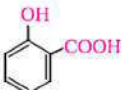
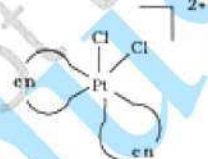


## CBSE Class 12 Chemistry Question Paper Solution 2016

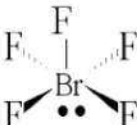
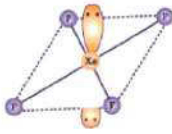
**Chemistry Marking scheme****Delhi - 2016****Set – 56/1/1/D**

Q.No	VALUE POINTS	MARKS
1	$\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CH}_3$ ; secondary halide/ $2^\circ$ carbocation is more stable	$\frac{1}{2}, \frac{1}{2}$
2	$\text{NH}_3$	1
3	Ferromagnetism	1
4	2,4,6-Tribromoaniline / 2,4,6-Tribromobenzenamine	1
5	Like Charged particles cause repulsion/ Brownian motion/ solvation	1
6	(i) Mercury cell (ii) Fuel cell (iii) Lead storage battery (iv) Dry cell	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
7	A- $\text{Na}_2\text{CrO}_4$ B- $\text{Na}_2\text{Cr}_2\text{O}_7$ C- $\text{K}_2\text{Cr}_2\text{O}_7$ Use- strong oxidising agent / as a primary standard in volumetric analysis	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	OR	
7	$8\text{MnO}_4^- + 3\text{S}_2\text{O}_3^{2-} + \text{H}_2\text{O} \longrightarrow 8\text{MnO}_2 + 6\text{SO}_4^{2-} + 2\text{OH}^-$	1
	$\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 3\text{Sn}^{2+} \rightarrow 2\text{Cr}^{3+} + 3\text{Sn}^{4+} + 7\text{H}_2\text{O}$	1
8	(i) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ (ii) pentaquaachloridoChromium(III) chloride monohydrate (or chloride hydrate) (no deduction for not writing hydrate)	1 1
9.	(i) zero order , bimolecular/ unimolecular (ii) $\text{mol L}^{-1} \text{s}^{-1}$	$\frac{1}{2}, \frac{1}{2}$ 1
10.	(i) $\text{CH}_3\text{CH}_2\text{O}^\ominus\text{H} + \text{H}^+ \rightarrow \text{CH}_3\text{CH}_2\text{O}^\ominus\text{H}-\text{H}$ (ii) $\text{CH}_3\text{CH}_2\text{O}^\ominus\text{H} + \text{CH}_3\text{CH}_2\text{O}^\ominus\text{H} \rightarrow \text{CH}_3\text{CH}_2\text{O}^\ominus\text{H}-\text{CH}_2\text{CH}_3 + \text{H}_2\text{O}$ (iii) $\text{CH}_3\text{CH}_2\text{O}^\ominus\text{H}-\text{CH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH}_2\text{O}-\text{CH}_2\text{CH}_3 + \text{H}^+$	$\frac{1}{2}$ 1 $\frac{1}{2}$
11.	(i) In chlorobenzene, each carbon atom is $\text{sp}^2$ hybridised / resonating structures / partial double bond character. (ii) Due to +R effect in chlorobenzene/ difference in hybridization i.e. $\text{sp}^2$ and $\text{sp}^3$ respectively/ -I and +R effect oppose each other while -I effect is the only contributing factor in cyclohexane. (iii) Due to formation of planar carbocation/ Carbon in carbocation formed is $\text{sp}^2$ hybridised.	1 1 1
12.	$2 \times 10^{24}$ atoms weigh = 300g	

