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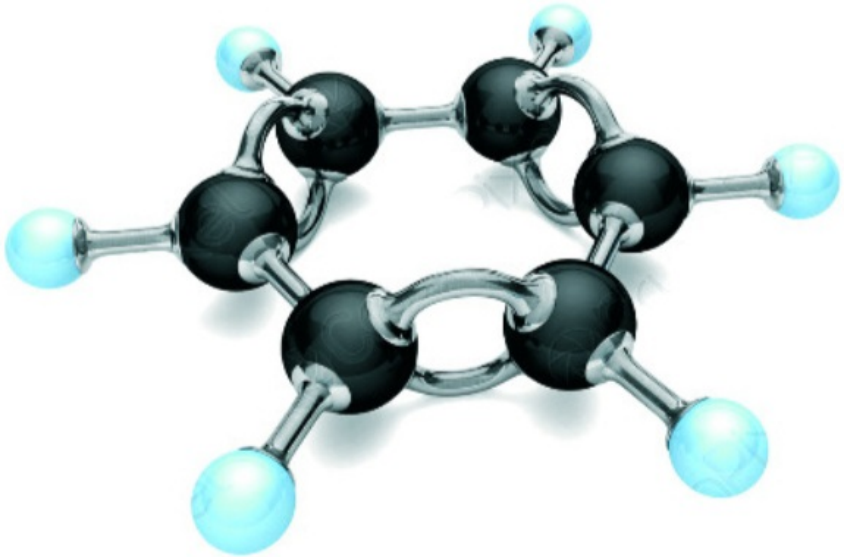
CHEMISTRY

TEN GOVERNMENT PUBLIC EXAM QUESTIONS & ANSWERS UNITWISE

(2020 - 2024)



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CHEMISTRY

12th standard

TEN PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE (2020 to 2024) .

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S.NO	**TEN PUBLIC QUESTION PAPERS**	**PAGE NUMBER**

QUESTION PAPER : 1

Time Allowed : 3.00 Hours **(MARCH-2020)** **Maximum Marks : 70**

Instructions : (1) check the question paper for fairness of printing .If there is any black of fairness , inform the Hall Supervisor immediately

(2) Use Blue or Black ink to write and underline and pencil to draw diagrams

Note : Draw diagrams and Write equations wherever necessary.

PART-I

Note : (i) Answer all the questions. **15X1=15**

(ii) Choose the most appropriate answer from the given four Alternatives And write the option code and corresponding answer.

1. Match the following

(1) Fluorine (i) Identification of coloured metal ions

(2) Borax (ii) strong oxidizing agent

(3) Aluminium (iii) Chalcogen present in volcanic ashes

(4) Sulphur (iv) Most abundant element

(a) (1) –(iii) (2)-(ii) (3)-(iv) (4)-(i) (b) (1)-(ii) (2)-(i) (3)-(iv) (4)-(iii)

(c) (1)-(iv) (2)-(iii) (3)-(ii) (4)-(i) (d) (1)-(ii) (2)-(iv) (3)-(i) (4)-(iii)

2. .wolframite ore is separated from tinstone by the process of _____

(a) Electromagnetic Separation. (b) Smelting

(c) Calcination (d) Roasting

3. The transition element which has only +3 oxidation state is

(a) Ni (b) Mn (c) Cr (d) Sc

4. The medicinal value of a drugs is measured in terms of its

(a) Deoxyribose (b) Gold number

(c) Therapeutic Intex (d) Equilibrium constant

5. The aqueous solutions of sodium formate, anilinium chloride and potassium cyanide respectively.

(a) acidic,acidic,acidic (b) acidic ,acidic ,basic

(c) Basic acidic basic (d) basic,neutral ,basic

6. If one strand of the DNA has the sequence ATGCTTGA then the sequence of complementary strand would be

(a) TACGRAGT (b) TACGAACT (c) TCCGAACT (d) TACGTACT

7. Which one of the following is most basic?

(a) 2, 4-dibromo aniline (b) 2, 4-dichloro aniline

(c) 2, 4-dimethyl aniline (d) 2, 4-dinitro aniline

8. how many Faradays of electricity are required for the following reaction to occur $MnO_4^- \rightarrow Mn^{2+}$.

