INDIAN SCHOOL AL WADI AL KABIR

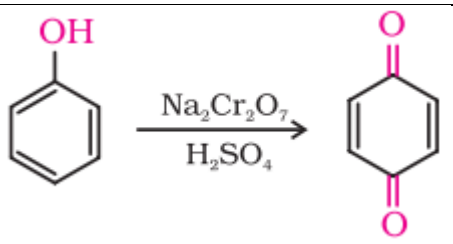
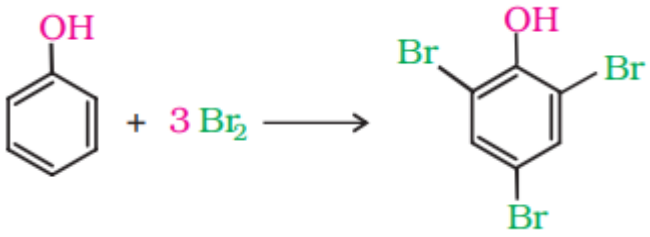
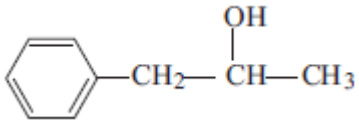
REHEARSAL EXAMINATION-I

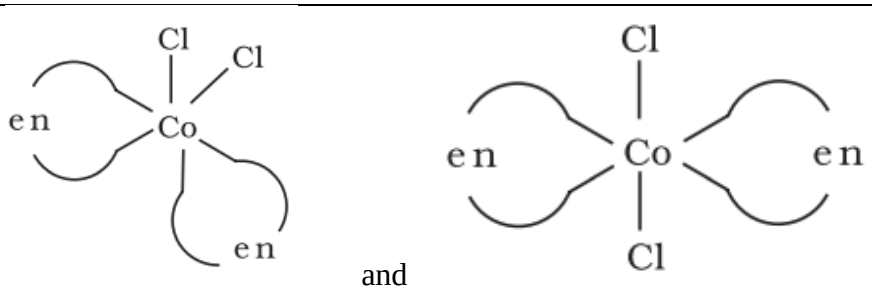
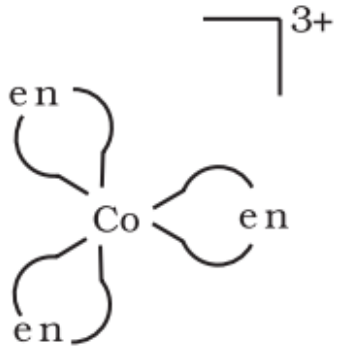
08/12/2022 **CHEMISTRY (043)** **Maximum Marks: 70**

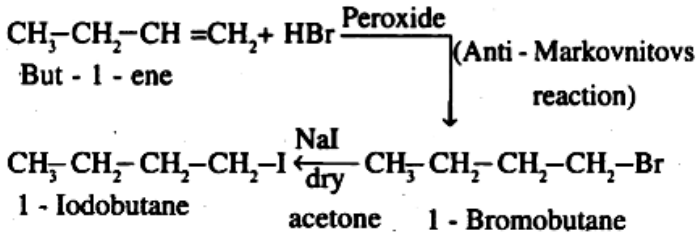
Class: XII **Time: 3 Hours**

SET – I – ANSWER KEY

1.	(A) osmotic pressure	**1**
2.	(C) first order reaction	**1**
3.	(B) Argon	**1**
4.	(C) (iii) and (iv)	**1**
5.	(D) 2	**1**
6.	(D) +3	**1**
7.	(A) i, iv	**1**
8.	(D) Benzyl halides are more reactive than vinyl and aryl halides	**1**
9.	(B) a dehydrohalogenation reaction	**1**
10.	(B) Scandium	**1**
11.	(C) Linkage Isomers	**1**
12.	(C) Polypeptides	**1**
13.	(A) Acetone	**1**
14.	(B) 2-Methylbutan-2-ol	**1**
15.	(C) Assertion is correct statement but reason is wrong statement.	**1**
16.	(D) Assertion is wrong statement but reason is correct statement.	**1**
17.	(A) Assertion and reason both are correct statements and reason is correct explanation for assertion.	**1**
18.	(C) Assertion is correct statement but reason is wrong statement.	**1**
19.	a) Oxygen stabilizes Mn more than F due to multiple bonding. b) This is due to decrease in size and increase in mass from titanium to copper.	**1** **1**
20.	k = 0.693/t k = 0.0277 min^{-1} $t_{80\%}$ = (2.303/0.0277) log 100/20 = 58.11 min	½ ½ ½ ½

