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 DEPARTMENT OF GOVERNMENT EXAMINATIONS – CHENNAI-6
 HSC SECOND YEAR EXAMINATION MARCH - 2024
CHEMISTRY ANSWER KEY

- Note:** 1. Answer written with Blue or Black ink only to be evaluated
 2. Choose the most suitable answer in **PART – I** from the given alternatives and write the option code and the corresponding answer.

Maximum Marks: 70

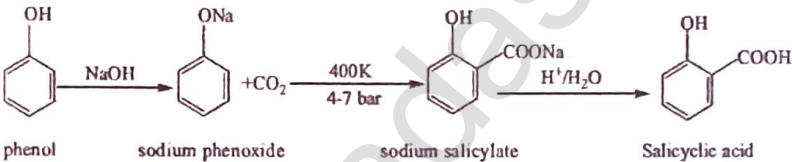
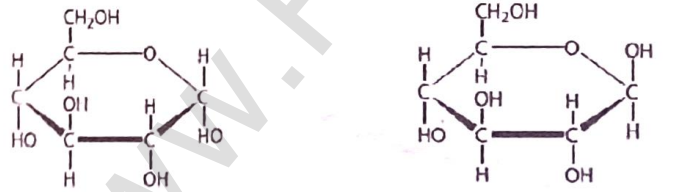
PART-I

Answer all the questions

15×1=15

Q.No	Option Code	'A' Type	Q. No	Option Code	'B' Type
1	b)	Both Assertion and Reason are true and Reason is the correct explanation of Assertion	1	b)	First order
2	c)	Potassium trioxalato aluminate (III)	2	b)	Acetyl salicylic acid
3	b)	HI	3	d)	carbon dioxide
4	c)	Dry ice	4	c)	Potassium trioxalato aluminate (III)
5	c)	Cytosine and Uracil	5	a)	Sodium chloride
6	b)	Acetyl salicylic acid	6	b)	(i) and (iv)
7	d)	carbon dioxide	7	d)	Impure copper
8	c)	acetanilide	8	b)	Both Assertion and Reason are true and Reason is the correct explanation of Assertion
9	a)	Sodium chloride	9	c)	Nucleophilic addition
10	b)	(i) and (iv)	10	c)	Dry ice
11	c)	Nucleophilic addition	11	d)	PCC
12	b)	First order	12	b)	HI
13	d)	Impure copper	13	c)	acetanilide
14	c)	Al ₂ O ₃	14	c)	Cytosine and Uracil
15	d)	PCC	15	c)	Al ₂ O ₃

Answer any SIX Questions and Question No.24 is Compulsory. 6×2=12

Q.No	Answer	Marks	
16	Correct Explanation (or) Correct Equation	2	2
17	Correct equation (or) unbalanced equation (or) equation without condition (or) mere explanation alone	2 1½ 1	2
18	Any one correct equation (or) Explanation (Any one)	2 1	2
19	Correct explanation Example	1 1	2
20	$E^{\circ}_{\text{cell}} = (E^{\circ}_{\text{oxi}}) + (E^{\circ}_{\text{red}})$ (or) $= -1.09 + 0.771$ $E^{\circ}_{\text{cell}} = -0.319 \text{ V}$ (or) E°_{cell} is -ve , Fe^{3+} cannot oxidises Br^- to Br_2	½ ½ 1	2
21	 <p>phenol sodium phenoxide sodium salicylate Salicylic acid</p>	2 1	2
22	 <p>α-D- glucopyranose β-D- glucopyranose</p>	1+1	2
23	Correct explanation (or) one example	2 1	2
24	correct definition	2	2