(a) 7F (b) 5F (c) 3F (d) 1F

QUESTION PAPER : 2

CHEMISTRY

Time Allowed : 3.00 Hours **(INSTANT20)** **Maximum Marks : 70**

Instructions : (1) check the question paper for fairness of printing .If there is any lack of fairness , inform the Hall Supervisor immediately

(2) Use Blue or Black ink to write and underline and pencil to draw Diagrams

Note : Draw diagrams and Write equations wherever necessary.

PART-I

Note : (i) Answer all the questions. **15X1=15**

(ii) Choose the most appropriate answer from the given four alternatives And write the option code and corresponding answer.

1. The incorrect statement among the following is
   (a) Nickel is refined by mond's process
   (b) Titanium is refined by van-Arkel's process
   (c) Zinc blende (ZnS) is Concentrated by froth floatation process
   (d) In the metallurgy of gold the metal is leached with dilute sodium chloride solution
2. The metal which is used in packing material for food items
   (a) Zn (b) Zr (c) Al (d) Au
3. Sodium salt of tetraboric acid is known as
   (a) B_2H_6 (b) Na_2BO_3 (c) H_3BO_3 (d) $Na_2B_4O_7.10H_2O$
4. _____ is used for producing smoke screen as it gives large smoke
   (a) Borax (b) Diborane (c) Potash alum (d) Phosphine
5. The actual position of lanthanoids in the periodic table is at
   (a) group number 3 period number 4
   (b) group number 6 period number 3
   (c) group number 4 period number 4
   (d) group number 3 period number 6
6. Fac-mer isomerism is shown by :
   (a) $[Co(en)_3]^{3+}$ (b) $[Co(NH_3)_4Cl_2]^+$
   (c) $[Co(NH_3)_3Cl_3]$ (d) $[Co(NH_3)_5Cl]\ SO_4$
7. Packing efficiency of Body Centred Cubic (BCC)
   (a) 52.31% (b) 68% (c) 86% (d) 52.13%

PART-III 6 X 3 = 18

Note : Answer any six questions. Question no .33 is compulsory .

25. What is meant by term "coordination number"? What is the coordination number of atoms in a BCC structure?
26. What are interhalogen compounds ? give two examples
27. Give the difference between double salts and coordination compound
28. Mention the factors responsible for the anomalous behaviour of the first element Of p-block
29. State Faraday's law of electrolysis ?
30. How are the following conversion effected?
    i) ethylene glycol → acetaldehyde
    ii) glycerol →acrolein
31. Give the test for carboxylic acid group
32. Give any three differences between DNA and RNA
33. Glassify the following into Covalent, molecular ,ionic and metallic solids
    i) Diamond ii) brass iii) NaCl
    iv) Naphthalene v) glucose vi) SiO_2

PART-IV

Note : answer all the questions **5 X 5 = 25**

34. a) Explain froth flotation process

    (OR)

    b) i) explain the bleaching action of Sulphur dioxide
    ii)Write any two uses of helium

35. a) i) What are interstitial compounds ?
    ii) Calculate the number of unpaired electrons in Ti^{3+}, Mn^{2+} and calculate the spin only magnetic moment ?

    (OR)

    b) i) what are the limitations of VB theory ?
    ii) based on the VB theory ,explain why $[Ni(CN)_4]^{2-}$ is diamagnetic

36. a) i) write two difference between rate and rate constant of a reaction
    ii) Derive integrated rate law for a zero order reaction A→ product

    (OR)

QUESTION PAPER : 9

CHEMISTRY

Time Allowed : 3.00 Hours (MARCH24) Maximum Marks : 70

Instructions : (1) check the question paper for fairness of printing .If there is any lack of fairness , inform the Hall Supervisor immediately
(2) Use Blue or Black ink to write and underline and pencil to drawdiagrams

Note : Draw diagrams and Write equations wherever necessary.

PART-I

Note : (i) Answer all the questions. 15X1=15
(ii) Choose the most appropriate answer from the given four alternatives And write the option code and corresponding answer.

