

Board of Secondary Education Rajasthan, Ajmer

Practice Question Paper Sr. Secondary Examination-2022

SUBJECT: CHEMISTRY

CLASS-XII

Time: 2 Hours 45 Minutes

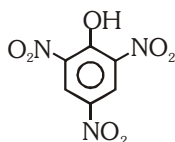
Marks: 56

(SECTION-A)

Multiple Choice Questions

Q.1. In the following questions select the correct answer and write it into the answer sheet:-

- (i) (d) Glass
- (ii) (c) PbS
- (iii) (b) +3
- (iv) (a) Isopropyl chloride
- (v) (a) Halide group



- (vi) (d)
- (vii) (a) Saccharic acid
- (viii) (b) Antiscorvy
- (ix) (a) neutral ion

Q.2. Fill in the blanks -

- (i) Flux
- (ii) Cu
- (iii) Decrease
- (iv) Complex salt

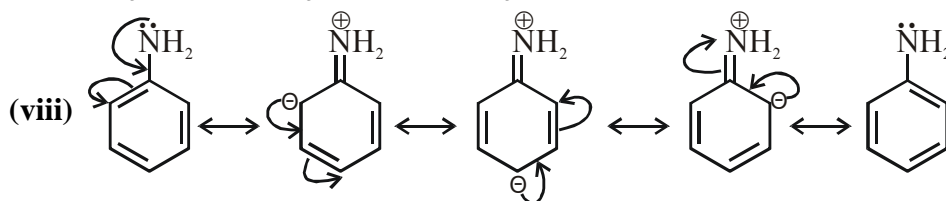
Q.3. Very Short answer type question:-

- (i) 68%
- (ii) Raoult's Law

For a solution of volatile liquids the partial vapour pressure of any component at constant temperature is equal to vapour pressure of pure component multiplied by mole fraction of that component in the solution.

- (iii) Van't Hoff factor for ethanoic acid in benzene is 0.5 because ethanoic acid forms dimer in benzene.
- (iv) Graphite rods act as anode during electrolytic reduction of alumina.
- (v) Poor shielding effect of the 4f electrons.

(vi) Ethoxyethane.



(SECTION-B)

Short Answer type question:-

4. B from hcp

Therefore, $B = 8 \times \frac{1}{8} = 1$

A occupy $1/3^{\text{rd}}$ of tetrahedral voids

Number of A = $2 \times \frac{1}{3} = \frac{2}{3}$

Ratio = A : B = $\frac{2}{3} : 1$

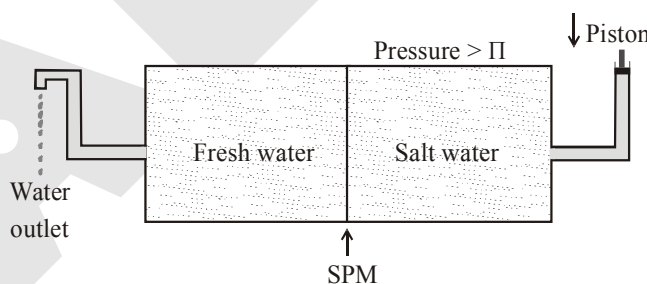
$2 : 3$

formula A_2B_3

5.

Isotropic	Anisotropic
The value of physical properties such as refractive index, are obtain same in all direction represents isotropy nature of solid.	The value of physical properties are obtain different in different direction represent anisotropy nature of solid.

6. The direction of osmosis can be reversed if a pressure larger than the osmotic pressure is applied to the solution side. That is, now the pure solvent flows out of the solution through the semi permeable membrane. This phenomenon is called reverse osmosis and is of great practical utility. Reverse osmosis is used in desalination of sea water.

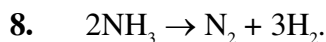


7. (i) Dissolution of gas in the liquid is an exothermic process with increase in temp. solubility decreases.

