CHEMISTRY (052) E

Question Paper-IV

Total Marks : 100 **Time : 3 Hours**

Atomic weights : Na = 23, Mg = 24, Cl = 35.5 gm/mole

Q. 1. (A) Answer the following questions in short **[5]**

(1) Why absolute value of free energy G^0 cannot be determined ?

(2) Give conjugate base of HPO_4^{2-} and NH_3.

(3) Give importance of $E = mc^2$ equation.

(4) How are double chain structures in silicate compounds formed ?

(5) What does symbol $A_{(1-x)}$ / $\square_A$ indicate ?

(B) Solve any two examples. **[6]**

(1) Calculate free energy change and equilibrium constant of following cell. if standard potential of the cell is 0.78 volt at 25^0C.

$Fe_{(s)}$ / Fe^{2+}(1M) // Cu^{2+} (1M) / $Cu_{(s)}$

$E^0_{Fe/Fe^{+2}} = 0.45V$; $E^0_{Cu/Cu^{+2}} = 0.34V$

(2) Calculate pH of 0.25 M CH_3COONa solution. Ka of CH_3COOH is 1.75×10^{-5} at 25^0C.

(3) 0.1 mole solid $Ca(NO_3)_2$ and 0.001 mole solid $Ba(NO_3)_2$ are added in 9.92×10^{-8} M H_2SO_4 solution such that its volume does not change. Which salt $BaSO_4$ or $CaSO_4$ will precipitate ?

Ksp of $BaSO_4 = 9.9 \times 10^{-11}$ and Ksp of $CaSO_4 = 2.4 \times 10^{-5}$

(C) Explain the following questions. (Any three) **[9]**

(1) State first law of thermodynamics. Explain its relation with work.

(2) Explain (i) Hydration of NaCl

(ii) Hydrolysis of $CuSO_4$ in water

(3) Explain (i) Ultra marines.

(ii) Importance of first law of thermodynamics.

(4) Explain (i) Amorphous solids

(ii) Crystal structure of ZnS (figs. not required)

Q. 2. (A) Answer the following questions in short. **[5]**

(1) What is called one faraday ?

(2) What is known as electrolytic cell ?

(3) Define : specific rate constant of reaction.

(4) What is called nodal plane ? Which type of molecular orbitals possess nodal plane ?

(5) Why SF_6 is stable through it is formed from excited state ?

(B) Solve any two examples. **[6]**

(1) Fused $MgCl_2$ and NaCl are connected in series and same current is passed through them. During this period, 142 gm. of Cl_2 gas is evolved. How much Mg and Na would be produced during this period ?

(2) In a first order reaction, the concentration of reactant decreases from 0.8 M to 0.6 M in 2700 seconds. Calculate half–life of the reaction.

(3) Calculate wavelength of particle weighing 500 milligram and moving with a velocity of 3600 km/second ($h = 6.626 \times 10^{-27}$ erg.)

(C) Explain any three of following. **[9]**

(1) Explain : "Fuel cell".

(2) Derive integrated rate law equation for first order reaction.

(3) Explain (i) Energy barrier

(ii) Difference between BMO and ABMO

(4) Give molecular orbital diagram of O_2 molecule. Calculate its bond order and predict its magnetic property.

Q. 3. (A) Answer the following objectives. **[5]**

(1) Why the temperature for the bromination of benzene is maintained higher ?

(2) Give structural formula of glycerol and DDT.

(3) Give the equation of reaction when ethanol is reacted with PI_3.

(4) What is half–life of francium ? Why does it not occure free in nature ?

(5) Which of the following reaction is possible ? Why ?

(i) $Cl_2 + 2KF \rightarrow 2KCl + F_2$

(ii) $F_2 + 2KCl \rightarrow 2KF + Cl_2$

(B) Give equations of following conversions (any three). Mention name, structures of organic compounds and necessary conditions. (only in two steps) **[6]**

(1) Benzene into TNT.

(2) Toluene into Benzoyl chloride

(3) Di ethyl ether into n–butane.

(4) Chlorobenzene into sodium phenoxide

(C) Explain any three of following. **[9]**

(1) Explain (1) Ozonolysis of benzene and its importance

(2) Toluene has one isoner while xylene has three isomers.

(2) Explain (1) B–elimination reaction

(2) Classification alkyl halides

(3) Explain (i) Crystal structures of alkali metal elements.