1.Assertion : Monoclinic sulphur is an example of monoclinic crystal System Reason : For a monoclinic system , $a \neq b \neq c$ and $\alpha = \gamma = 90^0$ $\beta \neq 90^0$

a) Assertion is true but Reason is false
b) Both Assertion and Reason are true and Reason are true and Reason is the correct explanation of Assertion
c) Both Assertion and reason are false
d) Both Assertion and Reason are true but Reason is not the correct correct explanation of Assertion

2.IUPAC name of the complex $K_3[Al(C_2O_4)_3]$ is

a) Potassium trisoxalato aluminate (III)
b) Potassium trisoxalato aluminium (III)
c) Potassium trioxalato aluminate (III)
d) Potassium trioxalato aluminate (II)

3.Which of the following is the strongest acid among all ?

a) HBr b) HI c) HCl d) HF

4.Which of the following is not SP^2 hybridised ?

a) Fullerene b) Graphite
c) Dry ice d) Graphene

5.The pyrimidine bases present in RNA are :

a) Cytosine and Thiamine b) Cytosine and Adenine
c) Cytosine and Uracil d) Cytosine and Guanine

6.Aspirin is :

a) chlorobenzoic acid b) Acetyl salicylic acid
c) anthranilic acid d) benzoyl salicylic acid

7.In acid medium , potassium permanganate oxidizes oxalic acid to :

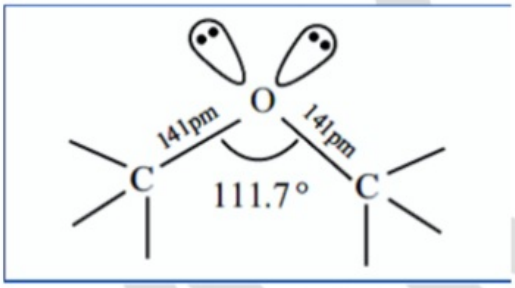
a) Acetate b) oxalate c) acetic acid d) carbon dioxide

ALL COMPULSORY QUESTIONS & ANSWER

2 MARKS : -

1.Why is C-O –C bond angle in ether slightly greater than the tetrahedral bond angle ?(mar20) (lesson no : 11)

- The C-O-C bond angle is slightly greater than the tetrahedral bondangle **due to the repulsive interaction between the two bulkier alkyl groups (or) due to steric effect (or) Interaction**



2. How is aryl halide prepared by using Cu_2Cl_2 /HCl(or) Cu_2Br_2/HBr ? (Sep20) (lesson no : 13)

$$C_6H_5\text{-}N_2^+Cl^- \xrightarrow{Cu_2Cl_2/HCl} C_6H_5\text{-}Cl + N_2$$

Benzene Diazonium Chloride — Chlorobenzene

(OR)

$$C_6H_5\text{-}N_2^+Cl^- \xrightarrow{Cu_2Br_2/HBr} C_6H_5\text{-}Br + N_2$$

Benzene Diazonium Chloride — Bromobenzene

3. A hydride of second period alkali metal (A) on reaction with compound of boron (C) in the presence of ether to give a reducing agent (C) . Identify A B and C (Ins20) (lesson no : 2)

$$B_2H_6 + 2LiH \xrightarrow{Ether} 2LiBH_4$$

(Diborane) (B) + (lithiumhydride) (A) → (lithiumborohydride) (C)

3 MARKS : -

1.There is only a marginal differences in decrease in ionisation enthalpy from aluminium to Thallium – Explain why ? (mar20) (lesson no : 2)

- This is due to the presence of inner d and f-electrons which has poor shielding effect compared to s and p-electrons. As a result, the effective nuclear charge on the valance electrons increases.

2.A solution of silver nitrate is electrolysed for 30 minutes with a current of 2 Amperes calculate the mass of silver deposited at the cathode. (Sep20) (lesson no : 9)

Electrochemical reaction at cathode is

$Ag^+ + e^- \longrightarrow Ag$ (reduction)

$m = ZIt$

$$m = \frac{108\ g mol^{-1}}{96500 C\ mol^{-1}} \times 3600C$$

$m = 4.02$ g

$$Z = \frac{molar\ mass\ of\ Ag}{(96500)}$$

$$= \frac{108}{1\ X\ 96500}$$

$I = 2A$

$t = 30 \text{ X } 60S = 1800\ S$

$It = 2A \text{ X } 1800S = 3600C$

mass of silver deposited at the cathode $m = 4.02$ g

3. Powdered $CaCO_3$ reacts much faster with dilute HCl than with the same mass of $CaCO_3$ as marble . give reason ? (Ins20) (lesson no : 3)