(ii) $\% \frac{W}{V} = \frac{\text{Mass of solute(g)} \times 100}{\text{Vol. in (ml)}}$

$$5 = \frac{x}{200} \times 100$$

$$x = 10 \text{ g}$$



$$\text{Rate of reaction (r)} = -\frac{1}{2} \frac{d[\text{NH}_3]}{dt} = \frac{d[\text{N}_2]}{dt} = \frac{1}{3} \frac{d[\text{H}_2]}{dt}$$

$$\text{Rate (r)} = \text{K}[\text{NH}_3]^0 = \text{K} \quad (\text{zero order reaction})$$

$$= 1.5 \times 10^{-4}$$

$$\therefore \frac{d[\text{N}_2]}{dt} = r = 1.5 \times 10^{-4} \text{ mol lit}^{-1}\text{s}^{-1}$$

$$\frac{d[\text{H}_2]}{dt} = 3r = 3 \times 1.5 \times 10^{-4} = 4.5 \times 10^{-4} \text{ mol lit}^{-1}\text{sec}^{-1}$$

9. $\text{K} = \frac{2.303}{t} \log \frac{[\text{A}]_0}{[\text{A}]}$

$$\text{K} = \frac{2.303}{t} \log \frac{100}{100-75}$$

$$\text{K} = \frac{2.303}{t} \log \frac{100}{25}$$

$$\text{K} = \frac{2.303}{t} \log 4 \quad \{\log 4 = .602\}$$

$$\text{K} = \frac{2.303}{t} \times 0.602$$

$$\text{K} = \frac{1.386}{t} \text{ or } t = \frac{1.386}{\text{K}} \quad \dots\dots\dots(1)$$

$$t_{1/2} = \frac{0.693}{\text{K}} \quad \dots\dots\dots(2)$$

\therefore From equation (1) and (2)

$$\frac{t}{t_{1/2}} = \frac{1.386}{\text{K}} \times \frac{\text{K}}{0.693}$$

$$\frac{t}{t_{1/2}} = 2$$

$$t = 2 \times t_{1/2}$$

10. (i) Transition metals show paramagnetic behaviour. Paramagnetism arises due to the presence of unpaired electrons with each electron having a magnetic moment associated with its spin angular momentum and orbital angular momentum.

(ii) Transition elements have high effective nuclear charge and a large number of valence electrons. Therefore, they form very strong metallic bonds. As a result, the enthalpy of atomization of transition metals is high.

11. $Z = 27$

$$\Rightarrow [\text{Ar}] 3d^7 4s^2$$

$$\therefore M^{2+} = [\text{Ar}] 3d^7$$



i.e., 3 unpaired electrons

$$\therefore n = 3$$

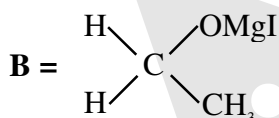
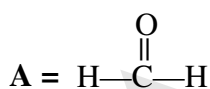
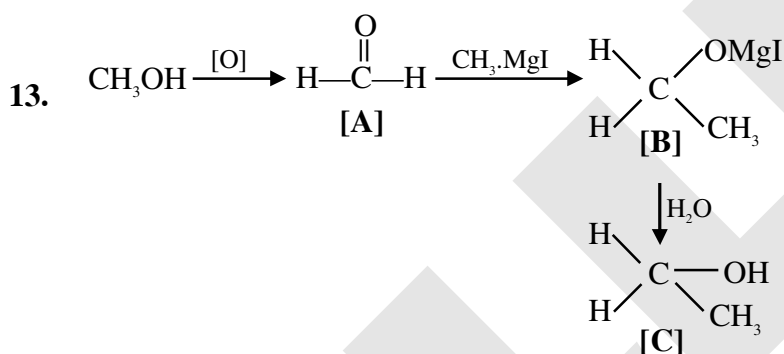
$$\Rightarrow \sqrt{n(n+2)} = \mu$$

$$\Rightarrow \sqrt{3(3+2)} = \mu$$

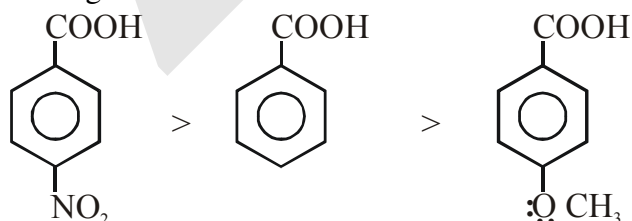
$$\Rightarrow \sqrt{15} = \mu$$

$$\mu \approx 4 \text{ BM}$$

12. In Aldehyde, carbon of carbonyl group attached with one alkyl group and In ketone attached with two alkyl group the e^- donating tendency of alkyl group decrease the positive charge of carbon of carbonyl group therefore possibility of attack of Nucleophile get reduce and as increases size and no. of alkyl group the steric hinderance increased. that also decrease the possibility of Nucleophile attack.