	$6.022 \times 10^{23}$ atoms weigh = $(300 \times 6.022 \times 10^{23}) / 2 \times 10^{24}$ = 90.3 g  $d = \frac{z \times M}{a^3 N_A}$ = $4 \times 90.3 / (250 \times 10^{-10})^3 \times N_0$ = $38.4 \text{ g cm}^{-3}$  (or any other correct method)	1  $\frac{1}{2} + \frac{1}{2}$  1						
13	$\log k = \log A - E_a / 2.303RT$ $E_a / 2.303 RT = 1.0 \times 10^4 \text{ K} / T$ $E_a = 1.0 \times 10^4 \times 2.303 \times 8.314$ = 191471.4 J/mol  $t_{1/2} = 0.693 / k$ $k = 0.693 / 200 \text{ min}$ = $0.0034 \text{ min}^{-1}$	$\frac{1}{2}$  1  $\frac{1}{2}$  1						
14.	(i) <table border="1"><thead><tr><th>Adsorption</th><th>Absorption</th></tr><tr><th>Surface phenomena</th><th>Bulk phenomena</th></tr></thead><tbody><tr><td>The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption.</td><td>The substance is uniformly distributed throughout the bulk of the solid essentially a bulk phenomenon. (any one difference)</td></tr></tbody></table> (ii) $\text{AlCl}_3$ , more positive charge/Hardy-Schulze rule  (iii) Sulphur	Adsorption	Absorption	Surface phenomena	Bulk phenomena	The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption.	The substance is uniformly distributed throughout the bulk of the solid essentially a bulk phenomenon. (any one difference)	1  $\frac{1}{2} + \frac{1}{2}$  1
Adsorption	Absorption							
Surface phenomena	Bulk phenomena							
The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption.	The substance is uniformly distributed throughout the bulk of the solid essentially a bulk phenomenon. (any one difference)							
15.	(i) Zone refining (ii) Leaching / Bayer's process (iii) Reducing agent / to form CO which acts as a reducing agent.	1 1 1						
16.	(i) $E_{\text{cell}}^0 = E_{\text{c}}^0 - E_{\text{a}}^0$ = $(-0.44) - (-0.74) \text{ V}$ = 0.30V  $E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.059}{n} \log \frac{[\text{Cr}^{3+}]^2}{[\text{Fe}^{2+}]^3}$  $E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.059}{6} \log \frac{[0.01]^2}{[0.1]^3}$ = $0.30 - (-0.059/6)$ = 0.3098V	$\frac{1}{2}$  $\frac{1}{2}$  1  1						
17.	(i) ability of oxygen to form multiple bond/ $p\pi-d\pi$ bond. (ii) Partially filled d orbitals / due to comparable energies of ns and (n-1) d orbitals (iii) due to relative stabilities of the $f^0$ , $f^7$ and $f^{14}$ occupancies of the 5f orbitals/ Comparable energies of 7s, 6d, 5f orbitals.	1 1 1						

18.	(i) $\text{CH}_3\text{OH}$ , $(\text{CH}_3)_3\text{C-I}$ (ii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (iii) 	1 1 1
19.	(i) $\text{C}_6\text{H}_5\text{NH}_2$ , $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^-$ , $\text{C}_6\text{H}_5\text{I}$ (ii) $\text{CH}_3\text{CN}$ , $\text{CH}_3\text{CH}_2\text{NH}_2$ , $\text{CH}_3\text{CH}_2\text{NC}$	$\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$
20.	a. Catalyst / initiator of free radical b. Hexamethylene diamine and adipic acid / structure / IUPAC name c. Buna-S < polystyrene < Terylene	1 $\frac{1}{2}$ , $\frac{1}{2}$ 1
OR		
20	<p><i>Chain initiation steps</i></p> $\text{C}_6\text{H}_5-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{O}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{C}_6\text{H}_5 \longrightarrow 2\text{C}_6\text{H}_5-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\dot{\text{O}} \longrightarrow 2\dot{\text{C}}_6\text{H}_5$ <p style="text-align: center;">Benzoyl peroxide <span style="margin-left: 150px;">Phenyl radical</span></p> $\dot{\text{C}}_6\text{H}_5 + \text{CH}_2=\text{CH}_2 \longrightarrow \text{C}_6\text{H}_5-\text{CH}_2-\dot{\text{C}}\text{H}_2$ <p><i>Chain propagating step</i></p> $\text{C}_6\text{H}_5-\text{CH}_2-\dot{\text{C}}\text{H}_2 + \text{CH}_2=\text{CH}_2 \longrightarrow \text{C}_6\text{H}_5-\text{CH}_2-\text{CH}_2-\text{CH}_2-\dot{\text{C}}\text{H}_2$ $\downarrow$ $\text{C}_6\text{H}_5-(\text{CH}_2-\text{CH}_2)_n-\text{CH}_2-\dot{\text{C}}\text{H}_2$ <p><i>Chain terminating step</i></p> <p>For termination of the long chain these free radicals can combine in different ways to form polythene. One mode of termination of chain is shown as under:</p> $\text{C}_6\text{H}_5-(\text{CH}_2-\text{CH}_2)_n-\text{CH}_2-\dot{\text{C}}\text{H}_2 + \text{C}_6\text{H}_5-(\text{CH}_2-\text{CH}_2)_m-\dot{\text{C}}\text{H}_2 \longrightarrow \text{C}_6\text{H}_5-(\text{CH}_2-\text{CH}_2)_n-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-(\text{CH}_2-\text{CH}_2)_m-\text{C}_6\text{H}_5$	1 1 1
21.	(i) $\beta$ -D glucose and $\beta$ -D-galactose / glucose and galactose (ii) water soluble, excreted out of the body (iii) In nucleotide, phosphoric acid/phosphate group attached to the nucleoside / structures of both nucleotide and nucleoside / nucleotide = base + sugar + phosphate group, nucleoside = base + sugar.	$\frac{1}{2}$ , $\frac{1}{2}$ 1 1
22.	$d^2sp^3$ , Paramagnetic, low spin 	$1, \frac{1}{2}, \frac{1}{2}$ 1
23.	(i) Aware, concerned or any other correct two values. (ii) Side effects, unknown health problems (iii) Neurologically active drugs/ stress relievers Example- valium, equanil (or any other correct two example)	$\frac{1}{2} + \frac{1}{2}$ 1 1 $\frac{1}{2} + \frac{1}{2}$
24	a) i. Endothermic compound / decomposition of ozone is exothermic in nature and $\Delta G$ is negative / decomposition of ozone is spontaneous. ii. Exists as $[\text{PCl}_4]^+[\text{PCl}_6]^-$ iii. Shows only -1 oxidation state / most electronegative element / absence of d-orbitals	1 1 1