Reason

For a given mass of react and when a particle decrease, surface are increases, Increase in surface area of the reactant leads to more collisions per litre per second and hence the rate of reaction also increases **When the $CaCO_3$ particles are smaller so surface area for the acid is high**

1.METALLURGY

ONE MARKS :-

1.wolframite ore is separated from tinstone by the process of __(mar20)

(a) electromagnetic separation. (b) smelting

(c) calcination (d) Roasting

2. the incorrect statement among the following is(Sep20)

(a) Nickel is refined by mond's process

(b) Titanium is refined by van-Arkel's process

(c) Zinc blende (ZnS) is connected by froth floatation process

(d) In the metallurgy of gold the metal is leached with dilute sodium chloride solution

3. The metal which is used in packing material for food items (Sep20)

(a) Zn (b) Zr **(c) Al** (d) Au

4. Extraction of gold involves leaching with cyanide ion Gold is later recovered by : (Ins20)

(a) metal displacement with zinc. (b) Liquation

(c) Distillation (d) Zone refining

5. The following set of reactions are used in refining zirconium. This method is called as___ (Aug21)

$$Zr(impure) + 2I_2 \xrightarrow{523K} ZrI_4$$

$$ZrI_4 \xrightarrow{1800K} Zr(pure) + 2I_2$$

(a) Zone refining (b) Liquation

(c) Mond's process **(d) van Arkel process**

6.Bauxite has the composition : (May22)

a)$Al_2O_3.nH_2O$ b) $Fe_2O_3.2H_2O$

c) Al_2O_3 d) none of the above

7.Zinc is obtained from ZnO by (jul22)

a) carbon reduction b) reduction using silver

c) Electrochemical process d) Acid leaching

8. The metal extracted by Hall- Heroult process is : (Mar23)

(a) Cu **(b) Al**

(c) Zn (d) Ni

(OR)

$$CaCO_3 \xrightarrow{\Delta} CaO + CO_2\uparrow$$

14.what is the role of silica in the extraction of copper ? (March24)

Silica act as acidic flux

$$FeO\ (s) + SiO_2(s) \longrightarrow FeSiO_3\ (s)$$

Gangue Flux Slag

15.Explain the electrometallurgy of aluminium. (june24)

In this method, electrolysis is carried out in an **iron tank lined with carbon which acts as a cathode**. The **carbon blocks** immersed in the electrolyte act as a **anode**. **A 20% solution of alumina, obtained from the bauxite ore is mixed with molten cryolite and is taken in the electrolysis chamber. About 10% calcium chloride** is also added to the solution. Here calcium chloride helps to lower the melting point of the mixture. The fused mixture is maintained at a temperature of **above 1270 K.** The chemical reactions involved in this process are as follows.

Ionisation of alumina $Al_2O_3 \longrightarrow 2Al^{3+} + 3O^{2-}$

Reaction at cathode $2Al^{3+}\ (melt) + 6e^- \longrightarrow 2Al(l)$

Reaction at anode $6O^{2-}\ (melt) \longrightarrow 3O_2 + 12e^-$

Since carbon acts as anode the following reaction also takes place on it.

$$C(s) + O^{2-}\ (melt) \longrightarrow CO + 2e^-$$

$$C(s) + 2O^{2-}\ (melt) \longrightarrow CO_2 + 4e^-$$

Due to the above two reactions, anodes are slowly consumed during the electrolysis **The pure aluminium is formed at the cathode and settles at the bottom**. The net electrolysis reaction can be written as follows

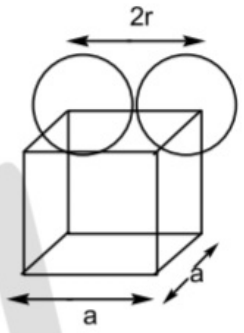
$$\mathbf{4Al^{3+}(melt) + 6O^{2-}(melt) + 3C\ (s) \longrightarrow 4Al(l) + 3CO_2\ (g)}$$

