Sample Paper 14 Solutions

Class XII 2023-24

Chemistry

Time: 3 Hours **Max. Marks: 70**

General Instructions:

1. There are 33 questions in this question paper with internal choice.
2. SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 5 very short answer questions carrying 2 marks each.
4. SECTION C consists of 7 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 case-based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.
8. Use of log tables and calculators is not allowed.

SECTION-A

Directions (Q. Nos. 1-16) : The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1. As a result of osmosis, the volume of the solution :

(a) gradually decreases

(b) gradually increases

(c) is not affected

(d) suddenly increases

Ans : (b) gradually increases

As a result of osmosis, the volume of the concentrated solution gradually increases. Solvent particles are small and can very easily pass through these holes, therefore, solute particles are larger and cannot pass through.
When a semipermeable membrane separates a solution from the pure solvent, solvent molecules move back and forth through the membrane, but not in equal numbers. More move from the pure solvent into the solution than from the solution into the solvent increases the volume of the solution.

2. Alcohols of low molecular weight are

(a) Soluble in water

(b) Soluble in water on heating

(c) Insoluble in water

(d) Insoluble in all solvents

Ans : (a) Soluble in water

The lower alcohols are readily soluble in water and the solubility decreases with the increase in molecular weight. The solubility of alcohols in water can be explained due to the formation of hydrogen bond between the highly polarised $-OH$ groups present both in alcohol and water.

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3. The conductivity of strong electrolyte is

(a) Increase on dilution electrolyte is

(b) Decrease on dilution

(c) Does not change with dilution

(d) Depends upon density of electrolytes itself

Ans : (a) Increase on dilution electrolyte is

We know that according to Debye Huckel rule, on dilution the ionisation of strong acid increases due to increasing volume. Since ionic mobility also increases. Therefore the conductivity of strong electrolyte increases on dilution slightly.

4. Which of the following aqueous solution has minimum freezing point ?

(a) 0.01 m NaCl (b) 0.005 m C_2H_5OH

(c) 0.005 m MgI_2 (d) 0.005 m $MgSO_4$

Ans : (a) 0.01 m NaCl

$$\Delta T_f = i \times K_f \times m$$

Van't Hoff factor, $i = 2$ for NaCl

Hence $\Delta T_f = 0.02 K_f$

Which is maximum in the present case.
Hence ΔT_f is maximum or freezing point is minimum.

5. Units of rate constant of first and zero order reactions in terms of molarity M unit are respectively

(a) $\sec^{-1}, M\sec^{-1}$ (b) $\sec^{-1}, M$

(c) $M\sec^{-1}, \sec^{-1}$ (d) $M, \sec^{-1}$

Ans : (a) $\sec^{-1}, M\sec^{-1}$

For a zero order reaction.

$$\text{rate} = k[A]^\circ$$

i.e. $$\text{rate} = k$$

Hence, Unit of $k = M.\sec^{-1}$

For a first order reaction.

$$\text{rate} = k[A]$$

$$k = M.\sec^{-1}/M = \sec^{-1}$$

6. The number of unpaired electrons in the complex ion $[CoF_6]^{3-}$ is (Atomic no.: Co=27).

(a) zero (b) 2

(c) 3 (d) 4

Ans : (d) 4

Co here is in $+3$ oxidation state
Unpaired electrons $= 4$ and sp^3d^2 hybridisation and octahedral shape.

7. Isotonic solutions have same:

(a) Molar concentration (b) Molality

(c) Normality (d) None of these

Ans : (a) Molar concentration

Isonotic solutions have same molar concentration at given temperature provided the Van't Hoff factor (i) is same.

8. The compound obtained by heating a mixture of a primary amine and choloroform with ethanolic potassium hydroxide (KOH) is :

(a) an alkyl cyanide (b) a nitro compound

(c) an alkyl isocyanide (d) an amide

Ans : (c) an alkyl isocyanide

$$CH_3CH_2NH_2 + CHCl_3 + 3KOH \longrightarrow CH_3 - CH_2NC + 3KCl + 3H_2O$$

In this reaction, bad smelling compound ethyl isocyanide (CH_3CH_2NC) is produced. This equation is known as carbyl amine reaction.