(ii) Density of alkali metals.

(4) Explain : Preparation of halogen acids.

Q. 4. (A) Answer the following objectives **[5]**

(1) Give structural formula of diethyl ketone and acetone cyanohydrine.

(2) What is called formaline ? Give its use.

(3) Give equation of bromination of aniline.

(4) What are called optical brightners ?

(5) Give two different names of iso cyanide compounds.

(B) Give equations of any three conversions. Mention names, structures of organic compounds. Also state necessary reaction conditions. (only in two steps) **[6]**

(1) Acetophenone into Ethyl benzoate

(2) Acetic acid into ethene.

(3) Nitro benzene into acetanilide

(4) Benzene diazonium chloride into phenyl acetate.

(C) Explain the following questions (any three) **[9]**

(1) Explain (i) Condensation of ethanal

(ii) Wolf–kishner reduction

(2) Explain preparation of amide. Give its two different chemical properties with equations.

(3) Explain (i) Degree of polymerisation

(ii) preparation of polystyrene and its uses.

(4) Explain (i) Hormones and its importance

(ii) CNS and CND drugs.

Q. 5. (A) Answer the following objectives. **[5]**

(1) Give two characteristics of black arsenic.

(2) Give the compound of manganese in highest oxidation state. What is its characteristic ?

(3) Give IUPAC name.

(i) K_3 $[Co(OX)_2$ $(CN)_2]$

(ii) $[Mn(en)_2$ $Br_2]$ NO_3

(4) Give the molecular formula of calcium phosphide and stibine

(5) Give electron configuration of Bi (Z = 83) Br (z = 35) elements.

(B) Answer the following questions. **[6]**

(1) Explain allotropes of phosphorous

(2) Explain properties of interstitial compounds.

(3) Give only importance of chlorophyl and hamoglobin

(C) Explain the following questions. (any three) **[9]**

(1) Explai : bi dentate and hexadentate ligands with illustrations.

(2) Explain coloured ions of transition elements.

(3) Explain Wenner's theory.

(4) Explain nature of bonding of V–A group elements.

*_*_*

Marking Scheme

Q. 1. (A) Answer the following objectives **(5)**

(1) According to equation G = H–TS, the value of G depends on enthalpy and absolute value of enthalpy cannot be determine. ∴ G cannot be determine

(2) Conjugate base : $HPO_4^{2-} \rightarrow H_2PO_4^{3-}$

$NH_3 \rightarrow NH_2^-$

(3) Importance of $E = mc^2$ equation.

(i) mass is itself is one form of energy

(ii) Thus, if mass is converted into heat energy, extremely large amount of heat can be produced

(4) When half the Si atoms in chain silicates shares with more O–atoms, then bent or double chain silicates are formed

(5) This symbol indicates that atom A occupies (1–x)th part of its normal lattice site and remaining site being vacant

(B) Solve any two examples (Each of 3 marks) **(6)**

(1) Here, n = 2 mole and ΔE^0 = 0.78 V

∴ $\Delta G^0 = -nF\Delta E^0$ (total mark 1 1/2)

$= -2 \times 96500 \times 0.78$ volt. quolomb

$= -88140$ joules

But 4.183 j → 1 cal

– 88140 j → (?)

∴ $\Delta G^0 = -21071$ cal

Now $\Delta G^0 = -2.303\ RT \log Kc$

$-21.071 = -2.303 \times 1.987 \times 10^{-3} \times 298 \times \log Kc$

$$\therefore Kc = \frac{21.70}{2.303 \times 1.987 \times 10^{-3} \times 298}$$

$$= \frac{21.70}{1363.7 \times 10^{-3}}$$

$= 15.4513$

∴ Kc = Anti (15.4513)

$Kc = 2.8 \times 10^{15}$

(2) Here, total volume V = 1 litre = 1000 ml

$\therefore$ Molar solubility of $Ca(NO_3)_2 = 0.1 \times \frac{1000}{V_{ml}} = 0.1 \times \frac{1000}{1000}$