3.P-BLOCK ELEMENTS-II

ONE MARKS :-

1. Formula for hyponitrous acid (mar20)
   (a) HOONO **(b) $H_2N_2O_2$** (c) HNO_2 (d) HNO_4
2. _____ is used for producing smoke screen as it gives large smoke (Sep20)
   (a) Borax (b) Diborane (c) Potash alum **(d) Phosphine**
3. The oxidation state of chlorine in Cl_2O_7 is (Ins20)
   (a) +6 **(b) +7** (c) +4 (d) +5
4. which one of the following compounds is not formed? (Aug21)
   (a) XeF_2 (b) $XeOF_4$ **(c) NeF_2** (d) XeO_3
5. An element belongs to group-15 and 3rd period of the periodic table .its electronic configuration would be (May22)
   a) $1S^2\ 2S^2\ 2P^6\ 3S^2\ 3P^2$ b) $1S^2\ 2S^2\ 2P^4$
   c) $1S^2\ 2S^2\ 2P^6\ 3S^2\ 3P^3$ d) $1S^2\ 2S^2\ 2P^3$
6. XeF_6 on complete hydrolysis produces (jul22)
   a) $XeOF_4$ b) XeO_2F_2 **c) XeO_3** d) XeO_2
7. Which of the following is used as the source of gamma rays ? (Mar23)
   (a) Xe (b) Ar
   (c) Rn (d) Kr
8. On hydrolysis, PCl_3 gives : (jun23)
   (a) H_3PO_3 (b) PH_3
   (c) H_3PO_4 (d) $POCl_3$
9. Which of the following is the strongest acid among all ? (March24)
   a) HBr **b) HI**
   c) HCl d) HF
10. On hydrolysis, PCl_3 gives : (june24)
    a) H_3PO_3 b) PH_3
    c) H_3PO_4 d) $POCl_3$

15. calculate the percentage efficiency of packing in case of simple cubic crystal. (March24)



$$\text{Packing fraction (or) efficiency} = \frac{\{Total\ volume\ occupied\ by\ spheres\ in\ a\ unit\ cell\}}{Volume\ of\ the\ unit\ cell} \text{X100}$$

⟶ (1)

Volume of the cube with edge length a is = a x a x a = a^3

r is the radius of the sphere. From the figure a= 2r $\Longrightarrow r=\frac{a}{2}$

∴Volume of the sphere with radius $r = \frac{4}{3}\pi r^3$

$$= \frac{4}{3}\pi\left(\frac{a}{2}\right)^3$$

$$= \frac{4}{3}\pi\left(\frac{a^3}{8}\right)$$

$$= \frac{\pi a^3}{6}$$

In a simple cubic arrangement , number of spheres Belongs to a unit cell is equal to one

∴ Total volume occupied by the sphere in SC unit cell = 1 x $\left(\frac{\pi a^3}{6}\right)$

⟶ (2)

Equation 2 substitution in 1

$$\text{Packing fraction} = \frac{\left(\frac{\pi a^3}{6}\right)}{(a^3)} \text{x100}$$

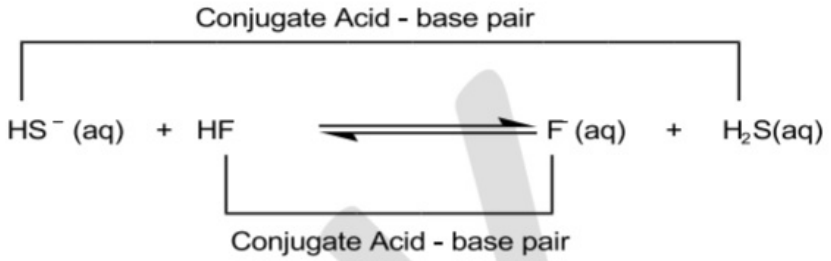
$$= \frac{100\pi}{6}$$

$$= 52.38\ \%$$

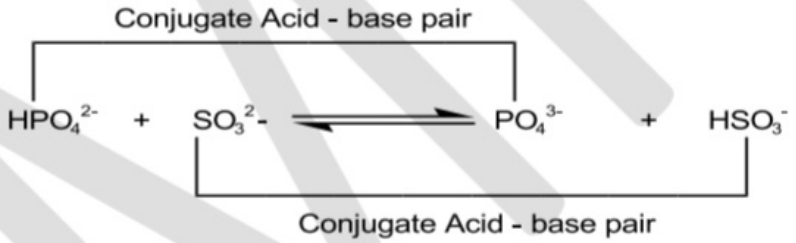
13.Identify the conjugate acid base pair for the following reaction in aqueous solution (Ins 20)