21.	a) In phenol, lone pair of electrons on oxygen are delocalized over benzene ring due to resonance but in alcohol lone pair of electrons on oxygen are localized and hence available for protonation. b) In anisole, O-C_6H_5 bond is stronger than O-CH_3 bond as O-C_6H_5 bond has partial double bond character due to resonance.	**1** **1**
22.	a)  b)  **OR** a) i) PCC (or any other suitable reagent) ii) Conc. HNO_3 b)  	**1** **1** **OR** ½ ½ **1**
23.	Due to osmosis. An increase in temperature would accelerate the process of osmosis.	**1** **1**
24.	a) $[Co(NH_3)_4(H_2O)Cl]Cl_2$ b) Coordination number is 6 Oxidation state of chromium is +3 **OR**	**1** ½ ½

	a)  and Cis Trans b) 	½ + ½ **1**
25.	a) 2,3-Dimethylbutane b) Isopropyl chloride < 1-Chloropropane < 1-Chlorobutane	**1** **1**
26.	a) Order of reaction with respect to A is 1 Order of reaction with respect to B is 0 b) Rate law is, Rate = k[A] Overall order of reaction is 1 c) **II**	½ ½ ½ ½ **1**
27.	a) On addition of barium chloride, $[Co(NH_3)_5Cl]SO_4$ forms white precipitate of $BaSO_4$ while $[Co(NH_3)_5(SO_4)]Cl$ does not. b) Diamminechloridonitrito-N-platinum(II) c) i) Strong field ligand: $t_2g^5\ e_g^0$ ii) Weak field ligand: $t_2g^3\ e_g^2$ **OR** a) Type of hybridization – sp^3d^2 b) Magnetic property - Paramagnetic c) Type of complex – Outer orbital complex	**1** **1** ½ ½ **1** **1** **1**

28.	a) Lead storage battery is a secondary battery. Anode: $Pb(s) + SO_4^{2-}(aq) \rightarrow PbSO_4(s) + 2e^-$ Cathode: $PbO_2(s) + SO_4^{2-}(aq) + 4H^+(aq) + 2e^- \rightarrow PbSO_4(s) + 2H_2O(l)$ Overall reaction: $Pb(s)+PbO_2(s)+2H_2SO_4(aq) \rightarrow 2PbSO_4(s) + 2H_2O(l)$ b) Ions are not involved in the overall cell reaction in the mercury cell.	½ ½ ½ ½ **1**
29.	a) i) CH_3Br ii) CH_3CH_2Cl b)  	**1** **1** **1**
30.	a) Carbon-oxygen bond in phenol has a partial double bond character due to resonance. b) It is due to symmetry of para-isomers that fits in crystal lattice better as compared to ortho- and meta-isomers. c) Grignard reagents are highly reactive and react with any source of proton to give hydrocarbons. d) Due to -I effect of halogen, ring is deactivated. ***(Any 3 correct answers)***	**1** **1** **1** **1**
31.	a) E and F b) A and B c) Exothermic reaction. The intermolecular attractive forces between C and D is stronger than those Between C-C and D-D. Therefore, energy is released. **OR** c) $P_{total} = P_1^0 + (P_2^0 - P_1^0) X_2$ $400 = 350 + (500-350) X_2$ $X_2 = 1/3 = 0.33$ $X_1 = 2/3 = 0.67$	**1** **1** **1** **1** ½ ½ ½ ½
32.	a) Phosphodiester linkage. b) The two strands in DNA are complementary to each other because the hydrogen bonds are formed between specific pairs of bases. c) DNA - Adenine (A), guanine (G), cytosine (C) and thymine (T). RNA - Adenine (A), guanine (G), cytosine (C) and uracil (U). **OR**	**1** **1** **1** **1**

c)

DNA	RNA
It has a double stranded α-helix structure	It has a single stranded structure
The sugar present is 2-deoxyribose	Sugar is ribose

(Any 2 points) **2**

33. a) $E_{cell} = (E^{o}_{c} - E^{o}_{a}) - \frac{0.059}{2} \log \frac{[Mg^{2+}]}{[Ag^{+}]^2}$ ½

$E_{cell} = [0.80 - (-2.37)] - \frac{0.059}{2} \log \frac{10^{-2}}{(10^{-4})^2}$ ½