Similarly, molarity of $Ba(NO_3)_2 = \frac{0.001 \times 1000}{1000} = 0.0001$ M

Now,

$Ca(NO_3)_{2(aq)} \rightarrow Ca^{2+}_{(aq)} + 2\ NO_3^-{}_{(aq)}$

0.1M 0.1 M 0.2 M

$Ba(NO_3)_{2(aq)} \rightarrow Ba^{2+}_{(aq)} + 2NO_3^-{}_{(aq)}$

0.001 M 0.001 M 0.002 M

$H_2SO_{4(aq)} \rightarrow 2H^+_{(aq)} + SO_4^{2-}{}_{(aq)}$

9.92×10^{-8} M 9.92×10^{-8} M

Now : IP of $CaSO_4$:

$CaSO_{4(s)} \rightleftharpoons Ca^{2+}_{(aq)} + SO_4^{-2}{}_{(aq)}$

$Ip = [Ca^{2+}]\ [SO_4^{2-}]$

$= (0.1)\ (9.92 \times 10^{-8})$

$IP = 9.92 \times 10^{-9}$

But $Ksp = 2.4 \times 10^{-5}$ $\therefore$ IP < Ksp

$\therefore$ $CaSO_4$ will not precipitate

Similarly, IP of $BaSO_4$:

$BaSO_{4(s)} \rightleftharpoons Ba^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)}$

$Ip = [Ba^{2+}]\ [SP_4^{2-}] = (0.001) \times (9.92 \times 10^{-8}) = 9.92\ 10^{-11}$

$\therefore$ Ip > Ksp $\therefore$ $BaSO_4$ will precipitate

(2) CH_3COONa is a salt of NaOH and CH_3COOH Thus, it undergoes hydrolysis

$CH_3COONa_{(aq)} \rightarrow CH_3COO^-_{(aq)} + Na^+_{(aq)}$

$CH_3COO^- + H_2O_{(l)} \rightleftharpoons CH_3COOH_{(aq)} + OH^-_{(aq)}$

$\therefore \frac{Kw}{Ka} = \frac{[OH]^2}{Co}$ $\therefore [OH^-] = \sqrt{\frac{Kw \cdot Co}{Ka}} = \sqrt{\frac{1 \times 10^{-14} \times 0.25}{1.75 \times 10^{-5}}}$

$\therefore$ $[OH^-] = 1.2 \times 10^{-5}$ M

$\therefore$ pOH = $-\log [OH^-] = -\log [1.2 \times 10^5] = -[5 - 0.0969]$

pOH = 4.9031 c $\quad\quad$ $\therefore$ pH + pOH = 14.00

$\therefore$ pH = 14 – 4.9031 = 9.0969

Q. 1. (C) Answer any three (Each of 3 marks) **(9)**

(1) First law :

(i) Energy is neither created nor destroyed

(ii) Total energy in the world is constant

Work : If a force acts on a body and the point on which the force acts is displaced in any direction, we say that the work is done.

There are two types of work in chemistry

(i) Electrical work and (ii) Mechanical work

→ Electrical work is importance in reactions involving ions. While mechanical work is important in reactions involving gase.

→ In gaseous process, the volume of the system changes under constant external pressure Thus, if volume increases, work is done by the system and if volume decreases, work is done on the system.

$\therefore$ work done $W = P(V_2 - V_1) = P\Delta V$

Now : If only P.V type work is done, then, at constant pressure q = q(v) and $W = -P\Delta V$. $\therefore$ According to $\Delta E = q + w$, $\Delta E = q(v) - P.\Delta V$. But if volume does not change then $P\Delta V = 0$. $\therefore$ $\boxed{\Delta E = qv}$

This indicates that "internal energy change of reaction at constant volume is equal to the heat lost or gain by the system.

(2) Hydration of NaCl

(1) → When a salt dissolves in water, some definite no. of water molecules attaches to the ions of salt.This is known as hydration. e.g. NaCl in water.

$$NaCl_{(s)} \xrightarrow{12H_2O_{(l)}} [Na(H_2O)_6]^+_{(aq)} + [Cl(H_2O)_6]^-_{(aq)}$$

This, Na^+ is Lewis acid and H_2O is Lewis base.

Similarly Cl^- is Lewis base and H_2O is Lewis acid.