Part-III

Answer any **SIX** Questions and **Question No.33 is Compulsory.** 6×3=18

Q.No	Answer	Marks							
25	Any three uses	3	3						
26	Fe ³⁺ = [Ar] 3d ⁵ Fe ³⁺ - half-filled d orbital Fe ³⁺ is stable	1 1 1	3						
27	$r = \frac{a\sqrt{2}}{4}$ (or) $a = \frac{4r}{\sqrt{2}}$ (or) $a = 2\sqrt{2} r$ (or) $a=2 \times 1.414 r$ $a = \frac{4 \times 125}{\sqrt{2}}$ (or) $a = 2\sqrt{2} \times 125$ (or) $a=2 \times 1.414 \times 125$ $a = 353.5 \text{ pm}$	1 1 1/2+1/2	3						
28	$K = Ae^{-E_a/RT}$ <p>K = Rate constant A = Frequency factor R = Gas constant E_a = Energy of activation T = Temperature</p>	1 4x1/2	3						
29	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%; text-align:center;">Physisorption</th> <th style="width:50%; text-align:center;">chemisorption</th> </tr> </thead> <tbody> <tr> <td>Physisorption decreases with increase in temperature.</td> <td>When temperature is raised chemisorption first increases and then decreases.</td> </tr> <tr> <td>In Physisorption, when pressure increases the extent of adsorption increases.</td> <td>Chemical adsorption is fast with increase Pressure, it cannot alter the amount.</td> </tr> </tbody> </table>	Physisorption	chemisorption	Physisorption decreases with increase in temperature.	When temperature is raised chemisorption first increases and then decreases.	In Physisorption, when pressure increases the extent of adsorption increases.	Chemical adsorption is fast with increase Pressure, it cannot alter the amount.	1/2 1/2	3
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Physisorption decreases with increase in temperature.	When temperature is raised chemisorption first increases and then decreases.								
In Physisorption, when pressure increases the extent of adsorption increases.	Chemical adsorption is fast with increase Pressure, it cannot alter the amount.								
30	$\text{C}_6\text{H}_5-\text{CH}=\text{O} + \text{H}_2\text{C}(\text{COOH})_2 \xrightarrow[\text{-H}_2\text{O}]{\text{Pyridine}} \text{C}_6\text{H}_5-\text{CH}=\text{C}(\text{COOH})_2 \xrightarrow[\text{-CO}_2]{\Delta} \text{C}_6\text{H}_5-\text{CH}=\text{CH}-\text{COOH}$ <p style="text-align:center;">Benzaldehyde Malonic acid Cinnamic acid</p> <p>(or) equation without condition (or) explanation only</p>	3 2 1/2 1	3						

<p>31 www.Padasalai.Net</p> $\text{CH}_3 - \underset{\text{H}}{\text{N}} - \text{H} + \text{C} = \overset{\text{S}}{\parallel} \text{S} \longrightarrow \text{CH}_3 - \text{NH} - \overset{\text{S}}{\parallel} \text{C} - \text{SH} \xrightarrow{\text{HgCl}_2} \text{CH}_3 - \text{N} = \text{C} = \text{S} + \text{HgS} + 2\text{HCl}$ <p>Methylamine N-methyl dithiocarbamic acid Methyl isothiocyanate (Mustard oil smell)</p> <p>(or)</p> $\text{C}_6\text{H}_5\text{NH}_2 + \text{C} = \overset{\text{S}}{\parallel} \text{S} \xrightarrow{\Delta} \text{C}_6\text{H}_5\text{NH} - \overset{\text{S}}{\parallel} \text{C} - \text{NH} - \text{C}_6\text{H}_5 \xrightarrow[\Delta]{\text{Con HCl}} \text{C}_6\text{H}_5\text{N} = \text{C} = \text{S}$ <p>Aniline S-diphenyl thiourea Phenyl isothiocyanate</p> <p>(or) equation without condition (or) explanation only</p>	<p>www.Trb Tnpsc.com</p> <p>3</p> <p>3</p> <p>2½</p> <p>1</p>	<p>3</p> <p>3</p>
<p>32</p>	<p>Correct explanation (or) correct example (or) -CO-NH- bond only</p>	<p>3</p> <p>1</p> <p>3</p>
<p>33</p>	<p>Mere Attempt</p>	<p>3</p> <p>3</p>

Part-IV

Answer all the Questions

5x5=25

Q.No	Answer	Marks	
34 (a)	i) Any 3 differences ii) Silica acts as a flux (or) Correct Equation only	3 2	5
(OR)			
(b)	i) Any 3 uses ii) Correct definition (or) Correct Structure only	3 2 1	5
35 (a)	Lanthanoid contraction – Explanation Lanthanoid contraction consequences (Any Three)	2 3	5
(OR)			
(b)	i) Double salt – Explanation (or) Double salt – Example Co-ordination Compound – Explanation (or) Co-ordination Compound – Example ii) One example for medicinal importance One example for biological importance	1½ 1 1½ 1 1 1	5