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9. The electronic configuration of gadolinium (Atomic number 64) is :

(a) $[Xe]4f^85d^06s^2$ (b) $[Xe]4f^35d^16s^2$

(c) $[Xe]4f^65d^26s^2$ (d) $[Xe]4f^75d^16s^2$

Ans : (d) $[Xe]4f^75d^16s^2$

Electronic configuration of gadolinium is $[Xe]4f^75d^16s^2$.

10. Haloforms are trihalogen derivatives of

(a) Ethane (b) Methane

(c) Propane (d) Benzene

Ans : (b) Methane

Haloform compounds with the formula CHX_3, where X is a halogen atom.
Haloforms are trihalogen derivatives of methane.
Example : Chloroform $CHCl_3$.

11. Complete hydrolysis of cellulose gives

(a) D-ribose (b) D-glucose

(c) L-glucose (d) D-fructose

Ans : (b) D-glucose

Cellulose is a linear polymer of $\beta-$D $-$glucose in which C_1 of one glucose unit is connected to C_4 of the other through $\beta-$D glucosidic linkage. It does not undergo hydrolysis easily. However on heating with dilute H_2SO_4 under pressure. It does undergo hydrolysis to give only D-glucose.

$$(C_6H_{10}O_5)n + nH_2O \xrightarrow{H+} \underset{\text{D-Glucose}}{nC_6H_{12}O_6}$$

12. The reagent (s) which can be used to distinguish acetophenone from benzophenone is (are)

(a) 2, 4-Dinitrophenylhydrazine

(b) Aqueous solution of $NaHSO_3$

(c) Benedict reagent

(d) l_2 and Na_2CO_3

Ans : (d) l_2 and Na_2CO_3

l_2 and Na_2CO_3 react with acetophenone ($C_6H_5COCH_3$) to give yellow ppt. of CHl_3 but benzophenone $C_6H_5COC_6H_5$ does not and hence can be used to distinguish between them.

Directions (Q. Nos. 13-16) : Each of the following questions consists of two statements, one is Assertion and the other is Reason. Give answer :

13. **Assertion :** Aniline is better nucleophile than anilium ion
Reason : Anilium ion have positive charge.

(a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

(b) Both Assertion and Reason are correct but Reason is not the a correct explanation of the Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Both the Assertion and Reason are incorrect.

Ans : (a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

It is fact that aniline is better nucleophile than anilium ion. Anilium ion contain positive charge, which reduces the tendency to donate lone pair of electron $C_6H_5NH_3^+$ (anilium ion).

14. **Assertion :** The two strands of DNA are complementary to each other.
Reason : Adenine specifically forms hydrogen bonds with guanine whereas cytosine forms hydrogen bonds with thymine.

(a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

(b) Both Assertion and Reason are correct but Reason is not the a correct explanation of the Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Both the Assertion and Reason are incorrect.

Ans : (c) Assertion is correct but Reason is incorrect.

Adenine forms hydrogen bonds with thymine whereas cytosine forms hydrogen bonds with guanine.
Due to specific pairing of bases the two strands are complementary to each other.

15. **Assertion :** NF_3 is a weaker ligand than N $(CH_3)_3$.
Reason : NF_3 ionizes to give F^- ions in aqueous solution.

(a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

(b) Both Assertion and Reason are correct but Reason is not the a correct explanation of the Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Both the Assertion and Reason are incorrect.

Ans : (c) Assertion is correct but Reason is incorrect.

NF_3 is a weak ligand due to high electro-negativity of fluorine which withdraws electrons from N, with the result lone pair of electrons on N atom can't be ligated. $N(CH_3)_3$ is a strong ligand because CH_3 groups are electron releasing and thus increase electron availability on N atom.

16. **Assertion :** Anilinium chloride is more acidic than ammonium chloride.
Reason : Anilinium ion is resonance stabilized.

(a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

(b) Both Assertion and Reason are correct but Reason is not the a correct explanation of the Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Both the Assertion and Reason are incorrect.

Ans : (c) The Assertion is correct but Reason is incorrect.

Anilinium chloride is more acidic than ammonium chloride because it liberates aniline (resonance stabilized) when heated with strong base.
Anilinium ions does not show resonance because charge dispersion at ring may involve pentavalent nitrogen structure.

SECTION-B

Directions (Q. No. 17-21) : This section contains 5 questions with internal choice in two questions. The following questions are very short answer type and carry 2 marks each.