(2) **Hydrolysis of $CuSO_4$:** $CuSO_4$ is a salt of base $Cu(OH)_2$ and acid H_2SO_4. It hydrolysis as follows :

$$H_2O_{(l)} \rightleftharpoons H^+_{(aq)} + OH^-_{(aq)}$$

$$CuSO_{4(aq)} \rightarrow Cu^{2+}_{(aq)} + SO_4^{2-}$$

$$Cu^{2+}_{(aq)} + 2H_2O \rightleftharpoons Cu(OH)_2 + 2H_3O^+$$

Explanation : According to text book.

(3) Explain :

(1) Ultramarines

They are known as for their attractive colours

Blue $\rightarrow S_2^{2-}$, Green : S_2^{2-}, S_3^{2-} and Red : S_2^{2-}, S_3^{2-} and S_4^{2-} ions.

(2) Importance of first law of thermodynamics.

(i) Bond energy (ii) Heat of formation of compounds (iii) heat of combustion (iv) Enthaly charge and internal energy changes can be determined.

(4) Explain : (1) Amorphorus solids :

→ Solids which do not have ordered arrangement or definite pattern of symmetry of their constituent particles like atoms, ions or molecules are called amorphous solids.

Explain : acc. to text book page no.

(2) Crystal structure of Zns :

There are two forms of Zns. (i) Zinc bend (ii) Wrutzite.

→ As C–atoms are arranged in tetrahedral shape, Zn^{2+} and S^{2-} ions are also arranged in tetrahedral shape.

→ In Wurtzite, Zn^{+2} ions ... hexagonal str.

Zinc blene, S^{2-} ions ... Face centered cubic str.

→ In Zns, Zn shares its two Valence $\bar{e}$s and s shares its six Valence $\bar{e}$s making total 8 es. for four covalent bond.

∴ Each ions has co–ordination number → 4

Q. 2. (A) (1) The quantity of electricity carried by 1 mole electrons is called one Faraday. 1 F = 96500 C = 6.023×10^{23} electrons

(2) The device in which redox reaction is carried out by passing current through fused or aqueous solutions of electrolytes is called electrolytic cell.

(3) When concentration of each of the reactant in a reaction is 1M i.e. unity, then rate of reaction becomes equal to the rate constant. Such rate constant is called specific rate constant.

(4) The surface or plane having zero probability of electron is called nodal plane.

π and π^* molecular orbital possess nodal planes.

(5) Because energy released during formation of more no. of bonds in SF_6 is greater than energy absorbed in unpairing of electrons.

(B) Solve any two examples (Each of three marks) **(6)**

(1) Molecular weight of Cl_2 = 71 gm/mole

$\therefore$ mole of $Cl_2 = \frac{142}{71} = 2.0$

Anode : $2Cl^-_{(l)} \rightarrow Cl_{2(g)} + 2e^-$ | 1 mole cb $\rightarrow$ 2F
1 mole 2F | 2 mole $\rightarrow$?

$\therefore$ Faraday = 4.0 = 4 × 96500 coulombs

Now Cathode : $Mg^{2+}_{(l)} + 2e^- \rightarrow Mg_{(s)}$
2F 1 mole

2 F $\rightarrow$ 1 mole Mg

4 F $\rightarrow$? $\therefore$ moles of Mg = 2.0 $\therefore$ wt. of Mg = 2 × 24 = 48 gms

Similarly : Cathode : $Na^+_{(l)} + e^- \rightarrow Na_{(s)}$
1 mole 1 mole
(1F)

Thus, 1F $\rightarrow$ 1 mole Na

4F $\rightarrow$ (?) $\therefore$ moles of Na = 4 $\therefore$ weight of Na = 4 × 23 = 92 gm.

(2) $K = \frac{2.303}{t} \times \log \frac{C}{C_o}$

$= \frac{2.303}{2700} \times \log \frac{0.8}{.6}$

$= \frac{2.303}{2700} \times (9.9031 - \bar{1}.778)$

$= \frac{2.303}{2700} \times 0.1253$

$K = 383.4 \text{ second}^{-1}$

Now : $t_{½} = \frac{0.693}{K} = \frac{0.693}{3834}$

$t_{½}$ = 6504 seconds

(3) Velocity V = 3600 km/second = 3600×10^5 cm/second

$$\lambda = \frac{h}{mv} = \frac{6.626\times10^{-27}}{500\times10^{-3}\times3600\times10^{5}} = \frac{6.626\times10^{-27}}{1800000\times10^{2}} = \frac{6.626\times10^{-27}}{1.8\times10^{8}}$$

$\lambda = 3.68 \times 10^{-5}$ cm $= 3.68 \times 10^{-27}$ A^0

→ Such extremely small λ cannot be determined by experiment.

