

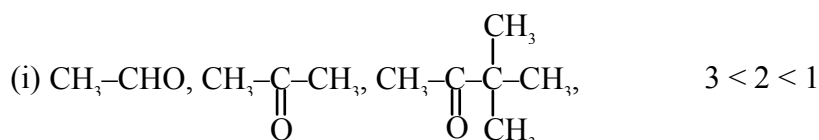
CBSE QUESTIONS PAPER SOLUTION – 2022 (56/3/2)

SUBJECT : CHEMISTRY

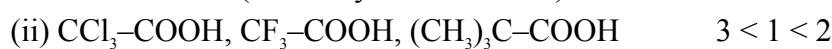
TERM-II

SECTION-A

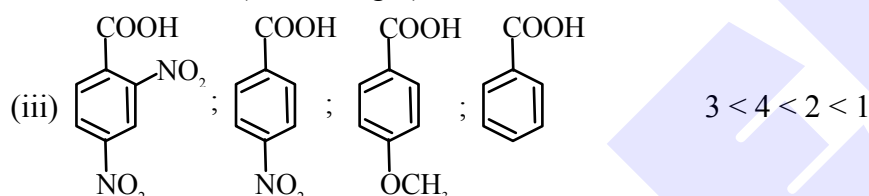
1. Arrange the following compounds in increasing order of their property as indicated in bracket : (Any two)



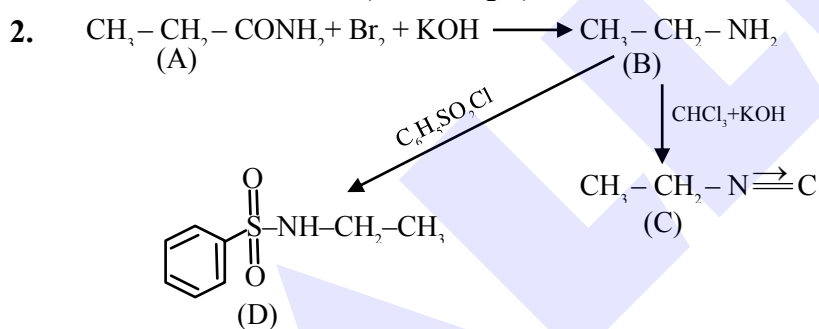
(reactivity towards HCN)



(acid strength)



(acid strength)



3. **Conductivity** : It can be defined as the conductance of a solution of 1m length with area of cross-section equal to 1m^2 or $\text{K} = \frac{1}{\delta} = \frac{1}{\text{R}} \times \left(\frac{\ell}{\text{A}}\right)$ is called conductivity. The conductivity of a solution is the conductance of ions present in a unit volume of the solution. The number of ions (responsible for carrying current) decreases when the solution is diluted. As a result, the conductivity of a solution decreases with dilution.

SECTION-B

4. (i) Cr^{2+} is strongly reducing in nature. It has a d^4 configuration. While acting as a reducing agent, it gets oxidized to Cr^{3+} (electronic configuration, d^3). This d^3 configuration can be written as t_{2g}^3 configuration, which is a more stable configuration.
- (ii) Sc^{3+} is colourless is due to the absence of unpaired e^- as it attains $3d^0$ configuration while Ti^{3+} has $3d^1$ -configuration
- (iii) Due to completely filled d-orbitals in their ground state as well as in oxidized state.

5. (a) (i)

	Absorption		Adsorption
(i)	Gas or liquid get equally distributed at the surface as well as in the inner bulk	(i)	Gas or liquid Get absorb at the surface only
(ii)	It is a bulk phenomenon	(ii)	It is a surface phenomenon

(ii) S.No.	Property	Lyophilic sol	Lyophobic sol
1	Preparation	Can be easily prepared by shaking or warming the substance with solvent.	Can not be prepared easily. Special methods are required.
2	Stability	Are more stable	Are less stable