(A) $HS^-(aq) + HF \rightleftharpoons F^-(aq) + H_2S(aq)$

(B) $HPO_4^{2-} + SO_3^{2-} \rightleftharpoons PO_4^{3-} + HSO_3^-$



HS^- - Base 2
HF - Acid 1
F^- - Base 1
H_2S - Acid 2



HPO_4^{2-} - Acid 1
SO_3^{2-} - Base 2
PO_4^{3-} - Base 1
HSO_3^- - Acid 2

14.Classify the following into Lewis acids and Lewis bases(Sep 20)

(A) BF_3 **(B)** CO_2 **(C)** MgO **(D)** CH_3^-

Lewis acid	Lewis bases
(A) BF_3	(C) MgO
(B) CO_2	(D) CH_3^-

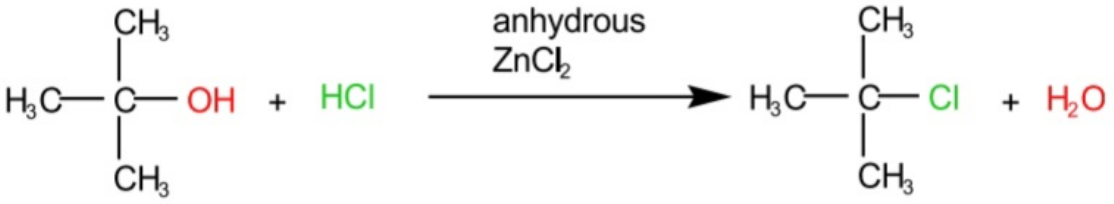
22.Explain any one method for coagulation . (june24)

The flocculation and settling down of the sol particles is called coagulation

By mixing two oppositively charged sols :-

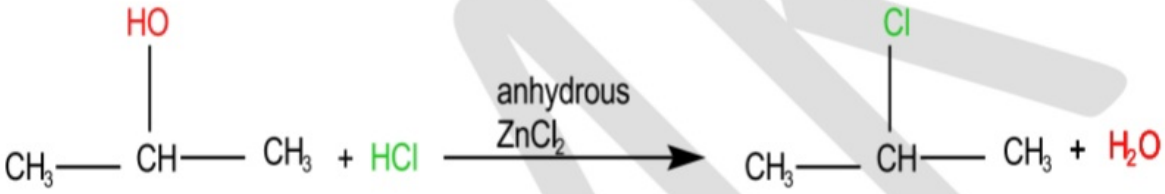
When colloidal sols with opposite charges are mixed mutual coagulation takes place. It is due to migration of ions from the surface of the particles.

Test for tertiary alcohol :-



2-methylpropan-2-ol — **2-chloro-2-methylpropane**
(immediate appearance of turbidity)

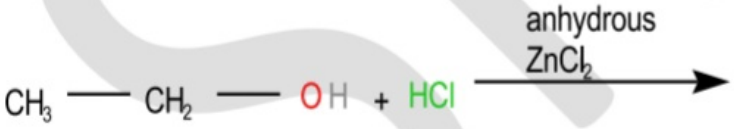
Test for Secondary alcohol :-



Propan-2-ol — **2-chloropropane**

slow appearance of turbidity

Test for Primary alcohol :-



ethanol

No reaction at room temperature

(Turbidity appears only on heating)

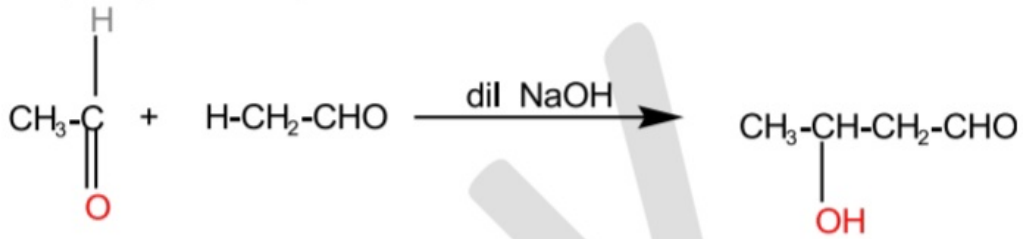
Result :-

- Primary alcohol - Turbidity appears only on heating
- Secondary alcohol - slow appearance of turbidity
- tertiary alcohol - immediate appearance of turbidity