∴ wave nature concept cannot be applied to such particle.

(C) Answer any three : (Each of 3 marks) **(9)**

(1) Fuel cell : fig. and construction of cell

Equations at electrodes

→ importance of the cell

(2) Integrated rate law :

$$N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)} \quad \therefore -\frac{d[N_2O_5]}{dt} = K.[N_2O_5]$$

$\therefore$ But $[N_2O_5] = C$ $\therefore -\frac{dc}{dt} = K.C$ $\therefore -\frac{dc}{c} = K.dt$

→ **Now** : Integrating this equation

$$-\int_{c_o}^{c}\frac{dc}{c} = K\int_{0}^{t}dt \quad \therefore -\left[\ln C^{-1}\right]_{C_o}^{C} = K[t]_0^t \quad \therefore -\ln\frac{c}{Co} = \mathbf{Kt}$$

$$\therefore 2.303 \times \log\frac{w}{c} = Kt \therefore K = \frac{2.303}{t} \times \log\frac{Co}{C} \text{ time}^{-1}$$

(3) Explain : (1) Energy barrier

→ There is a presence of energy barries between molecules of reactant and product during reaction.

→ The height of energy barier is an important factor determining rate of reaction.

→ If height is more, rate is less and height is less, rate is more.

→ Energy barrier decreases in presence of catalyst. ∴ rate of reaction increases.

(2) Difference between BMO and ABMO (each point 1/2 mark)

BMO	ABMO
→ lower energy	→ higher energy
→ indicated as	→ Indicated as σ*, π*
→ helps in bonding	→ opposes in bonding

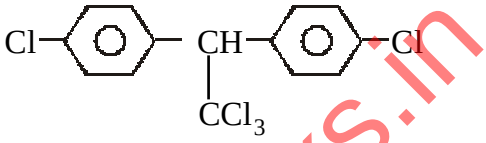
(4) → Molecular orbital diagram with labbels and es.

→ Calculation of bond order B.O. = 1/2[10–6] = 2.0

→ Magnetic property : two unpd. es. Paramagnetic

Q. 3. (A) Answer the following questions (Each of 1 mark) **5**

(1) Because rate of bromination of benzene is very slow.

(2) $CH_2(OH)-CH(OH)-CH_2(OH)$ 

(3) $3CH_3CH_2OH + PI_3 \rightarrow 3CH_3CH_2I + H_3PO_3$

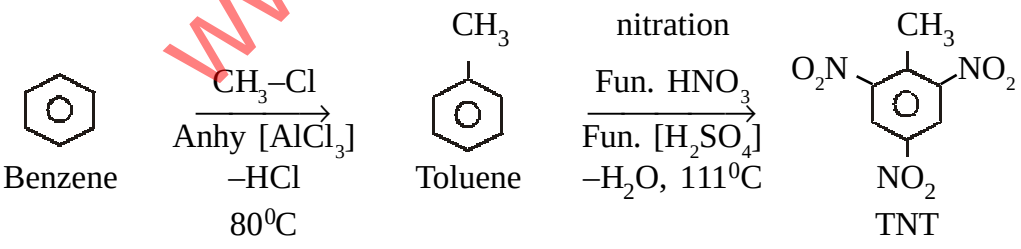
Ethanol Ethyl iodide

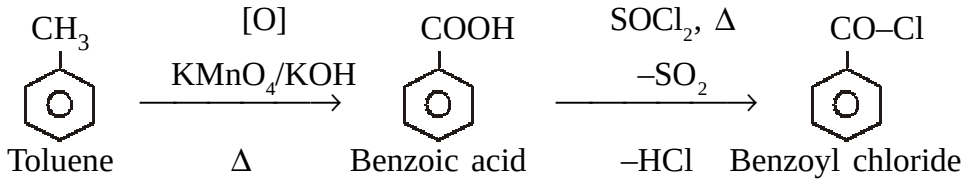
(4) Fr, $t_{1/2}$ = 21 minutes. It is radio active therefore does not occur in nature.

(5) $F_2 + 2KCl \rightarrow 2KF + Cl_2$ is possible.