17. Define standard reduction potential of electrode.

Ans :

Standard reduction potential (E°) is the reduction potential of an element when the concentration of its ions in solution is 1 M and the temperature is 298 K (When the concentrations of all the species involved in a half-cell in is unity then the electrode potential is called standard electrode potential).

18. Why transition metals have high enthalpies of ionization?

Ans :

Because they have large number of unpaired electrons in their atoms. Due to it they have stronger interatomic interaction and hence stronger bonding between atoms.

or

Why to transition elements show variable oxidation state?

Ans :

Because the energies of $(n-1)\,d$ orbitals and ns orbitals are very close. Hence electrons from both can participate in bonding.

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19. Write the integrated equation for a first order reaction in terms of $[R]$, $[R]_0$ and t.

Ans :

$[R]$ = Concentration of reaction after time t

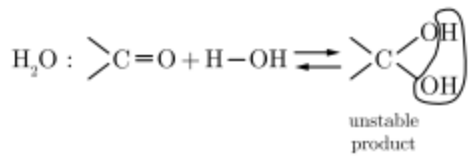
$[R]_0$ = Initial concentrations of reactant

Hence, $$k = \frac{2.303}{t}\log\frac{[R]_0}{[R]}$$

This is the integrated Equation for a first order reaction.

20. Write the chemical reaction of carbonyl group with : H_2O

Ans :

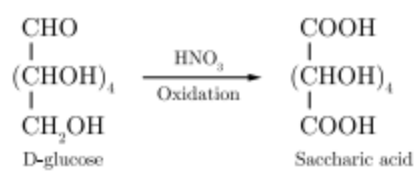


unstable product

21. Write a reaction which shows the presence of a primary alcoholic $(-OH)$ group in glucose.

Ans :

On oxidation with nitric acid glucose gives a dicarboxylic acid, saccharic acid. This indicates the presence of primary alcoholic $(-OH)$ group in glucose.



D-glucose Saccharic acid

SECTION-C

Directions (Q. No. 22-28) : This section contains 5 questions with internal choice in two questions. The following questions are short answer type and carry 3 marks each.

22. What are cells? Name the two types of cells.

Ans :

A device used to convert chemical energy into electrical energy or electrical energy into chemical energy is called cell.

Cells are of two types :

1. **Electrolytic Cell :** It is used to convert electrical energy into chemical energy.
2. **Electrochemical Cell :** It is used to convert chemical energy into electrical energy. It is also called Galvanic cell or Voltaic cell.

23. What is electrolysis? Give the reactions occurring at two electrodes during electrolysis of molten sodium chloride.

Ans :

The process of decomposition of an electrolyte when electric current is passed through its aqueous solution or in the molten state is called electrolysis.

Electrolysis of molten NaCl.

$$NaCl(l) \rightleftharpoons Na^+(l) + Cl^{-1}(l)$$

At cathode : $Na^+ + e^- \rightarrow Na$

At anode : $Cl^- - e^- \rightarrow Cl$

$$Cl + Cl \rightarrow Cl_2(g)$$

Overall reaction, $2\,Na\,Cl\,(l) \xrightarrow{\text{Electrolysis}} \underset{\text{At cathode}}{2Na\,(l)} + \underset{\text{At anode}}{Cl_2(g)}$

24. Calculate the number of unpaired electrons in the following gaseous ions : Mn^{3+}, Cr^{3+}, V^{3+} and Ti^{3+}. Which one of these is the most stable in aqueous solution?

Ans :

Ions	No. of unpaired electrons
Mn^{3+}, $3d^4$	4
Cr^{3+}, $3d^3$	3
V^{3+}, $3d^2$	2
Ti^{3+}, $3d^1$	1

Cr^{3+} is most stable in aqueous solution because it has half filled t_{2g} level.

