CBSE Class 12 Chemistry Question Paper Solution 2016
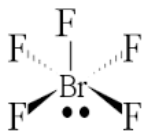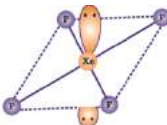
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<u>Chemistry Marking scheme</u>
<u>Delhi - 2016</u>
<u>Set – 56/1/1/D</u>

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Q.No	VALUE POINTS	MARKS
1	$CH_3CH_2CH(Cl)CH_3$; secondary halide/ 2^0 carbocation is more stable	½, ½
2	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	½ ½ ½ ½
7	A-Na_2CrO_4 B-$Na_2Cr_2O_7$ C-$K_2Cr_2O_7$ Use- strong oxidising agent / as a primary standard in volumetric analysis	½ ½ ½ ½
	OR	
7	$8MnO_4^- + 3S_2O_3^{2-} + H_2O \longrightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$ $Cr_2O_7^{2-} + 14 H^+ + 3 Sn^{2+} \rightarrow 2 Cr^{3+} + 3 Sn^{4+} + 7 H_2O$	1 1
8	(i) $[Cr(H_2O)_5Cl]Cl_2.H_2O$ (ii) pentaaquachloridoChromium(III) chloride monohydrate (or chloride hydrate) (no deduction for not writing hydrate)	1 1
9.	(i) zero order , bimolecular/ unimolecular (ii) mol L^{-1} s^{-1}	½, ½ 1
10.		½ 1 ½
11.	(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
12.	2×10^{24} atoms weigh =300g	

	6.022×10^{23} atoms weigh $= (300 \times 6.022 \times 10^{23})/2 \times 10^{24}$ $= 90.3$ g $d = \dfrac{z \times M}{a^3 N_A}$ $\quad = 4 \times 90.3/(250 \times 10^{-10})^3 \times N_0$ $\quad = 38.4 \; gcm^{-3}$ (or any other correct method)	1 ½ + ½ 1
13	$\log k = \log A - E_a/2.303RT$ $E_a / 2.303 \, RT = 1.0 \times 10^4 \, K/ T$ $E_a = 1.0 \times 10^4 \times 2.303 \times 8.314$ $\quad = 191471.4$ J/mol $t_{1/2} = 0.693/ k$ $\quad k = 0.693/200$ min $\quad\quad = 0.0034 \, min^{-1}$	½ 1 ½ 1
14.	(i) 	Adsorption	Absorption
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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) | (ii) $AlCl_3$, more positive charge/Hardy-Schulze rule (iii) Sulphur	 1 ½ + ½ 1
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) $E^0_{cell} = E^0_c - E^0_a$ $\quad = (-0.44) - (-0.74)$ V $\quad = 0.30$ V $E_{cell} = E^0_{cell} - \dfrac{0.059}{n} \log \dfrac{[Cr^{3+}]^2}{[Fe^{2+}]^3}$ $E_{cell} = E^0_{cell} - \dfrac{0.059}{6} \log \dfrac{[0.01]^2}{[0.1]^3}$ $\quad = 0.30 - (-0.059/6)$ $\quad = 0.3098$ V	 ½ ½ 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) CH_3OH , $(CH_3)_3C$-I	1
	(ii) $CH_3CH_2CH_2OH$	1
	(iii) OH COOH (benzene ring with OH and COOH)	1
19.	(i) $C_6H_5NH_2$, $C_6H_5N_2^+Cl^-$, C_6H_5I	½ + ½ + ½
	(ii) CH_3CN, $CH_3CH_2NH_2$, CH_3CH_2NC	½ + ½ + ½
20.	a. Catalyst / initiator of free radical	1
	b. Hexamethylene diamine and adipic acid / structure / IUPAC name	½, ½
	c. Buna-S<polystyrene<Terylene	1
	OR	
20		1
		1
		1
21.	(i) β-D glucose and β-D-galactose / glucose and galactose	½ , ½
	(ii) water soluble ,excreted out of the body	1
	(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.	1
22.	d^2sp^3 , Paramagnetic, low spin	1, ½ , ½
		1
23.	(i)Aware, concerned or any other correct two values.	½ + ½
	(ii) Side effects, unknown health problems	1
	(iii) Neurologically active drugs/ stress relievers	1
	Example- valium, equanil	½ + ½
	(or any other correct two example)	
24	a)	
	i. Endothermic compound / decomposition of ozone is exothermic in nature and △G is negative / decomposition of ozone is spontaneous.	1
	ii. Exists as $[PCl_4]^+[PCl_6]^-$	1
	iii. Shows only -1 oxidation state / most electronegative element/ absence of d-orbitals	1

	b) i) ii)	1,1
	OR	

24	(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) $H_3PO_4 < H_3PO_3 < H_3PO_2$
	 b) $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$
		½ $\times$ 4=2
		
		1
		1
		1

25.	A -$C_6H_5COCH_3$ B-$C_6H_5 CH_2 CH_3$ C-C_6H_5COOH D ,E -C_6H_5COONa , CHI_3	1 1 1 1+1
	OR	
25	a)HCHO + HCHO $\xrightarrow[\text{conc}]{\text{NaOH}}$ HCOONa +CH_3OH (or any other example) b)$CH_3CH=N-NHCONH_2$ c) Stronger -I effect of fluorine ,stronger acid less pk_a / strong electron withdrawing power of fluorine. d)$CH_3CH=CHCH_2 CHO$ 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
26.	a) $\Delta T_f = i \dfrac{K_f w_b \times 1000}{M_b \times w_a}$ $\Delta T_f = 3 \times (1.86 \times 1.9/95 \times 50) \times 1000$ = 2.23K $T_f - \Delta T_{f'} = 273.15 - 2.23$ / 273- 2.23 $T_{f'} = 270.92$ K or 270.77K b) i)2M glucose ; More Number of particles / less vapour pressure ii)Reverse Osmosis	1 1 1 ½ + ½ 1
	OR	
26	 a)	

$\Delta T_f = \dfrac{K_f\, w_b \times 1000}{M_b \times w_a}$		1
$0.383 = (3.83 \times 2.56/M \times 100) \times 1000$ M=256 S $\times$ x = 256 32$\times$ x= 256 x=8 b) i)Shrinks ii)swells		1 1 1 1