Because reactivity of F > Cl ∴ F can displace Cl.

(B) Conversions (any three) (Each of two mark) **6**

(1) 

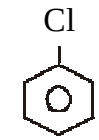
(2) 

(3)

$$\underset{\text{Di–Ethyl ether}}{CH_3CH_2–O–CH_2CH_3} + \underset{\text{conc.}}{2HI} \xrightarrow{\Delta} \underset{\text{Et–iodide}}{2CH_3CH_2I} + H_2O$$

$$\underset{\text{Et–iodide}}{2CH_3CH_2I} + \underset{\text{sodium}}{2Na} \xrightarrow[\text{Wurt}]{\text{Dry ether}} \underset{\text{n–butane}}{CH_3–CH_2–CH_2–CH_3} + 2NaI$$

(4)



Chloro benzene

$\xrightarrow[+ \text{ NaOH}]{\text{Aque}}$ 6–8%

$\xrightarrow[360^0C]{300 \text{ atm}}$ (Dow) –NaCl

Phenol ...(1)

$\xrightarrow[-H_2O]{\text{Aq.NaOH}}$

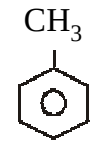
Sodium Phenoxide ...(1)

(C) Answer the following (any three) (Each of 3 marks) **(9)**

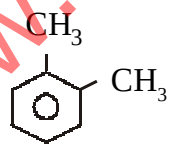
(1) Explain : $\underset{\text{Benzene}}{C_6H_6} + \underset{\text{Ozone}}{3O_3} \longrightarrow \underset{\text{BTO}}{C_6H_6(O_3)_3} \xrightarrow[-3H_2O_2]{Zn/3H_2O} 3 \underset{\text{Glyoxal}}{\begin{matrix}CHO\\|\\CHO\end{matrix}}$

Importance (i) Three C–C single bonds, three C = C double bond
(ii) benzene has hexagonal cyclic structure

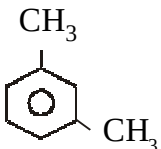
(2) Acc. to M.O. theory 6C and 6H atoms are indentical



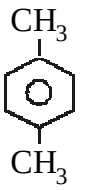
Toluene



o–xylene (1:2)



m–xylene (1:3)



p–xylene (1:4)

→ Explain of one isomer of toluene

→ Explanation of three isomers of xylenes

[2](1) β–elimination :

$$CH_3–CH_2–Cl + KOH \xrightarrow[-KCl\ -H_2O]{\text{Ethanol}} CH_2=CH_2$$

Et–chloride — ethene

$$CH_4–CH_2–CH_2–Cl + KOH \xrightarrow[-KCL\ -H_2O]{\text{Ethanol}} CH_3–CH = CH_2$$

1–chloro propane — Propene

OR

$$CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3 + KOH \xrightarrow[-KCl,\ -H_2O]{\text{Ethanol}} CH_3–CH=CH_2$$

2–chloro propane — propene

Discription

(2) Classification of alkyl halides

primary ... $CH_3–CH_2–Cl$

secondary ... $CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3$

tertiary ... $CH_3–\underset{\displaystyle Cl}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}–CH_3$

[3] (1) Crystal str. of alkali metals

→ 8 coordination no. and BCC–str.

→ Li at V. low temp., 12 co–ordi. no. & hcp str.

(2) Alkali metals have very large size. So they have remarkably low density

Li → half the density of water

Na → slightly less density than water

[4] Preparation of halogen acids (Discription is required)

(i) $CaF_2 + \underset{\text{conc.}}{H_2SO_4} \xrightarrow[\Delta]{} CaSO_4 + 2HF$

(ii) $NaCl + \underset{\text{Conc.}}{H_2SO_4} \xrightarrow{\Delta} NaHSO_4 + HCl$

$H_2 + Cl_2 \xrightarrow{\text{direct}} 2HCl$

(iii) $H_2 + Br_2 \xrightarrow[\Delta]{[pt]} 2HBr$

(iv) $3KI + H_3PO_4 \longrightarrow 3HI + K_3PO_4$

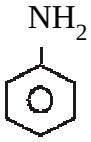
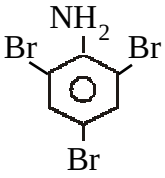
Q. 4. (A) Answer following in short (Each of half–mark) **(5)**