6.Write the mechanism of aldol condensation reaction(sep20)

In presence of dilute base NaOH, or KOH, two molecules of an aldehyde or ketone having α - hydrogen add together to give β- hydroxyl aldehyde (aldol) or β - hydroxyl ketone (ketol). The reaction is called **aldol condensation reaction**.

Acetaldehyde when warmed with dil NaOH gives β - hydroxyl butyraldehyde (acetaldol)



Acetaldehyde **Acetaldol (3-Hydroxy butanal)**

Step 1

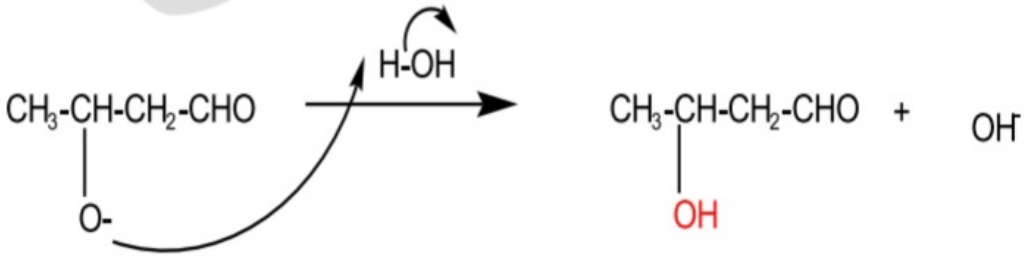
The carbanion is formed as the α **- hydrogen atom** is removed as a proton by the base.

Step 2 :

The carbanion attacks the carbonyl carbon of another unionized aldehyde to form an alkoxide ion.

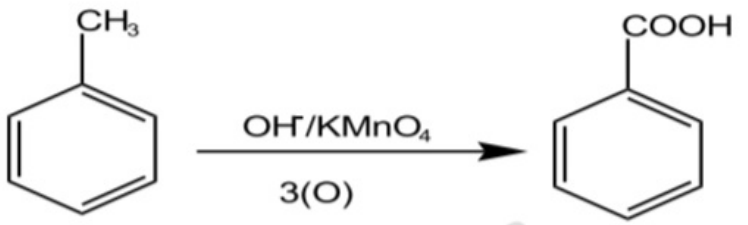
Step 3 :

The alkoxide ion formed is protonated by water to form aldol



3-Hydroxy butanal

21.How is Benzoic acid prepared from toluene(june24)

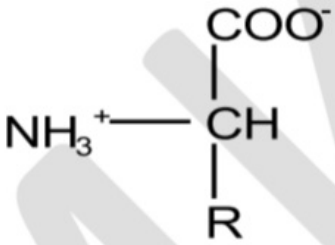


Toluene Benzoic acid

11.What are Hormones ? Give example (Mar23)

- Hormone is an organic substance (e.g. a peptide or a steroid) that is secreted by one tissue.
- It limits the blood stream and induces a physiological response (e.g. growth and metabolism) in other tissues.
- It is an intercellular signalling molecule.
- Virtually every process in a complex Endocrine glands, which are special groups of cells, make hormones
- Eg : Insulin

12. Give the structure of a zwitter ion . (Mar23)



13. Mention the importance of proteins in living organisms. (jun23)

1. All biochemical reactions occur in the living systems are catalysed by the catalytic proteins called enzymes.
2. Proteins such as keratin, collagen acts as structural back bones.
3. Proteins are used for transporting molecules (Haemoglobin), organelles (Kinesins) in the cell and control the movement of molecules in and out of the cells (Transporters).
4. Antibodies help the body to fight various diseases
5. Proteins are used as messengers to coordinate many functions. Insulin & glucagon control the glucose level in the blood
6. Proteins act as receptors that detect presence of certain signal molecules and activate the proper response.
7. Proteins are also used to store metals such as iron (Ferritin) etc