CARMEL SCHOOL, DHANBAD

FIRST TERM EXAMINATION- 2025

CHEMISTRY

STD X TIME: 2 HOURS

F.M. 80

Section A is compulsory. Attempt any four questions from section B.

SECTION A

[40 marks]

(Attempt ***all*** *questions from this section****)***

Choose **one** correct option for each of the following:

Question 1. [15 x 1 = 15]

i). The empirical formula of a compound is CH_2O, the possible molecular formula can be:

- A) $C_3H_6O_3$
- B) C_2H_4O
- C) $C_4H_3O_2$
- D) $C_4H_6O_2$

ii) The suitable pressure in Haber's process to prepare Ammonia from Nitrogen and Hydrogen is:

- A) 20 atm
- B) 200–900 atm
- C) 1–2 atm
- D) 10–100 atm

iii) The oxidized product formed when Sulphur is treated with Conc. H_2SO_4:

- A) SO_2
- B) S
- C) SO_3
- D) H_2S

iv) The salt formed when dilute H_2SO_4 reacts with insufficient Sodium hydroxide:

- A) Na_2SO_4
- B) $NaHSO_4$
- C) $MgCl_2$
- D) NaCl

v) Which of the following compounds is not suitable for the preparation of Ammonia by heating with an alkali?

- A) Ammonium sulphate
- B) Ammonium chloride
- C) Ammonium nitrate
- D) Ammonium sulphate and Ammonium chloride

vi) **Assertion(A):** Dry ammonia gas is collected by the downward displacement of air.
Reason(R): Ammonia is heavier than air.

- A) Both A and R are true and R is the correct explanation of A
- B) Both A and R are true and R is not the correct explanation of A
- C) A is true but R is false
- D) A is false but R is true

vii) A reddish brown gas:

- A) H_2S
- B) NO_2
- C) CO_2
- D) Cl_2

viii) A non-volatile acid:

- A) HNO_3
- B) H_2SO_4
- C) HCl
- D) SO_2

ix) Hydrochloric acid is a _____ acid:

- A) Monobasic
- B) Dibasic
- C) Tribasic
- D) Diacidic

x) The gas released when dilute acids react with metal sulphites:

- A) H_2S
- B) CO_2
- C) Cl_2
- D) SO_2

xi) The general formula C_nH_{2n} represents:

- A) Alkanes
- B) Alkenes
- C) Alkynes
- D) Alcohols

xii) Amongst Li, Be, C and F , the largest atomic size is of;

- A) Li
- B) Be
- C) C
- D) F

xiii) The energy required to remove an electron from the valence shell of an isolated gaseous atom is called:

- A) ionization energy
- B) electron affinity
- C) electronegativity
- D) both (A) & (C)

xiv) The chemical bond in ammonium ion are:

- A) covalent
- B) electrovalent
- C) co-ordinate
- D) covalent and co-ordinate

xv) Hydroxide of this metal is soluble in Sodium hydroxide solution :

- A) Magnesium
- B) Lead
- C) Copper
- D) Iron(II)

Question 2.

- (i) Complete the following by choosing the correct answer from the bracket. [5]

- (a) Alkenes differ from alkanes due to the presence of ..... (double / single) bonds.
- (b) Down the group, electronegativity ..... (increases / decreases).
- (c) Metals have low ..... (ionization / kinetic) energy.
- (d) The catalyst used for conversion of ammonia to nitric oxide in presence of oxygen is ..... (platinum / iron).
- (e) The properties of elements are a periodic function of their……..
  (atomic mass/atomic number)

- (ii) Match the following Column A with Column B: [5]

Column A	Column B
(a) Calcium ion	1.Alkaline earth metal
(b) Finely divided iron.	2. Covalent molecule
(c) Sulphur dioxide	3. Oxidizing as well as a reducing agent
(d) Magnesium	4. White sparingly soluble in excess of sodium hydroxide
(e) Carbon dioxide	5. Catalyst

(iii)

- (a) Draw the structural diagrams for the following compounds: [3]

- 1. n-Butane
- 2. Ethanal
- 3. Propan-2-ol

Give the:
- 1. IUPAC name of $CH_3–CH_2–COOH$
- 2. IUPAC name of CH_3COOH [2]

(iv) Identify the following (Give a suitable term for each): [5]

(a) A salt formed by the complete neutralization of an acid by a base: ……
(b) The pair of electrons in an atom that does not take part in a chemical bond formation: ……
(c) A bond formed between two atoms by sharing of a pair of electrons, with both electrons being provided by the same atom: ……
(d) The catalyst used in Contact process: ……

(e) The amount of energy released while converting a neutral gaseous isolated atom into a negatively charged ion (anion):

……

v) On analysis , a substance was found to contain: [5]
C = 54.54% , O = 36.36% , H = 9.09%.
The vapour density of the substance
is 44, calculate:

(a) its empirical formula,
(b) its molecular formula.

SECTION B

(Attempt any ***four*** questions)

[10 x 4 = 40]

Question 3. **[10]**

i) Draw the isomers of butane.
ii) Define the following term:
homologous series,
functional group,
hydrocarbons,
catenation,
isomers.

iii) Draw the structure of
(a) prop-1-ene (b) 3-methyl hexane (c) 2,3- dimethyl butane

Question 4. **[10]**

i) SO_3 on dissolving in water forms sulphuric acid but this method is not used. Why? How is sulphuric acid prepared from SO_3? Give an equation to support your answer.

ii) What do you observe when concentrated sulphuric acid is added to glucose? Give a balanced chemical reaction for the reaction.

iii) Name two metal nitrates that do not give a dark brown gas when heated. Give a balanced chemical reaction of any one of the above.

iv) Complete the following:

NH_4NO_3 ---→
C + conc. HNO_3 ----→
$NH_3 + O_2$ ----→
(in presence of Pt at 800°C)

Question 5. **[10]**

i)

a) Name the gas which is prepared by Haber's process.
b) Name two gases which give dense white fumes with ammonia.
c) Name an acidic gas which reacts with a basic gas liberating a neutral gas.
d) An amphoteric oxide reduced by a basic gas.
e) Name a compound prepared by ammonia and used as an explosive.

ii) Give the three balanced chemical equations for the formation of nitric acid in atmosphere during lightning discharge.

iii)
Draw the structure of (a) NaCl (b) An ammonium ion

Question 6. **[10]**
i)
Outline Ostwald's process. Give the relevant balanced chemical equations, mention the conditions- temperature and catalyst.

ii) Outline Contact process. Give the relevant balanced chemical equations, mention the conditions- temperature and catalyst.

Question 7. **[10]**
a) State the factors on which electronegativity depends.

b) State two conditions for the formation of an ionic bond.

c) Define :
i) precipitation
ii) empirical formula.

d) Calculate the % composition of C and O in CO_2. [Given C= 12 & O=16].

e) Draw a labelled diagram of the arrangement used to prevent back suction during the laboratory preparation of HCl.

****