14. Acidic strength order



15. Because phenolate conjugate base is resonance stabilised. The methoxide conjugate base has no such stabilisation and therefore is formed much more reluctantly.

(SECTION-C)

Long Answer type question:-

16. ORDER OF REACTION:-

The sum of powers of concentration of reactants in rate law expression is known as order of reaction.

Zero Order Reactions

Let $R \rightarrow P$ is a zero order reaction

$$\text{rate} = \frac{-d[R]}{dt} = k[R]^0$$

$$\text{rate} = \frac{-d[R]}{dt} = k$$

$$d[R] = -k dt$$

On integrating both sides

$$[R] = -kt + I \quad \dots (i)$$

$$t = 0, R = [R]_0$$

$$[R]_0 = I$$

Substituting value of I in eq. (i)

$$[R] = -kt + [R]_0 \quad \text{or} \quad k = \frac{[R]_0 - [R]}{t}$$

OR

Rate of reaction is defined as the change in concentration or pressure of reactant or product per unit time. It is always a positive quantity.

$$\text{Rate of reaction} = \frac{\text{Change in concentration of reactant or product}}{\text{Time taken in change}} = \boxed{r = \pm \frac{\Delta C}{\Delta t}}$$

Arrhenius equation:-

$$\boxed{k = Ae^{-E_a/RT}} \quad \dots(1)$$

On taking logarithm for equation (1) on both sides.

$$\ln k = \ln A + \ln e^{-E_a/RT}$$

$$2.303 \log_{10} k = 2.303 \log_{10} A - \frac{E_a}{RT}$$

$$\boxed{\log_{10} k = \log_{10} A - \frac{E_a}{2.303RT}} \quad \dots(2)$$

- E_a of reaction can be determined by measuring rate constant at two different temperatures

At temperature T_1 :

$$\log_{10} k_1 = \log_{10} A - \frac{E_a}{2.303RT_1} \quad \dots(3)$$

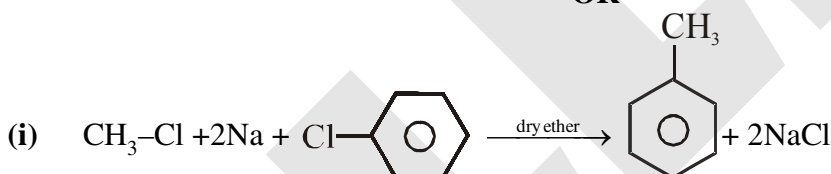
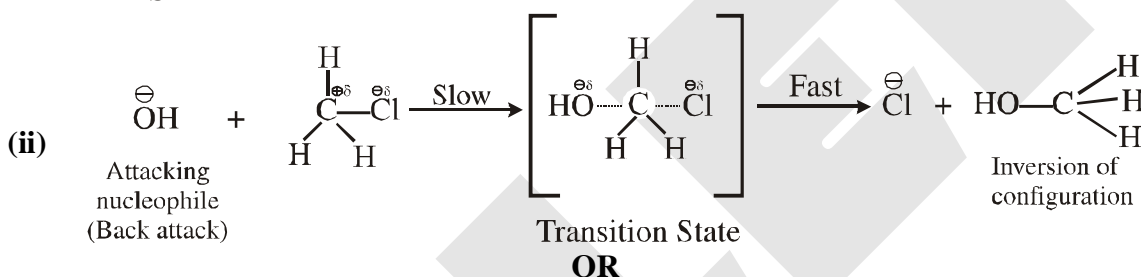
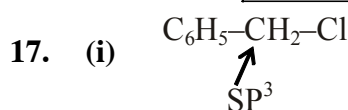
At temperature T_2 :