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25. What is meant by hydroboration-oxidation reaction? Illustrate it with an example

Ans :

The addition of diborane to alkenes to form trialkylboranes followed by their oxidation with alkaline hydrogen peroxide solution to form alcohols is called hydroboration oxidation reaction. For example.

$$\underset{\text{Propene}}{CH_3CH=CH_2} + \underset{\text{Diborane}}{(BH_3)_2} \xrightarrow[\text{ether}]{\text{Dry}} \underset{\begin{array}{cc}|&|\\H&BH_2\end{array}}{CH_3-CH-CH_2}$$

$$\xrightarrow{CH_3CH=CH_2} (CH_3CH_2CH_2)_2B-H$$

$$\xrightarrow{CH_3CH=CH_2} \underset{\text{Tri-n-propylborane}}{(CH_3CH_2CH_2)_3B}$$

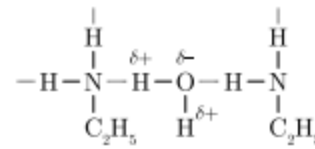
$$\underset{\text{Tri-n-propylborane}}{(CH_3CH_2CH_2)_3B} + 3H_2O_2 \xrightarrow{OH^-,H_2O} \underset{\text{Propan-1-ol}}{3CH_3CH_2OH} + \underset{\text{Boric acid}}{B(OH)_3}$$

The alcohols obtained by this process seems to have been formed by the direct addition of water to the alkene, contrary to Markovnikov's rule.

26. Ethylamine is soluble in water whereas aniline is not ?

Ans :

Ethylamine is soluble in water due to the formation of inter molecular H-bonding between Ethylamine and water molecules.



But in aniline due to the large hydrophobic part (hydrocarbon part), the extent of H-bonding decreases and hence aniline is insoluble in water.

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27. What are essential and non essential amino acids? Give two examples of each type.

Ans :

Those α-amino acids which can not be synthesised in our body and must be obtained through diet, are known as essential amino acids. For example, valine, leucine, isoleucine, lysine etc. On the other hand the amino acids, which can be synthesized in the body, are known as non essential amino acids. For example, glycine, alanine, aspartic acid etc.

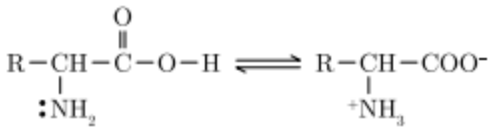
or

How do you explain the amphoteric behaviours of amino acids?

Ans :

In aqueous solution, the carboxyl group of amino acid can

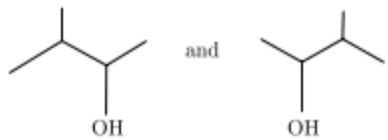
lose a proton and amino group can accept a proton, giving rise to a dipolar ion known as zwitterion. This is neutral but contains both positive and negative charges.



(Zwitter ion)

In Zwitter ionic form amino acids show amphoteric behaviour as they react both with acids and bases.

28. (i) Identify the chiral molecule in the following pair:



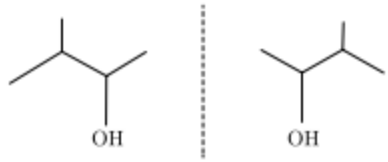
(a) (b)

(ii) Write the structure of the product when chlorobenzene is treated with methyl chloride in the presence of sodium metal and dry ether.

(iii) Write the structure of the alkene formed by dehydrohalogenation of 1-bromo-1-methylcyclohexane with alcoholic KOH.

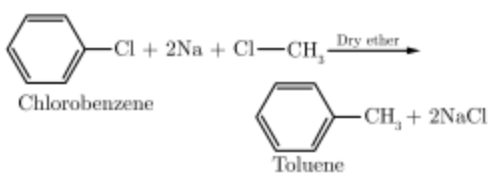
Ans :

(i) Molecule (a) is chiral as its mirror image is non-superimposable.



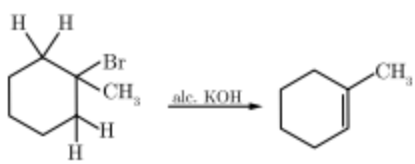
Mirror

(ii) Toluene is formed. This is known as Wurtz-Fittig reaction.



Chlorobenzene Toluene

(iii) 1-methylcyclohexene is formed.



1-bromo-1-methylcyclohexane 1-methylcyclohexene

β-hydrogen on each side of Br atom are equivalent because of which only one alkene will be formed.

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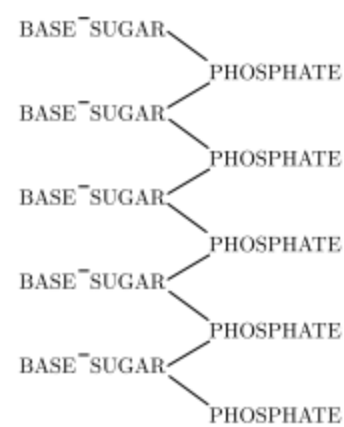
SECTION-D

Directions (Q. No. 29-30) : The following questions are case-based questions. Each question has an internal choice and carries 4 marks each. Read the passage carefully and answer the questions that follow.