$Ecell = 3.17 - 0.0295 \log 10^{6} = 2.993\ V$ **2**

b) Cells that convert the energy of combustion of fuels (like hydrogen, methane, methanol, etc.) directly into electrical energy are called fuel cells. **1**

c) Due to overpotential/ Overvoltage of O_2 **1**

OR

a) $\Lambda^{c}_{m} = \kappa \times 1000/M$ ½

$= 4.95 \times 10^{-5} \times 1000/ 0.001$ ½

$= 49.5\ S\ cm^2/mol$ ½

$CH_3COOH \rightarrow CH_3COO^- + H^+$

$\Lambda^0 CH_3COOH = \lambda^0 CH_3COO^- + \lambda^0 H^+$

$= 40.9 + 349.6$

$\Lambda^0 CH_3COOH = 390.5\ S\ cm^2/mol$ ½

$\alpha = \frac{\Lambda_m}{\Lambda^0_m}$ ½

$= 49.5/ 390.5$

$= 0.127$ ½

b) $E^{o}_{cell} = E^{o}_{(Ag+/Ag)} - E^{o}_{(Zn2+/Zn)}$

$= 0.80 - (-0.76)$ ½

$= 1.56V$ ½

$\Delta G^{o} = - nFE^{o}_{cell}$ ½

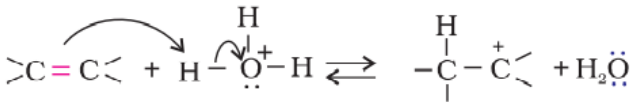
$= - 2 \times 96500 \times 1.56$

$= - 301080\ joules/mol$

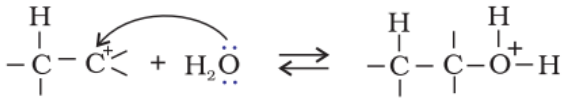
$= -301.080\ kJ/mol$ ½

34. a) Step 1: Protonation of alkene to form carbocation by electrophilic attack of H_3O^+. **1**

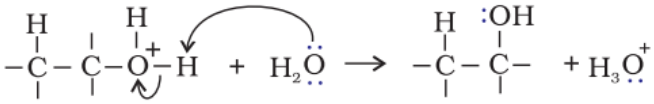
$H_2O + H^+ \rightarrow H_3O^+$



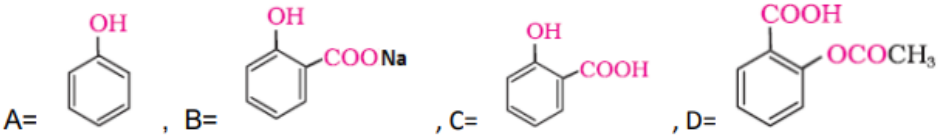
Step 2: Nucleophilic attack of water on carbocation. **1**



Step 3: Deprotonation to form an alcohol. **1**

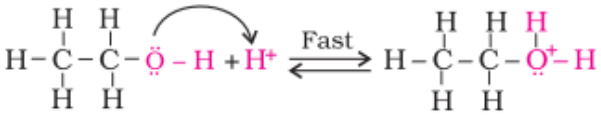


b) **2**

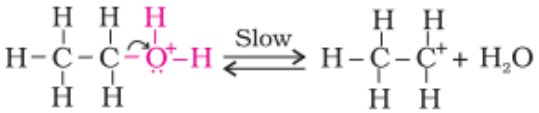


OR

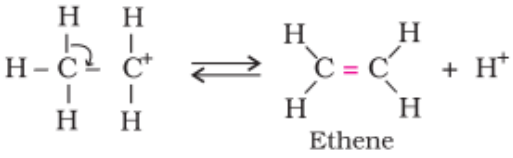
a) *Step 1:* Formation of protonated alcohol. **1**



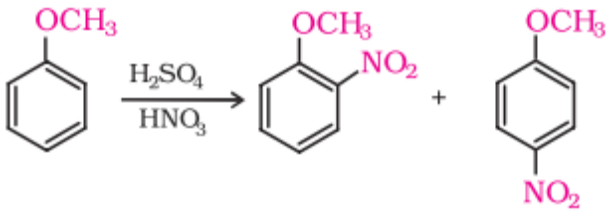
Step 2: Formation of carbocation: It is the slowest step and hence, the rate determining step of the reaction. **1**



Step 3: Formation of ethene by elimination of a proton. **1**



b) i) **1**



ii) $R{-}X + R'{-}\ddot{O}\,Na \longrightarrow R{-}\ddot{O}{-}R' + Na\,X$ (or any specific example) **1**

35.	a) i) Oxygen and fluorine have small size and high electronegativity. Hence, they can oxidize the metal to highest oxidation states.	**1**
	ii) This is because small atoms like B, C, H, N etc. can occupy interstitial sites in the lattice of transition elements.	**1**
	iii) This is because 5f electrons in actinoids have poorer shielding effect than 4f electrons in lanthanoids.	**1**
	b) $5NO_2^- + 2MnO_4^- + 6H^+ \rightarrow 2Mn^{2+} + 5NO_3^- + 3H_2O$	**1**
	c) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$	**1**