$$\log_{10} k_2 = \log_{10} A - \frac{E_a}{2.303RT_2} \quad \dots(4)$$

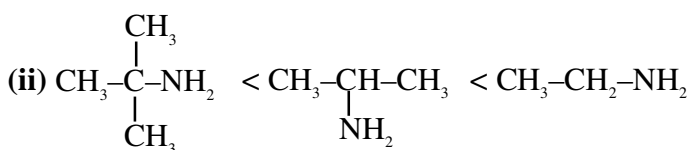
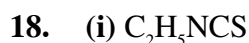
Equation (4) – Equation (3) gives -

$$\log k_2 - \log k_1 = \frac{E_a}{2.303R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$\boxed{\log_{10} \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left(\frac{T_2 - T_1}{T_1 T_2} \right)}$$

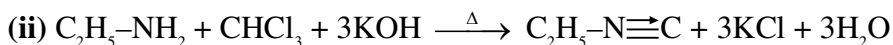
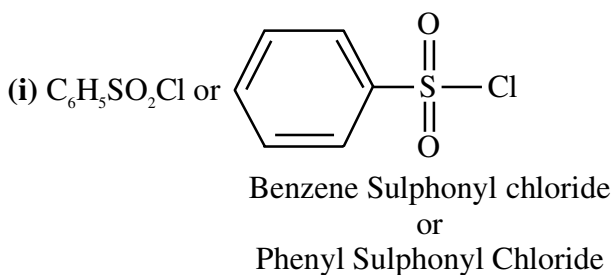


(ii) In the presence of water, KOH dissociates completely into OH^- ions which being a strong nucleophile brings about substitution on alkyl halides and produce alcohols from alkyl halides. Further, in the aqueous solution, OH^- ions are highly solvated (hydrated). This solvation reduces the basic character of OH^- ions which therefore, fails to abstract a H-atom from the β -carbon of the alkyl chloride to form an alkene. In alcoholic medium, solution also contains $\text{C}_2\text{H}_5\text{O}^-$, ethoxide ions in addition to OH^- ions. Being a stronger base than OH^- , they abstract H^+ ions from β -C-atom giving rise to an alkene as a major product (dehydrohalogenation).



(iii) Butan-1-ol are more polar than amine and forms stronger intermolecular hydrogen bonds with water molecules than amine.

OR



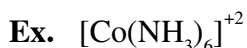
(iii) It is because in aniline or other arylamines, the $-NH_2$ group is attached directly to the benzene ring.

(SECTION-D)

Essayistic question:-

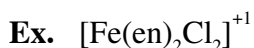
19. (i) Homoleptic complexes :

Complex in which all the ligands are identical is called homoleptic complex.

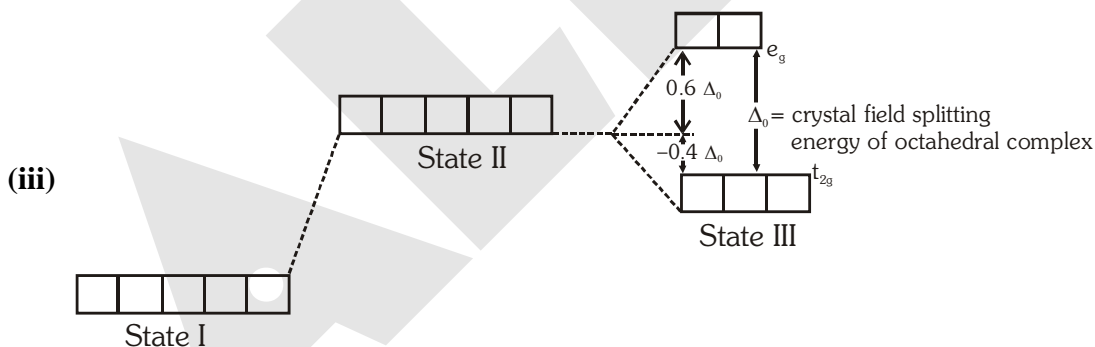


Heteroleptic complexes :

Complex in which all the ligands are not identical is known as heteroleptic complex.