29. The basic chemical formula of DNA is now well established. As shown in figure it consists of a very long chain, the backbone of which is made up of alternate sugar and phosphate groups, joined together in regular 3' 5' phosphate di-ester linkages. To each sugar is attached a nitrogenous base, only four different kinds of which are commonly found in DNA. Two of these—adenine and guanine— are purines, and the other two thymine and cytosine-are pyrimidines. A fifth base, 5-methyl cytosine, occurs in smaller amounts in certain organisms, and a sixth, 5-hydroxy-methyl-cytosine, is found instead of cytosine in the T even phages. It should be noted that the chain is unbranched, a consequence of the regular internucleotide linkage. On the other hand the sequence of the different nucleotides is, as far as can be ascertained, completely irregular. Thus, DNA has some features which are regular, and some which are irregular. A similar conception of the DNA molecule as a long thin fiber is obtained from physico-chemical analysis involving sedimentation, diffusion, light scattering, and viscosity measurements. These techniques indicate that DNA is a very asymmetrical structure approximately 20 A° wide and many thousands of angstroms long. Estimates of its molecular weight currently centre between 5×10^6 and 10^7 (approximately 3×10^4 nucleotides). Surprisingly each of these measurements tend to suggest that the DNA is relatively rigid, a puzzling finding in view of the large number of single bonds (5 per nucleotide) in the phosphate-sugar back bone. Recently these indirect inferences have been confirmed by electron microscopy.



Chemical formula (diagrammatic) of a single chain of deoxyribonucleic acid.

Answer the following questions :

(a) Name the purines present in DNA.

(b) What is the name of the linkage between nucleotides in DNA?

(c) (i) What is backbone of DNA?

(ii) Out of four different kinds of nitrogenous bases which are commonly formed in DNA has been replaced in some organisms.

or

(d) (i) Which component makes DNA chiral?

(ii) Between which carbon atoms of deoxyribose sugars of nucleotide are phosphodiester linkage present?

Ans :

(a) Adenine and Guanine

(b) regular phosphodiester, irregular

(c) (i) Phosphate-sugar forms backbone of DNA.

(ii) Cytosine

or

(d) (i) D-sugar component

(ii) 5' and 3' carbon atoms

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30. Observe the table in which azeotropic mixtures are given along their boiling points of pure components and azeotropes.

Some Azeotropic Mixtures					
A	B	Minimum Boiling Azeotropes	A	B	Mixture Azeotropes
H_2O H_2O CH_3COCH_3	C_2H_5OH C_3H_7OH CS_2	95.37% 71.69% 67%	373K 373K 329.25K	351.3K 370.19K 319.25K	351.15 350.72 312.30
H_2O	HCl	20.3%	373K	188K	383K
H_2O	HNO_3	68.0%	373K	359K	393.5K
H_2O	$HClO_4$	71.6%	373K	383K	476K

Answer the following questions :

(a) Why do ethanol and H_2O show positive deviation from Raoult's law ?

(b) Why do H_2O and HCI form maximum boiling azeotropes?

(c) (i) What are azeotropes ?

(ii) How are azeotropes separated ?

or

(d) If $p^\circ_A = 450$ mm, $p^\circ_B = 200$ mm, what is mole fraction of A in vapour phase if $x_A = 0.3$ in liquid phase ?

Ans :

(a) It is because force of attraction between ethanol-water are less than ethanol-ethanol and H_2O—H_2O.

(b) It is because force of attraction between H_2O and HCl are more than HCl—HCl and H_2O—H_2O.

(c) (i) Azeotropes are constant boiling mixtures which distill out unchanged in their composition.

(ii) They are separated by azeotropic distillation.

