salt with strong electrostatic attraction.</p> <p>V. it is soluble in water</p> <p>B</p> <p>I . Any one difference</p> <p>II The protein loses its biological activity due to changes in the secondary and tertiary structure .</p> <p>III.</p> <p><math>^+\text{NH}_3\text{-CH}_2\text{-COO}^-</math></p> <p>IV . Vitamins are essential organic compounds that your body needs in small amounts to function properly, grow, and stay healthy.Nightblindness is caused by the deficiency of Vitamin A</p> <p>V . The two major molecular shapes formed due to the folding of secondary structure of proteins are alpha helix and beta pleated sheets</p>	1  1  1 1  1  1 1  1 1  1 1  1 1
33	<p>A</p> <p>I a) Di-tert-butyl ketone &lt; Methyl tert-butyl ketone &lt; Acetone &lt; Acetaldehyde</p> <p>b) 4-Methoxybenzoic acid &lt; Benzoic acid &lt; 4-Nitrobenzoic acid &lt; 3,4-Dinitrobenzoic acid</p> <p>c) <math>\text{CH}_3\text{CH}_2\text{CH}_3 &lt; \text{CH}_3\text{OCH}_3 &lt; \text{CH}_3\text{CHO} &lt; \text{CH}_3\text{CH}_2\text{OH}</math></p> <p>II 5-Oxo- heptanal</p> <p>III</p> $2\text{CH}_3\text{CHO} \xrightarrow{\text{NaOH}} \begin{array}{c} \text{OH} \\   \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CHO} \\ \text{(Aldol)} \\ \text{3-hydroxy butanal} \end{array}$ $\xrightarrow[\text{(Reduction)}]{\text{NaBH}_4} \begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_2 \\   \qquad \qquad   \\ \text{OH} \qquad \qquad \text{OH} \end{array}$ <p style="text-align: center;"><b>OR</b></p> <p>I</p>	1  1  1  1   1    1



3

II **Iodoform test**-Pentan-2-one gives yellow precipitate with  $I_2$  and NaOH while Pentan-3-one does not

III  $\text{HCHO} + \text{HCHO} \rightarrow \text{CH}_3\text{OH} + \text{HCOONa}$

1

1