(1) $CH_3–CH_2–\underset{\underset{O}{||}}{C}–CH_2–CH_3$ Di–Et–Ketone

$CH_3–\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}–CN$

(2) Formaldehyde is gas but its aqueous solution is known as formaline

Uses : In preservation of dead bodies of animals

(3)  + $3Br_2$ water $\xrightarrow[\text{bromination}]{\text{Direct}}$ 

Aniline $-3HBr$

2,4,6 Tri bromo aniline

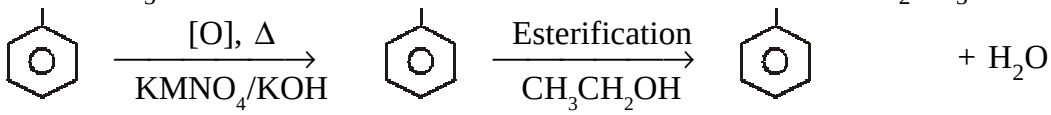
(4) Some colourless organic compounds have affinity toward the fabric. Moreover, they have fluorescent properly in presence of sunlight. Such compounds are called optical brightness.

(5) Two difference names of isocyanides are

(i) Carbyl amine compounds and

(ii) Iso-nitriles

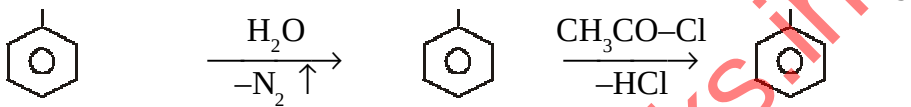
(B) Any three conversions (Each of 2 marks) **6**

(1) 

Aceto–phenone $-CO_2, -H_2O$ Benzoic acid conc.$[H_2SO_4]$ Δ Et.–benzoate

(2) $CH_3COOH \xrightarrow[LiAlH_4]{2H_2} CH_3CH_2OH \xrightarrow[350–400^0C]{[Al_2O_4]} CH_2=CH_2$

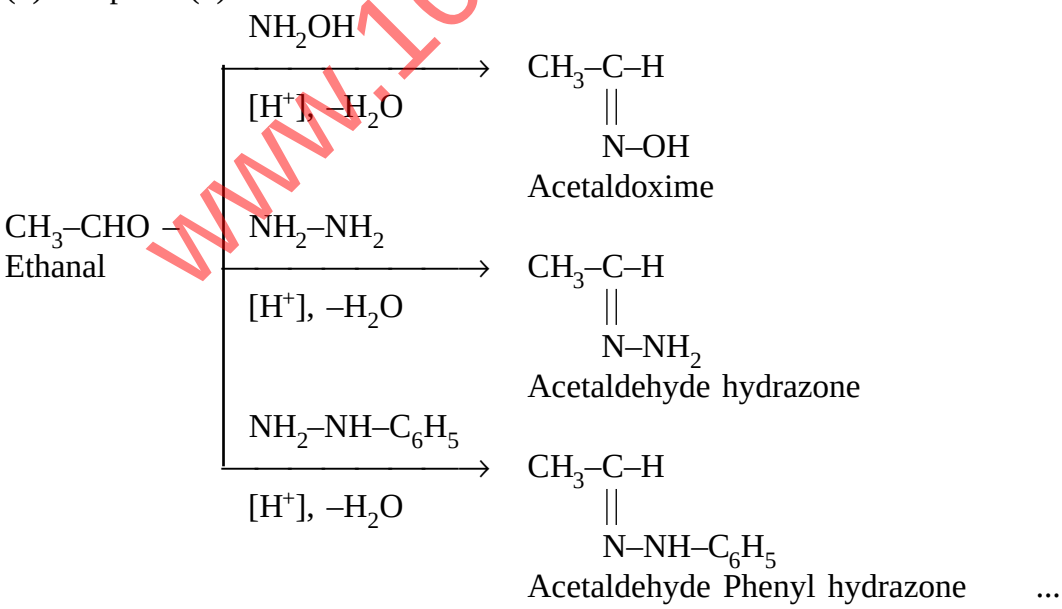
Acetic acid –H2O Ethanol $-H_2O$ Ethene ...(1)

(4) 

Benzene diazonium chloride –HCl phenol ...(1) Acetylation Phenyl acetate ...(1)