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or

(d) $p_A = p^\circ_A x_A$

$= 450 \times 0.3$

$= 135$ mm

$p_B = p^\circ_B x_B$

$= p^\circ_B (1 - x_A)$

$= 200 \times 0.7$

$= 140$ mm

$y_A = \dfrac{p_A}{p_A + p_B}$

$= \dfrac{135}{135 + 140}$

$= \dfrac{135}{275} = 0.49$

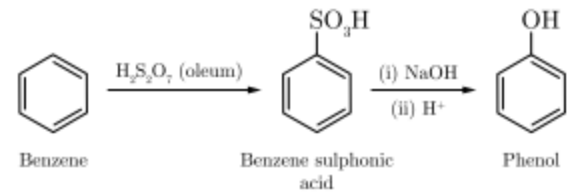
SECTION-E

Directions (Q. No. 31-33) : The following questions are long answer type and carry 5 marks each. Two questions have an internal choice.

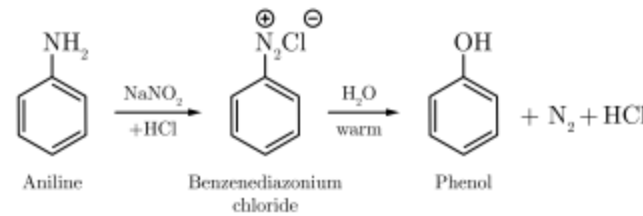
31. Write various methods of preparation of phenol.

Ans :

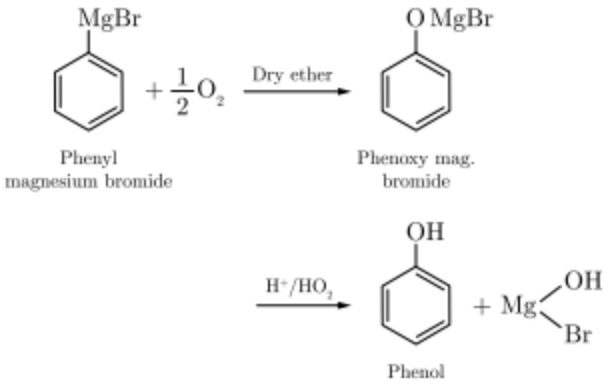
1. From benzenesulphonic acid



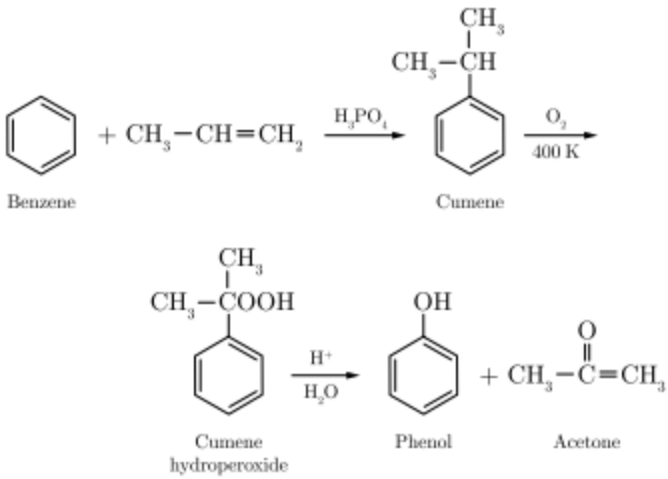
2. From diazonium salts



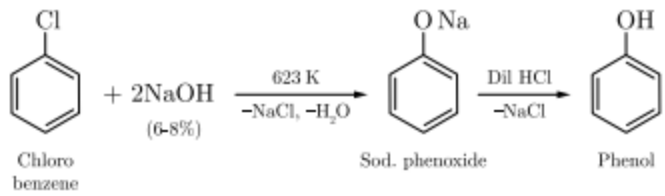
3. From Grignard reagent



4. From Cumene (Industrial prepartion)



5. From Chlorobenzene (Dow's process)



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32. Define the following terms :

1. Mole fraction
2. Molality
3. Molarity
4. Normality
5. Percentage
6. ppm

Ans :

