

ICSE Board
Class X Chemistry
Sample Paper – 14 Solution

SECTION I

Answer 1

- a. Alkyl radicals and functional groups:

Sr. No.	Formula	Name of alkyl radical	Name of functional group
i.	CH ₃ OH	Methyl	Alcohol
ii.	C ₂ H ₅ OH	Ethyl	Alcohol
iii.	C ₃ H ₇ CHO	Propyl	Aldehyde
iv.	C ₄ H ₉ COOH	Butyl	Carboxyl
v.	CH ₃ CHO	CH ₃	CHO

b.

- i. Cu(OH)₂
- ii. ZnO
- iii. NaOH
- iv. NH₄OH
- v. Na⁺, Ca²⁺

c.

- i. Na and F
- ii. Argon
- iii. C, N, O and F are non-metals present in Period 2, while Na, Mg and Al are metals in Period 3.
- iv. Silicon
- v. Argon

d.

- i. True.
- ii. False. Unsaturated hydrocarbons are joined by double or triple bonds.
- iii. False. Since it is highly soluble in water, HCl gas is not collected over water.
- iv. True.
- v. False. Since it is in the gaseous form, it does not form H⁺ ions.

e.

- i. The word acid comes from the Latin word *acidus* meaning '**sour**'.
- ii. Vinegar is the source of **acetic** acid.
- iii. Magnesia is used in making **refractory bricks**.
- iv. The pH scale was introduced by **Sorensen** in 1909.
- v. **Efflorescence** is the phenomenon by which hydrated salts on exposure to dry air lose their water of crystallisation and crumble to powder.

f.

- i. Less than 7
- ii. More than 7
- iii. Seven
- iv. Less than 7
- v. Less than 7

g.

- i. (B) Neutralisation
- ii. (E) Direct synthesis
- iii. (D) Double decomposition
- iv. (A) Simple displacement
- v. (C) Decomposition by acid

h.

- i. Mercury
- ii. Cryolite
- iii. Roasting
- iv. Calcium silicate
- v. Zone of heat absorption

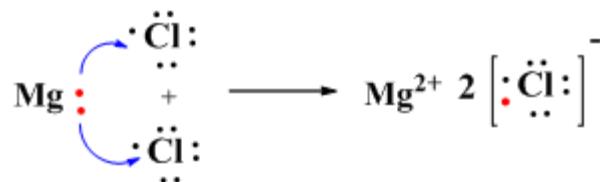
SECTION II

Answer 2

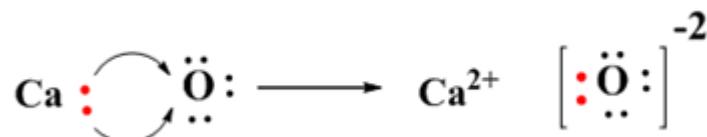
a.

- Electrovalent or ionic compounds
- One electron
- Since it has valency 1, M belongs to Group 1.
- At the cathode: $M^+ + 1e^- \rightarrow M$
- At the anode: Oxygen gas

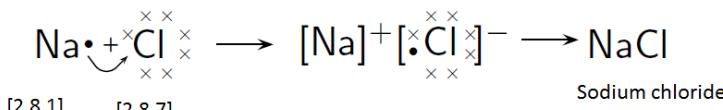
b.



i.



ii.



iii.



[2,8,1] [2,8,7]
Sodium atom Chlorine atom

c.

- X has 7 electrons in its outermost shell, and Y has only one electron in its outermost shell. So, Y loses its one electron and X gains that electron to form an ionic bond.
- The formula of the compound is XY.

Answer 3

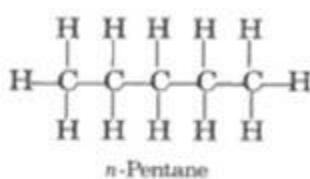
a.

- A metal which does not react with dilute hydrochloric acid: **Copper (Cu)**
- A metal which can form M^{2+} and M^{3+} ions: **Iron (Fe)**
- A metal which has a hydroxide that reacts with both acids and alkalis: **Zinc (Zn)**
- A metal which does not react with cold water but reacts with steam when heated: **Magnesium (Mg)**
- Metals in the decreasing order of reactivity:
Na > Mg > Zn > Fe > Cu

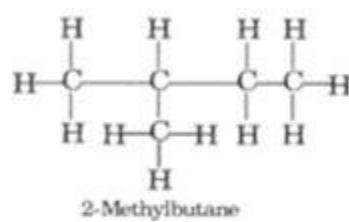
b.

- Aluminium being a strong, light and corrosion-resistant metal is used for making alloys.
- Aluminium is light, malleable and does not rust, so it is used for wrapping chocolates.
- Painting electric and telegraphic pole to prevent them from rusting.
- It is used in aluminothermy as it is a good reducing agent.
- As aluminium forms a film of aluminium oxide, it protects the ships from corrosion. So, it is used for making ships.