36 (a)	Packing efficiency = $\frac{\text{total volume occupied by spheres in a unit cell}}{\text{volume of the unit cell}}$ Volume of cube = $a \times a \times a = a^3$ (or) Radius of the sphere from figure, $a = 2r$ (or) $r = \frac{a}{2}$ Volume of the sphere with radius = $\frac{4}{3} \pi \left(\frac{a}{2}\right)^3$ (or) = $\frac{\pi a^3}{6}$ Packing efficiency = $\frac{1 \times \frac{\pi a^3}{6}}{a^3} \times 100$ = 52.38%	1	1	1	1
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(OR)

(b)	i) Rate = $k[A]^0$ (or) $-\frac{d[A]}{dt} = k$ (or) $-d[A] = k dt$ $-\int_{[A_0]}^{[A]} d[A] = k \int_0^t dt$ (or) $-([A])_{[A_0]}^{[A]} = k(t)_0^t$ $[A_0] - [A] = kt$ (or) $k = \frac{[A_0] - [A]}{t}$	1	1	1	5
	ii) Correct definition (or)	2			
	Formula	1			

37 (a)	i) <div style="text-align: center;"> </div>	3			5
	(or)				
	Correct Explanation	3			
	(or)				
	$Zn Zn^{2+} Cu^{2+} Cu \quad E^0 = 1.1V$	1			
	ii) Correct definition	2			

<p>(b)</p>	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{OH} \\ \\ \text{CH}_3 \end{array} + \text{HCl} \xrightarrow{\text{anhydrous ZnCl}_2} \begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{Cl} \\ \\ \text{CH}_3 \end{array} + \text{H}_2\text{O}$ <p>2-methylpropan-2-ol 2-chloro-2-methylpropane (immediate appearance of turbidity)</p> $\begin{array}{c} \text{OH} \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_3 \end{array} + \text{HCl} \xrightarrow{\text{anhydrous ZnCl}_2} \begin{array}{c} \text{CH}_3 - \text{CH} - \text{Cl} \\ \\ \text{CH}_3 \end{array} + \text{H}_2\text{O}$ <p>propan-2-ol 2-chloropropane (slow appearance of turbidity)</p> $\text{CH}_3 - \text{CH}_2 - \text{OH} + \text{HCl} \xrightarrow{\text{anhydrous ZnCl}_2} \text{No reaction at room temperature}$ <p>ethanol (Turbidity appears only on heating)</p> <p>(or) Correct equation without mentioning turbidity</p> <p>(or) Correct equation without mentioning Lucas reagent</p>	<p>2</p> <p>2</p> <p>1</p> <p>3</p> <p>3</p>	<p>5</p>													
<p>38 (a)</p>	<p>i)Any one correct equation</p> <p>(or)</p> <p>Correct Explanation</p> <hr/> <p>ii)Correct definition</p> <p>Any one example</p>	<p>2</p> <p>1</p> <p>2</p> <p>1</p>	<p>5</p>													
<p>(OR)</p>																
<p>(b)</p>	$\begin{array}{c} \text{CH}_3 - \text{C} - \text{H} + 4(\text{H}) \\ \\ \text{O} \end{array} \xrightarrow[\text{Con HCl}]{\text{Zn - Hg}} \text{CH}_3 - \text{CH}_3 + \text{H}_2\text{O}$ <p>Acetaldehyde Ethane</p> <p>(A) (B)</p> <table border="1" data-bbox="282 1535 1092 1719"> <thead> <tr> <th>Compound</th> <th>Formula</th> <th rowspan="4" style="text-align: center;">(or)</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>CH₃CHO</td> <td>Acetaldehyde</td> </tr> <tr> <td>B</td> <td>CH₃CH₃</td> <td>Ethane</td> </tr> <tr> <td>E</td> <td>CH₃COOH</td> <td>Acetic acid</td> </tr> </tbody> </table>	Compound	Formula	(or)	Name	A	CH ₃ CHO	Acetaldehyde	B	CH ₃ CH ₃	Ethane	E	CH ₃ COOH	Acetic acid	<p>2</p> <p>3×1</p>	<p>5</p>
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A	CH ₃ CHO		Acetaldehyde													
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