1. **Mole fraction** (x) **:** The fraction obtained by dividing number of moles of a component by the total number of moles of all the component present in the solution is called Mole Fraction.
   Mole fraction of a component
   $$= \frac{\text{Number of moles of Component}}{\text{Total number of moles of all the component}}$$
   For example, in a binary mixture, if the number of moles of A and B are n_A and n_B respectively, the mole fraction of A will be
   $$x_A = \frac{n_A}{n_A + n_B}$$
   Mole fraction of B, $x_B = \frac{n_B}{n_A + n_B}$
   $$x_A + x_B = \frac{n_A}{n_A + n_B} + \frac{n_B}{n_A + n_B} = 1$$
   Sum of the mole fraction of all the components present in a solution is unity. Mole fraction is independent of temperature as it is a mass/mass relationship.
2. **Molality** (m) **:** Molality is the number of moles of the solute present in per kilogram (kg) of the solvent.
   $$\text{Molality } (m) = \frac{\text{Moles of solute}}{\text{Mass of solvent in kg}}$$
   Units of molaltiy is m or mol kg^{-1}. It is independent of temperature as it is a mass/mass relationship.
3. **Molarity** (M) **:** Molarity is the number of moles of solute dissolved in one litre (or 1 cubic decimetre) of solution.
   $$\text{Molarity} = \frac{\text{Moles of solute}}{\text{Volume of solution in litre}}$$
   Units of molarity is M or mol L^{-1}. Molarity decreases with rise in temperature as it is a mass/volume relationship and volume increases with increases in temperature.
4. **Normality** (N) **:** Normality is the number of gram equivalents of the solute dissolved in one litre ($1\,dm^3$) of solution.
   $$\text{Normality} = \frac{\text{Number of gram equivalent of solute}}{\text{Volume of the solution in litre}}$$
   $$\text{Normality} = \frac{\text{Mass of solute}}{\text{Eq. mass of the value}} \times \frac{1000}{\text{V(ml)}}$$
   Units of Normality is N or gm eq. mol^{-1}. Normality decrease with rise in temperature as it is a gm eq/ volume relationship and volume increases with increase in temperature.
5. **Percentage :** The percentage of a solution is usually expressed either as Mass percentage or volume percentage or Mass by volume percentage.
   (a) **Mass Percentage** (w/w)
   Mass % of a component
   $$= \frac{\text{Mass of component in the solution}}{\text{Total mass of the solution}} \times 100$$
   For example, if a solution is described by 10% glucose in water by mass, it means that 10g glucose is dissolved in 90g of water resulting in a 100g solution.

(b) **Volume percentage** (v/v)
Volume % of a component

$$= \frac{\text{Volume of the component}}{\text{Total volume of the solution}} \times 100$$

For example 10% (V/V) ethanol solution in water means that 10 ml of ethanol is dissolved in water such that the total volume of the solution is 100 ml.

(c) **Mass by volume percentage** (w/v)
Mass/Volume % of a component

$$= \frac{\text{Mass of the component in the solution}}{\text{Total volume of the solution in ml}} \times 100$$

6. **Parts per million** (ppm) **:** When a solute is present into traces quantities it is convenient to express concentration in parts per million (ppm). Mass of the solute present in one million (10^6) parts by mass of the solution is called parts per million.
ppm

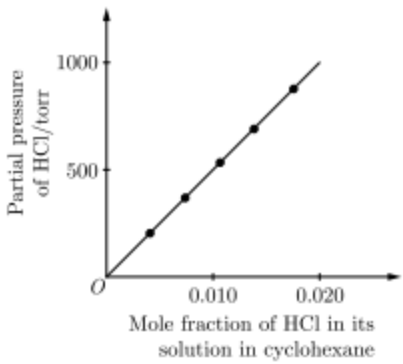
$$= \frac{\text{Number of parts of component}}{\text{Total number of parts of all components of the solution}} \times 10^6$$

or

State Henry's Law an mention some important applications.

Ans :

Henry's Law : The partial pressure of the gas in vapour phase (p) is directly proportional to the mole fraction of the gas (x) in the solution , $p = K_H x$
Here K_H is the Henry's law constant.
If we draw a graph between partial pressure of the gas versus mole fraction of the gas in solution, then we should get a plot of the type as shown (for the solubility of HCl gas in cyclohexane at 29.3K). The slope of the line is the Henry's law constant K_H. Different gases have different K_H values at the same temperature. This suggests that K_H is a function of the nature of the gas. Higher the value of K_H at a given pressure, the lower is the solubility of the gas in the liquid.



Application of Henry's Law

1. To increase the solubility of CO_2 in soft drinks and soda water, the bottle sealed under high pressure.
2. To minimise the painful effects accompanying the decompression of deep sea divers, oxygen diluted with less soluble helium gas is use as breathing gas.
3. In lungs, where oxygen is present in air with high partial, haemoglobin combines with oxygen to from oxyhaemoglobin. In tissues where partial pressure of oxygen is low, Oxyhaemoglobin releases oxygen for utilization in cellular activities.

