

Chemistry Marking scheme

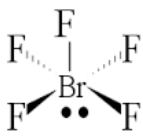
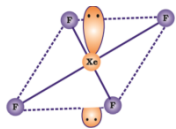
Delhi - 2016

Set – 56/1/2/D

Q.No	VALUE POINTS	MARKS
1	2,4,6-Tribromoaniline / 2,4,6-Tribromobenzenamine	1
2	Like Charged particles cause repulsion/ Brownian motion/ solvation	1
3	CH ₃ CH ₂ CH(Cl)CH ₃ ; secondary halide/ 2 ^o carbocation is more stable	½, ½
4	NH ₃	1
5	Ferromagnetism	1
6	(i) zero order , bimolecular/ unimolecular (ii) mol L ⁻¹ s ⁻¹	½, ½ 1
7	(i) $\text{CH}_3\text{-CH}_2\text{-}\ddot{\text{O}}\text{-H} + \text{H}^+ \rightarrow \text{CH}_3\text{-CH}_2\text{-}\overset{\text{H}}{\underset{+}{\text{O}}}\text{-H}$ (ii) $\text{CH}_3\text{CH}_2\text{-}\ddot{\text{O}}\text{:} + \text{CH}_3\text{-CH}_2\text{-}\overset{\text{H}}{\underset{+}{\text{O}}}\text{-H} \rightarrow \text{CH}_3\text{CH}_2\text{-}\overset{\text{H}}{\underset{+}{\text{O}}}\text{-CH}_2\text{CH}_3 + \text{H}_2\text{O}$ (iii) $\text{CH}_3\text{CH}_2\text{-}\overset{\text{H}}{\underset{+}{\text{O}}}\text{-CH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH}_2\text{-O-CH}_2\text{CH}_3 + \text{H}^+$	½ 1 ½
8	(i) Mercury cell (ii) Fuel cell (iii) Lead storage battery (iv) Dry cell	½ ½ ½ ½
9	A-Na ₂ CrO ₄ B-Na ₂ Cr ₂ O ₇ C-K ₂ Cr ₂ O ₇ Use- strong oxidising agent / as a primary standard in volumetric analysis	½ ½ ½ ½
OR		
9	$8\text{MnO}_4^- + 3\text{S}_2\text{O}_3^{2-} + \text{H}_2\text{O} \rightarrow 8\text{MnO}_2 + 6\text{SO}_4^{2-} + 2\text{OH}^-$	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

10	(i) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ (ii) pentaquachloridoChromium(III) chloride monohydrate (or chloride hydrate) (no deduction for not writing hydrate)	1 1						
11	(i) <table><tr><th>Adsorption</th><th>Absorption</th></tr><tr><th>Surface phenomena</th><th>Bulk phenomena</th></tr><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></table>	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
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	(ii) AlCl_3, more positive charge/Hardy-Schulze rule (iii) Sulphur	$\frac{1}{2} + \frac{1}{2}$ 1
12	(i) Zone refining (ii) Leaching / Bayer's process (iii) Reducing agent / to form CO which acts as a reducing agent.	1 1 1
13	(i) $E_{\text{cell}}^0 = E_{\text{c}}^0 - E_{\text{a}}^0$ $= (-0.44) - (-0.74) \text{ V}$ $= 0.30 \text{ V}$ $E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.059}{n} \log \frac{[\text{Cr}^{3+}]^2}{[\text{Fe}^{2+}]^3}$ $E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.059}{6} \log \frac{[0.01]^2}{[0.1]^3}$ $= 0.30 - (-0.059/6)$ $= 0.3098 \text{ V}$	$\frac{1}{2}$ $\frac{1}{2}$ 1 1
14	(i) In chlorobenzene, each carbon atom is sp^2 hybridised / resonating structures / partial double bond character. (ii) Due to +R effect in chlorobenzene/ difference in hybridization i.e. sp^2 and 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 sp^2 hybridised.	1 1 1
15	2×10^{24} atoms weigh = 300g 6.022×10^{23} atoms weigh = $(300 \times 6.022 \times 10^{23}) / 2 \times 10^{24}$ $= 90.3 \text{ g}$ $d = \frac{z \times M}{a^3 N_A}$ $= \frac{4 \times 90.3}{(250 \times 10^{-10})^3 \times N_0}$ $= 38.4 \text{ g cm}^{-3}$ (or any other correct method)	1 $\frac{1}{2} + \frac{1}{2}$ 1
16	$\log k = \log A - E_a / 2.303 RT$ $E_a / 2.303 RT = 1.0 \times 10^4 \text{ K} / T$ $E_a = 1.0 \times 10^4 \times 2.303 \times 8.314$ $= 191471.4 \text{ J/mol}$ $t_{1/2} = 0.693 / k$ $k = 0.693 / 200 \text{ min}$ $= 0.0034 \text{ min}^{-1}$	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1
17	a. Catalyst / initiator of free radical b. Hexamethylene diamine and adipic acid / structure / IUPAC name	1 $\frac{1}{2}, \frac{1}{2}$

	$T_f = 270.92 \text{ K or } 270.77\text{K}$ b) i) 2M glucose ; More Number of particles / less vapour pressure ii) Reverse Osmosis	1 $\frac{1}{2} + \frac{1}{2}$ 1
	OR	
24	a) $\Delta T_f = \frac{K_f w_b \times 1000}{M_b \times w_a}$ $0.383 = (3.83 \times 2.56 / M \times 100) \times 1000$ $M = 256$ $S \times x = 256$ $32 \times x = 256$ $x = 8$ b) i) Shrinks ii) swells	1 1 1 1 1
25	a) i. Endothermic compound / decomposition of ozone is exothermic in nature and ΔG 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 b) i)  ii) 	1 1 1 1,1
	OR	
25	(i) F_2 is the stronger oxidising agent than chlorine (a) low enthalpy of dissociation of F-F bond (b) less negative electron gain enthalpy of F (c) high hydration enthalpy of F^- ion ii) low temperature, high pressure and presence of catalyst iii) a) $\text{H}_3\text{PO}_4 < \text{H}_3\text{PO}_3 < \text{H}_3\text{PO}_2$ b) $\text{BiH}_3 < \text{SbH}_3 < \text{AsH}_3 < \text{PH}_3 < \text{NH}_3$	$\frac{1}{2} \times 4 = 2$ 1 1 1

26	A -C ₆ H ₅ COCH ₃ B-C ₆ H ₅ CH ₂ CH ₃ C-C ₆ H ₅ COOH D ,E -C ₆ H ₅ COONa , CHI ₃	1 1 1 1+1
	OR	
26	a)HCHO + HCHO $\xrightarrow[\text{conc}]{\text{NaOH}}$ HCOONa +CH ₃ OH (or any other example) b)CH ₃ CH=N-NHCONH ₂ c) Stronger -I effect of fluorine ,stronger acid less pK _a / strong electron withdrawing power of fluorine. d)CH ₃ CH=CHCH ₂ CHO e)Silver mirror formed on adding ammonical silver nitrate to propanal and not with propanone (or any other correct test)	1 1 1 1 1