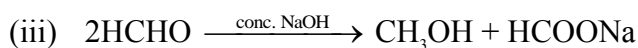
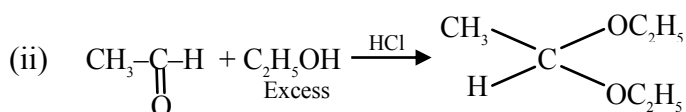
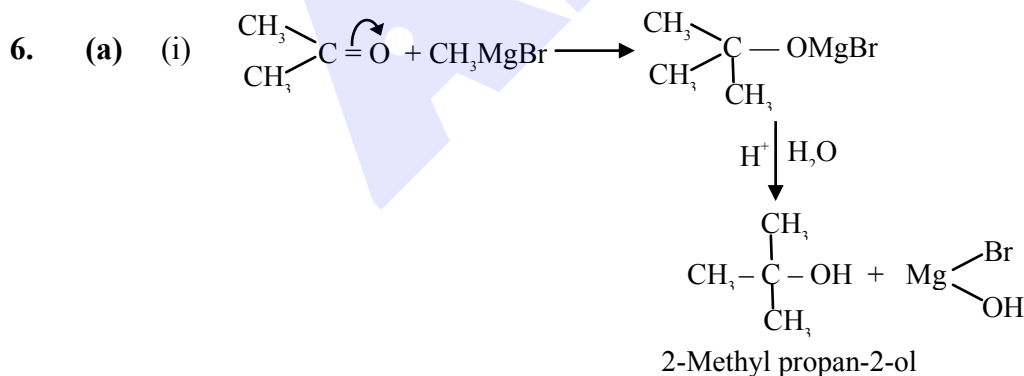
(iii)	Multi Molecular	Macro Molecular
	Formation by aggregation of a large number of atoms or smaller molecules of substance. Ex. → Gold Sol (Au) Sulphur sol (S₈)	In suitable solvents, macromolecules form solutions in which the size of particles may be in colloidal range. Ex. → Starch, Cellulose, Protein etc.

OR

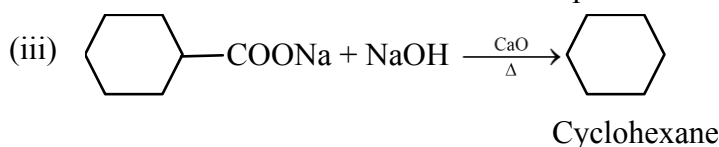
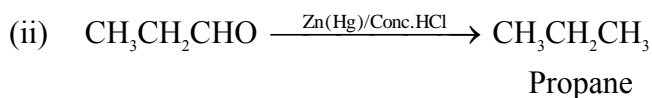
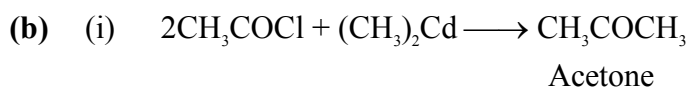
(b) (I)(i) The diffused layer is only loosely attached to the particle surface and moves in the opposite direction under an applied electric field. The potential difference between the fixed layer and the diffused layer of opposite charge is called **Electrokinetic Potential** or **Zeta Potential**.

(ii) The flocculation and settling down of the dispersed phase particles is called **coagulation or precipitation**.

(II) Due to common ion between the solvent and ppt.



OR



7. A regular decrease (contraction) in the atomic and ionic radii of lanthanoids with increasing atomic number is known as lanthanoid contraction.

Alloy containing lanthanoid metals is mischmetal.

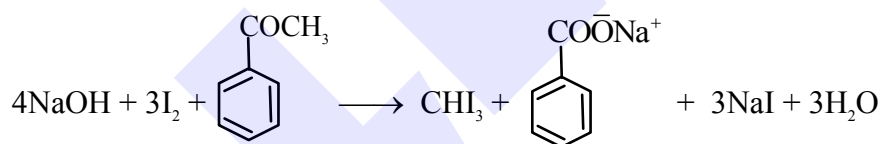
Consequences of lanthanoid contraction

- (i) There is similarity in the properties of second and third transition series.
- (ii) Separation of lanthanoids is possible due to lanthanide contraction.
- (iii) It is due to lanthanide contraction that there is variation in the basic strength of lanthanide hydroxides. (Basic strength decreases from $\text{La}(\text{OH})_3$ to $\text{Lu}(\text{OH})_3$.)

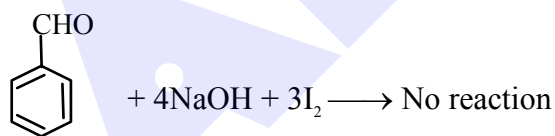
8. (a) (i) $\text{F}-\text{CH}_2-\text{COOH}$ due to electron withdrawing effect of F.

(ii) $\text{CH}_3\text{CHO} < \text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3-\text{COOH}$

(iii) Iodoform test :



Acetophenone will give iodoform test with yellow ppt.



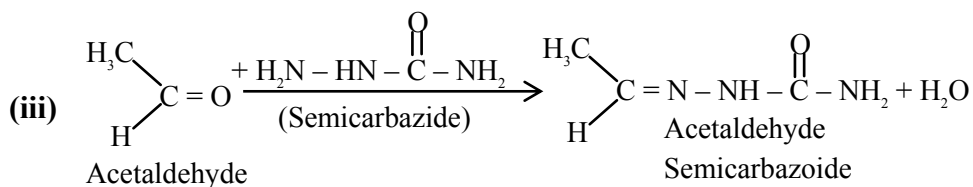
Benzaldehyde give tollen's test but acetophenone will not give tollen's test.