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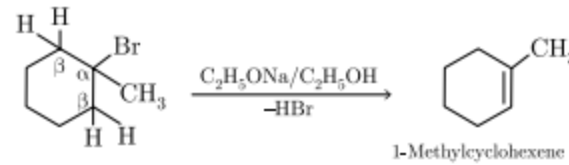
33. Predict the alkenes that would be formed by dehydrohalogenation of the following halides. With sodium ethoxide in ethanol and identity the major alkene.
(i) 1-Bromo-1-methyl cyclohexane
(ii) 2-Chloro-2-methylbutane
(iii) 3-Bromo-2, 2, 3-trimethylpentane

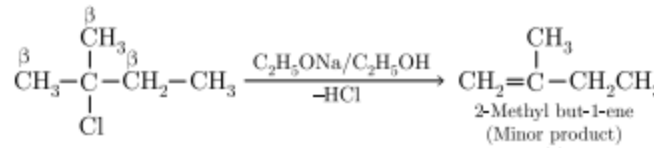
Ans :

(i) In 1-bromo-1-methylcyclohexane, the β-hydrogen's on either side of the Br atom are equivalent therefore only 1-alkene is formed.

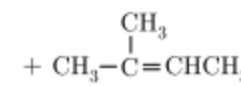


1-Methylcyclohexene

(ii) 2-chloro-2-methyl butane has two different sets of equivalent β-hydrogen.



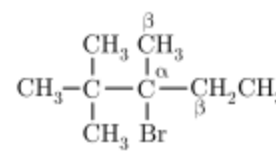
2-Methyl but-1-ene
(Minor product)
(a)



2-Methyl but-2-ene
(Major product)
(b)

According to Saytzeff's rule, more highly substituted alkene (b) being more stable, is the major product.

(iii)



2-Ethyl-3, 3-dimethyl but 1-ene
(Minor product)

3,4,4-Trimethylpent-2-ene
(Major product)

or

Give the preparation of chlorobenzene from benzene diazonium chloride and give its reaction with:

(i) Na

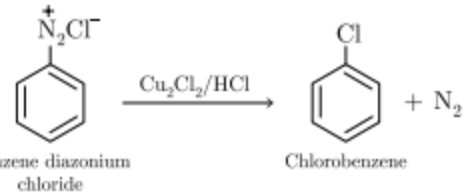
(ii) CH_3Cl is the presence of anhydrous $AlCl_3$

(iii) H_2SO_4

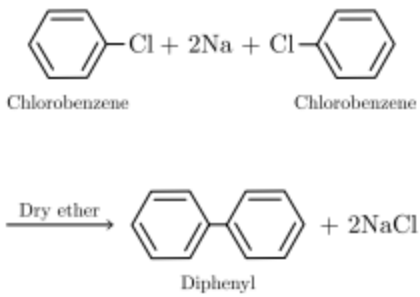
(iv) HNO_3 in the presence of cone. H_2SO_4.

Ans :

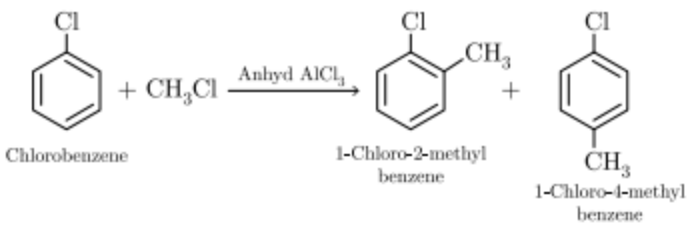
Preparation



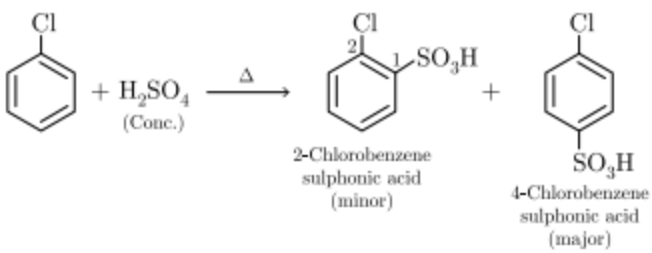
(i) **Fitting Reaction :**



(ii) **Friedel-Crafts Alkylation :**



(iii) **Sulphonation :**



(iv) **Nitration :**

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