[C] Answer any three (Each of three mark) **9**

(1) Explain (1) Condensation of ethanal



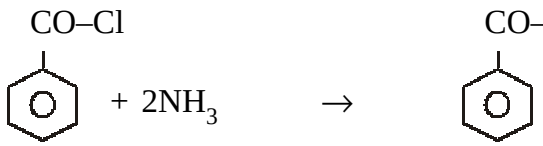
(2) $CH_3–CHO \xrightarrow{N_2H_4 \mid KOH} CH_3–CH_3 + N_2 \uparrow + H_2O$
Acetaldehyde

$CH_3–Co–CH_3 \xrightarrow{N_2H_4 \mid KOH} CH_3–CH_2–CH_3 + N_2 \uparrow + H_2O$
Propane

Explanation is required acc. to text book.

[2] Preparation of amide :

$CH_3CO–Cl + 2NH_3 \rightarrow CH_3CONH_2$ OR



*** Any two chemical reactions**

[3] Explain :

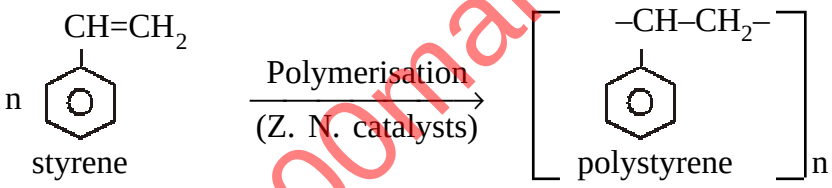
(i) Degree of polymerisation

→ No. of repeating units is called d. p.

→ If d. p. > 25 ... heavy polymers

→ If d. p. < 25 ... light polymers

(ii)



styrene
(n–molecules)

Polymerisation
(Z. N. catalysts)

polystyrene

Uses : In buttons, tooth brush handes, cock of botle, pipes, In cabinates of radio, freez, TV etc.

(4) Explain :

(1) Hormones :

→ Secretion of chemical messanger in ductless glands.

→ Inhibites circulation

(2) CNS and CND durgs :

→ some compounds like opium, morphin etc. decreases the activity of CNS

→ Some compounds like hashish, marijuana, Ethanol increase the activity to CNS

Q. 5. (A) Answer the following in short (Each one mark) **(5)**

(1) Black As : (i) Mixed properties of metal and non metals.
(ii) Non–conductor of heat adnd electric current.

(2) $KMnO_4$, strong oxidizing property

(3) (i) Potassium dicyano bis (oxalato) cobaltate (III)

(ii) Dibromo bis (ethylene diamine) manganese (III) nitrate

(4) Ca_3P_2 and SbH_3

(5) Bi(Z = 83) [Xe] to $4f^{14}5d^{10}6s^26p^3$

Br(Z = 35) . [Ar] $3d^{10}$ $4s^2$ $4p^5$

[B] Answer the following : (Each of two marks) **(6)**

(1) Allopropes of phosphorous yellow phospherous and its characteristics

(2) Properties (any four)

(i) Bonding forces increase (ii) m.p. and b.p. increases.

(iii) Hardness increases (iv) good electrical conductors.

(v) lusture like metal

(3) Chlorophy : → essential for photosynthesis.

→ responsible for geen colour of plants.

Hemoglobin : → Provides O_2 to the muxles.

→ resoponsible for red colour of blood.

Q. 5 (C) Answer the following (any three) (Each three mark) **(9)**

(1) Didentate : two co–ordination sites

eq. $CH(-\ddot{N}H_2)-CH_2-\ddot{N}H_2$, CO_3^{2-}, SO_4^{2-} etc

Hexadentate : Six co–ordination sites

give example of Edta with structure

(2) Coloured ions : (i) coloured property (ii) colourless property

(according to text book)

(3) Werner's theory : Each two points 1 mark.

(according to text book)

(4) Nature of bonding : → electron configuration

(i) Covalent bonding → sharing of $3e^-$s ... NH_3, PH_3

→ sharing of $5e^-$s ... PCl_5, NH_4^+ etc.

(ii) ionic bonding : → ions in +5 state not possible

→ ions in +3 state ... Sb^{3+}, Bi^{3+}

→ ions in –3 state ... Li_3N, Na_3P

(Write acc. to text book)

*_*_*