	<p>b)</p> <p>i)</p>  <p>ii)</p> 	1,1
	<u>OR</u>	
24	<p>(i)</p> <p><math>F_2</math> is the stronger oxidising agent than chlorine</p> <p>(a) low enthalpy of dissociation of F-F bond</p> <p>(b) less negative electron gain enthalpy of F</p> <p>(c) high hydration enthalpy of <math>F^-</math> ion</p> <p>ii) low temperature, high pressure and presence of catalyst</p> <p>iii)</p> <p>a) <math>H_3PO_4 &lt; H_3PO_3 &lt; H_3PO_2</math></p> <p>b) <math>BiH_3 &lt; SbH_3 &lt; AsH_3 &lt; PH_3 &lt; NH_3</math></p>	<p><math>\frac{1}{2} \times 4 = 2</math></p>
25.	<p>A - <math>C_6H_5COCH_3</math></p> <p>B - <math>C_6H_5CH_2CH_3</math></p> <p>C - <math>C_6H_5COOH</math></p> <p>D, E - <math>C_6H_5COONa</math>, <math>CHI_3</math></p>	<p>1</p> <p>1</p> <p>1</p> <p>1+1</p>
	<u>OR</u>	
25	<p>a) <math>HCHO + HCHO \xrightarrow{conc. NaOH} HCOONa + CH_3OH</math></p> <p>(or any other example)</p> <p>b) <math>CH_3CH=N-NHCONH_2</math></p> <p>c) Stronger -I effect of fluorine, stronger acid less <math>pK_a</math> / strong electron withdrawing power of fluorine.</p> <p>d) <math>CH_3CH=CHCH_2CHO</math></p> <p>e) Silver mirror formed on adding ammoniacal silver nitrate to propanal and not with propanone (or any other correct test)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
26.	<p>a) <math>\Delta T_f = i \frac{K_f w_b \times 1000}{M_b \times w_a}</math></p> <p><math>\Delta T_f = 3 \times (1.86 \times 1.9/95 \times 50) \times 1000</math></p> <p><math>= 2.23K</math></p> <p><math>T_f - \Delta T_f = 273.15 - 2.23 / 273 - 2.23</math></p> <p><math>T_f = 270.92 K</math> or <math>270.77K</math></p> <p>b)</p> <p>i) 2M glucose ; More Number of particles / less vapour pressure</p> <p>ii) Reverse Osmosis</p>	<p>1</p> <p>1</p> <p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p>
	<u>OR</u>	
26	<p>a)</p>	

$$\Delta T_f = \frac{K_f w_b \times 1000}{M_b \times w_a}$$

1

$$0.383 = (3.83 \times 2.56 / M \times 100) \times 1000$$

1

$$M = 256$$

$$S \times x = 256$$

$$32 \times x = 256$$

$$x = 8$$

1

b)

i) Shrinks

1

ii) swells

1