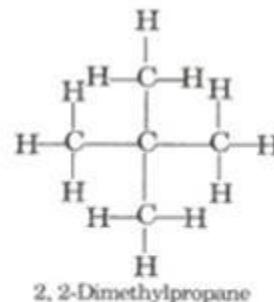
Answer 4

 (a) (i) C_5H_{12}


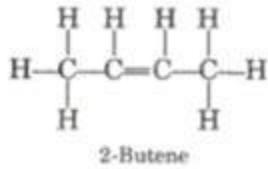
n-Pentane



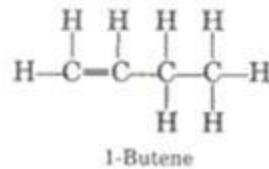
2-Methylbutane



2, 2-Dimethylpropane

 (ii) C_4H_8


2-Butene



1-Butene

b.

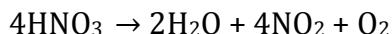
- 2,2 dimethyl propane
- 2-methyl butane
- Pent-2-ene

c.

- $H_2C=CH_2$
- Addition reaction
- Bromine solution gets decolourised.
- Ethanol
- By heating it (ethanol) with concentrated sulphuric acid at $170^{\circ}C$.

Answer 5
a.

- Dilute nitric acid is generally considered a typical acid except for its reaction with metals because it does not liberate hydrogen. It is a powerful oxidising agent, and nascent oxygen formed oxidises hydrogen in water.
- Although pure concentrated nitric acid is colourless, it appears yellow when left standing in a glass bottle due to the dissolution of reddish brown nitrogen dioxide gas in the acid. Nitrogen dioxide is produced because of the thermal decomposition of a portion of nitric acid.



- An all-glass apparatus is used in the laboratory preparation of nitric acid because nitric acid vapour corrodes rubber and cork.

b.

- A reddish brown coloured precipitate appears.
- A bluish white or pale blue precipitate appears which dissolves in excess of ammonium hydroxide to give a deep blue or intense blue or inky blue solution.

c.

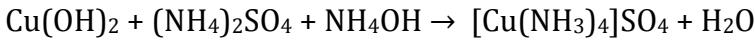
- Transition, Cr^{3+} , Fe^{2+} , MnO_4^{4-}
- $\text{Zn}(\text{OH})_2$
- NH_4Cl
- Al_2O_3 , Al
- NH_4OH

Answer 6
a.

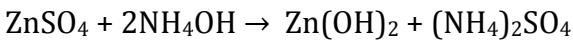
- When NH_4OH is added to copper sulphate solution drop-wise, a pale blue ppt. is obtained.



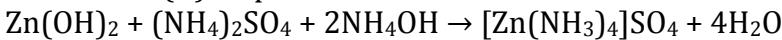
With excess of NH_4OH , the ppt. dissolves to give a deep blue solution of tetra amine copper (II) sulphate.



- When NH_4OH is added to zinc sulphate solution drop-wise, a white, gelatinous ppt. is obtained.



With an excess of NH_4OH , the ppt. dissolves to give a colourless solution of tetra amine zinc (II) sulphate.



b.

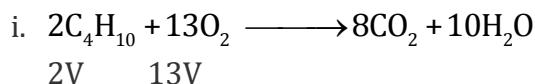
- i. J
- ii. M
- iii. T
- iv. Y
- v. Ionic bond will be formed and the molecular formula is A₂H.

c.

- i. Ionisation energy
- ii. Metallic character
- iii. Electronegativity

Answer 7

a.



2 vols. of butane requires O₂ = 13 vols.

$$90 \text{ dm}^3 \text{ of butane will require O}_2 = \frac{13}{2} \times 90 \\ = 585 \text{ dm}^3$$

ii. Molecular mass = 2 × Vapour density

So, molecular mass of gas = 2 × 8 = 16 g

As we know, molecular mass or molar mass occupies 22.4 litres.

That is,

16 g of gas occupies volume = 22.4 litres

So, 24 g of gas will occupy volume

$$= \frac{22.4}{16} \times 24 = 33.6\text{L}$$

iii. According to Avogadro's law, equal volumes of all gases under similar conditions of temperature and pressure contain the same number of molecules.

So, molecules of nitrogen gas present in the same vessel = X

b.

- i. $\text{AlN} + \text{H}_2\text{O} \rightarrow \text{Al}(\text{OH})_3 + \text{NH}_3$
- ii. $\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{C}_2\text{H}_2$
- iii. $\text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_5\text{OH}$
- iv. $\text{SO}_2 + 2\text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4 + 2[\text{H}^+]$
- v. $\text{C}_2\text{H}_5\text{Br} + \text{NaOH} \rightarrow \text{C}_2\text{H}_4 + \text{NaBr} + \text{H}_2\text{O}$