OR

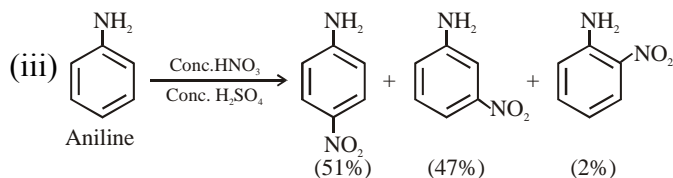
(b) (i) Acetaldehyde, due to less steric hindrance.

(ii) Fehling solution A – aqueous solution of CuSO_4 .

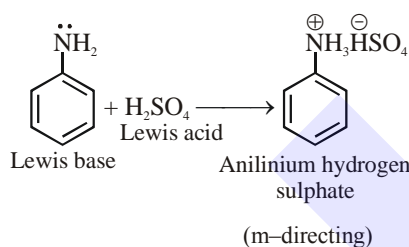
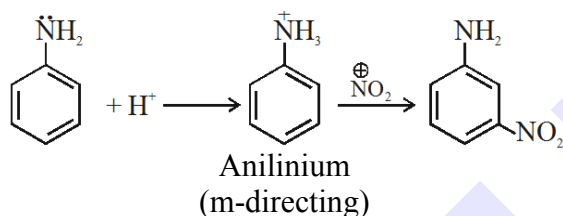
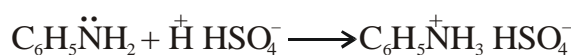
Fehling solution B – Roschelle salt (sodium potassium tartarate + NaOH)



9. (i) Ammonolysis of alkyl halides gives primary amine which behaves as a nucleophile and an subsequent reaction with alkyl halide forms 2°, 3° amines and finally forms quaternary ammonium salt. which is difficult to separate.
- (ii) Aniline does not undergo Friedel-Craft reaction due salt formation with aluminium chloride, the Lewis acid, which is used as catalyst. Due to this, N-atom of aniline acquires positive charge and hence, it acts as strong deactivating group for further reaction.



In strongly acidic medium aniline is protonated to form anilinium $\left(\text{C}_6\text{H}_5\text{NH}_3^+\right)$ ion in which $-\text{NH}_3^+$ group, + acts as meta directing.



10. (a) $[\text{CoF}_6]^{3-}$
Hybridization = sp^3d^2
Magnet character = Paramagnetic
- (b) dibromidobis – ethane-1,2-diamine.cobalt(I)
- (c) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2 \longrightarrow [\text{Co}(\text{NH}_3)_6]^{3+} + 2\text{Cl}^-$
(aq. sol.) \therefore 3 ions produced

11. (a) $\Delta_r G^\circ = -nF E_{\text{cell}}^\circ$
 $= -2 \times 96500 \times 1.05$

$$\Delta_r G^\circ = -202.65 \text{ kJ mol}^{-1}$$

$$\Delta_r G^\circ = -2.303 RT \log K_c$$

$$\log K_c = \frac{-\Delta_r G^\circ}{2.303 RT} = \frac{202.65}{2.303 \times 8.314 \times 298}$$

$$\log K_c = 35.54$$

OR

$$\begin{aligned}
 \text{(b) } E_{\text{cell}} &= E_{\text{cell}}^{\circ} - \frac{0.0591}{2} \log \frac{[\text{Fe}^{+2}]}{[\text{H}^+]^2} \\
 &= 0.44\text{V} - \frac{0.0591}{2} \log \frac{0.001}{(0.01)^2} \\
 &= 0.44\text{V} - \frac{0.0591}{2} \log 10 = 0.41\text{V}
 \end{aligned}$$

SECTION-C

12. (a) With increase in temperature effective no. of collision, increases due to increase in kinetic energy of molecules. Hence, Rate of reactions increase.

$$\text{(b) Rate} = K[\text{A}]^2 [\text{B}]^{1/2}$$

$$\text{Order} = 2 + \frac{1}{2}$$

$$\boxed{\text{Order}(n) = 2.5}$$

(c) Order is determined by show step of the reaction and molecularity determined by elementary step of the reaction.

$$\text{(d) } K = \frac{2.303}{t} \log \frac{[\text{R}]_0}{[\text{R}]}$$

$$t = \frac{2.303}{2 \times 10^{-3}} \log \frac{6}{2}$$

$$t = 549.38 \text{ sec.}$$

OR

$$t_{1/2} = \frac{0.693}{K}$$

$$K = \frac{0.693}{6930}$$

$$K = 10^{-4} \text{ year}^{-1}$$

$$t = \frac{2.303}{10^{-4} \text{ year}^{-1}} \log \frac{100}{75}$$

$$\boxed{t = 496 \text{ years}}$$