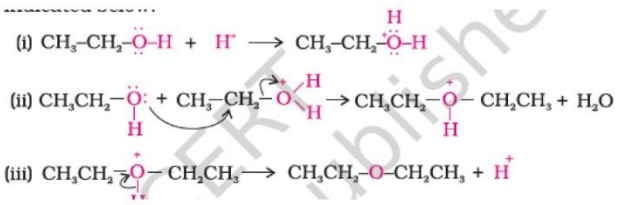
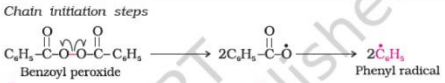
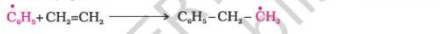
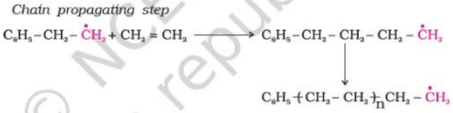
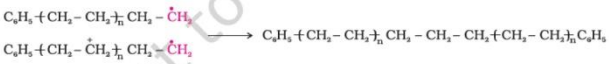
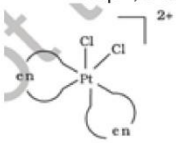
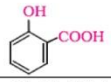
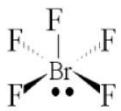
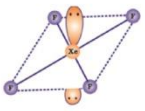
Chemistry Marking scheme
Delhi - 2016
Set – 56/1/2/D

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	$CH_3CH_2CH(Cl)CH_3$; secondary halide/ 2^0 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) $CH_3–CH_2–\ddot{O}–H + H^+ \longrightarrow CH_3–CH_2–\overset{H}{\overset{|}{\ddot{O}}}–H$ (ii) $CH_3CH_2–\ddot{O}(H)– + CH_3–CH_2–\overset{H}{\overset{|}{O}}–H \rightarrow CH_3CH_2–\overset{+}{O}(H)–CH_2CH_3 + H_2O$ (iii) $CH_3CH_2–\overset{+}{O}(H)–CH_2CH_3 \longrightarrow CH_3CH_2–O–CH_2CH_3 + H^+$	½ 1 ½
8	(i) Mercury cell (ii) Fuel cell (iii) Lead storage battery (iv)Dry cell	½ ½ ½ ½
9	A-Na_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	
9	$8MnO_4^- + 3S_2O_3^{2-} + H_2O \longrightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$ $Cr_2O_7^{2-} + 14\ H^+ + 3\ Sn^{2+} \rightarrow 2\ Cr^{3+} + 3\ Sn^{4+} + 7\ H_2O$	1 1

10	(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
11	(i) **Adsorption** / **Surface phenomena**: **The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption.** **Absorption** / **Bulk phenomena**: The substance is uniformly distributed throughout the bulk of the solid essentially a bulk phenomenon. **(any one difference)**	1

	• (ii) $AlCl_3$, more positive charge/Hardy-Schulze rule (iii)Sulphur	½ + ½ 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) $E^0_{cell} = E^0_c - E^0_a$ $=(-0.44)-(-0.74)$ V $=0.30$V $E_{cell} = E^0_{cell} - \frac{0.059}{n} \log \frac{[Cr^{3+}]^2}{[Fe^{2+}]^3}$ $E_{cell} = E^0_{cell} - \frac{0.059}{6} \log \frac{[0.01]^2}{[0.1]^3}$ $= 0.30-(-0.059/6)$ $=0.3098$V	 ½ ½ 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 g $d = \frac{z \times M}{a^3 N_A}$ $= 4 \times 90.3/(250 \times 10^{-10})^3 \times N_0$ $=38.4$ gcm^{-3} (or any other correct method)	1 ½ + ½ 1
16	$\log k = \log A - E_a/2.303RT$ $E_a / 2.303\ RT = 1.0 \times 10^4$ K/ T $E_a = 1.0 \times 10^4 \times 2.303 \times 8.314$ $=191471.4$ J/mol $t_{1/2} = 0.693/k$ $k = 0.693/200$ min $= 0.0034 min^{-1}$	½ 1 ½ 1
17	a. Catalyst / initiator of free radical b. Hexamethylene diamine and adipic acid / structure / IUPAC name	1 ½, ½

	c. Buna-S<polystyrene<Terylene	1
	OR	
17	*Chain initiation steps*  Benzoyl peroxide → Phenyl radical  *Chain propagating step*  *Chain terminating step* 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: 	1 1 1
18	(i) β-D glucose and β-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.	½ , ½ 1 1
19	d^2sp^3 , Paramagnetic, low spin 	1, ½ , ½ 1
20	(i) ability of oxygen to form multiple bond/ pπ-dπ 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
21	(i) CH_3OH , $(CH_3)_3C$-I (ii) $CH_3CH_2CH_2OH$ (iii) 	1 1 1
22	(i) $C_6H_5NH_2$, $C_6H_5N_2^+Cl^-$, C_6H_5I (ii) CH_3CN, $CH_3CH_2NH_2$, CH_3CH_2NC	½ + ½ + ½ ½ + ½ + ½
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)	½ + ½ 1 1 ½ + ½
24	a) $\Delta T_f = i \frac{K_f w_b \times 1000}{M_b \times w_a}$ $\Delta T_f = 3 \times (1.86 \times 1.9/95 \times 50) \times 1000$ $= 2.23K$ $T_f - \Delta T_f = 273.15 - 2.23 / 273 - 2.23$	1 1

	T_f = 270.92 K or 270.77K b) i)2M glucose ; More Number of particles / less vapour pressure ii)Reverse Osmosis	1 ½ + ½ 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 × x = 256 32 × x= 256 x=8 b) i)Shrinks ii)swells	1 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 $[PCl_4]^+[PCl_6]^-$ 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) $H_3PO_4 < H_3PO_3 < H_3PO_2$ b) $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$	½ ×4=2 1 1 1

26	A -$C_6H_5COCH_3$ B-$C_6H_5CH_2CH_3$ C-C_6H_5COOH D ,E -C_6H_5COONa , CHI_3	1 1 1 1+1
	OR	
26	a)$HCHO + HCHO \xrightarrow{conc.\ NaOH} HCOONa + CH_3OH$ (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)$CH_3CH=CHCH_2CHO$ 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