(ii) due to d-d transition

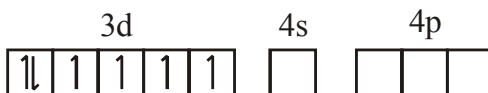


OR

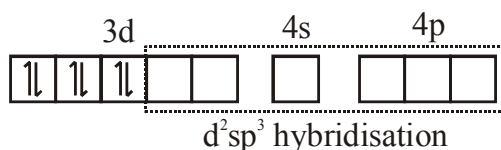
(i) Ionisation Isomerism:

Compounds having same molecular formula but give different type of ions in their aqueous solution are known as ionisation isomer.

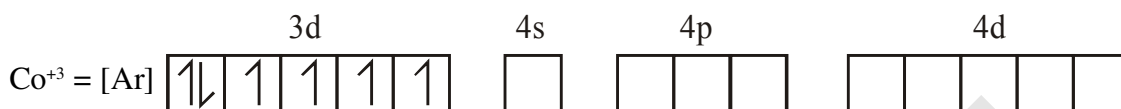
(ii) Complex ion $[Co(NH_3)_6]^{3+}$ posses d^2sp^3 hybridisation, because Co^{+3} ion posses electronic configuration $3d^6, 4s^0$



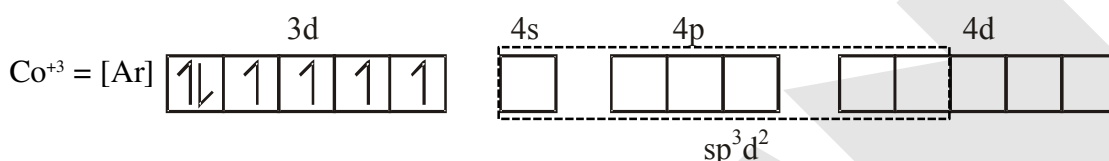
NH_3 is strong ligand. Thus, unpaired electron present in d-orbitals become paired.



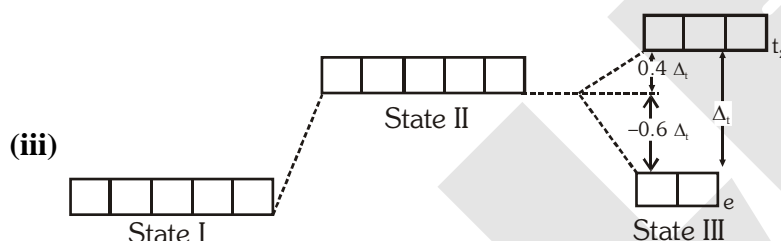
Complex ion $(\text{CoF}_6)^{-3}$ possesses $sp^3 d^2$ hybridisation, because Co^{+3} ion possesses electronic configuration.



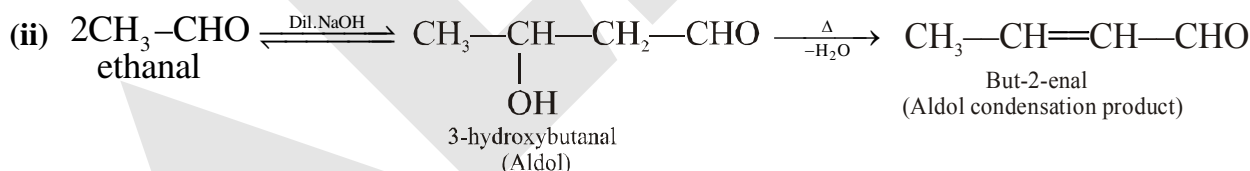
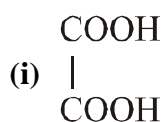
F^- is weak ligand so it cannot pair electrons of 3d orbitals in Co^{+3}



In $[\text{Co}(\text{NH}_3)_6]^{3+}$ all electrons are paired so it is diamagnetic whereas in $(\text{CoF}_6)^{-3}$ presence of unpaired electrons it is paramagnetic.



20.



OR

