

GREENLAWNS HIGH SCHOOL
SEMESTER I EXAMINATION
CHEMISTRY
X – 12/01/24

Maximum Marks: 80

Time allowed: Two hours

Answers to this Paper must be written on the paper provided separately.

The time given at the head of this Paper is the time allowed for writing the answers.

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

The intended marks for questions or parts of questions are given in brackets [].

SECTION A
(Attempt all questions)

Question 1

Choose the correct answers to the questions from the given options.
(Do not copy the question, Write the correct answer only.)

[15]

- (i) The particles present in strong electrolytes are:
- (a) only molecules (b) mainly ions
(c) ions and molecules (d) only atoms
- (ii) Dilute sulphuric acid will produce a white precipitate when added to a solution of
- (a) copper nitrate (b) zinc nitrate
(c) lead nitrate (d) sodium nitrate
- (iii) Among the elements of period Second the element which has high electron affinity is :
- (a) Lithium (b) Carbon
(c) Chlorine (d) Fluorine

- (iv) When dilute sulphuric acid reacts with iron sulphide, the gas evolved is
- (a) Vapours of sulphuric acid (b) Sulphur dioxide
(c) Sulphur trioxide (d) Hydrogen sulphide
- (v) Aluminium oxide is:
- (a) Amphoteric oxide (b) Acidic oxide
(c) Neutral oxide (d) Basic oxide
- (vi) Atomic mass of an element expressed in grams is called :
- (a) Gram molecular mass (b) Net atomic weight
(c) Molecular mass (d) Gram atomic mass
- (vii) An alkali which completely dissociates into ions is
- (a) calcium hydroxide (b) ammonium hydroxide
(c) barium hydroxide (d) None of the above
- (viii) Which of the following is correct order for ionisation energy?
- (a) $N > O > F$ (b) $N > O < F$
(c) $N < O < F$ (d) $N < O > F$
- (ix) A gas which dissolves in water to form the acid is known as
- (a) Acid Reflux (b) Acid anhydride
(c) Acidified Water (d) Acid Ketone
- (x) The compound responsible for the brown ring during the brown ring test of nitrate ion.
- (a) Nitrosoiron(II) sulphate (b) Iron(III) chloride
(c) Chromium sulphate (d) Lead(II) chloride

(xi) Match the columns:

Column A

1. Proton
2. Sodium
3. Barium
4. Chlorine
5. Electron
6. Completed shell

Column B

- A. An alkaline earth metal
- B. Halogen
- C. Noble gas
- D. An alkali metal
- E. Responsible for nuclear charge
- F. Occupied sub-shell

- (a) 1-E, 2-D, 3-A, 4-B, 5-F, 6-C
- (b) 1-D, 2-E, 3-C, 4-A, 5-B, 6-F
- (c) 1-A, 2-C, 3-F, 4-B, 5-E, 6-D
- (d) 1-E, 2-D, 3-A, 4-B, 5-C, 6-F

(xii) The unsaturated hydrocarbons undergo

- (a) a substitution reaction
- (b) an addition reaction
- (c) an oxidation reaction
- (d) None of these

(xiii) Zinc hydroxide forms gelatinous ppts.

- (a) red soluble
- (b) yellow insoluble
- (c) white soluble
- (d) white insoluble

(xiv) is the dilute solution of liquor ammonia.

- (a) Blue Vitriol
- (b) Mohr's Salt
- (c) Bench Reagent
- (d) Vinegar

(xv) Which of the following elements will form an acidic oxide?

- (a) An element with atomic number 19
- (b) An element with atomic number 3
- (c) An element with atomic number 12
- (d) An element with atomic number 7

Question 2

(i) Name the following :

[5]

- (a) An acidic gas which reacts with a basic gas liberating neutral gas.
- (b) A metallic chloride soluble in ammonium hydroxide.
- (c) The gas obtained when ammonia burns in an atmosphere of oxygen without any catalyst.
- (d) A nitride of a divalent metal which reacts with warm water liberating ammonia.
- (e) An amphoteric oxide reduced by the basic gas.

(ii) Complete the following by choosing the correct answers from the bracket:

[5]

- (a) On moving from left to right in the second period, the number of valence electrons _____. (increases / decreases)
- (b) Electrovalent compounds have _____ melting points. (high / low)
- (c) The most common ore of Aluminium is _____. (alumina / bauxite)
- (d) The conversion of ethene to ethane is an example of _____. (hydration / hydrogenation).
- (e) Addition of _____ to dilute hydrochloric acid results in liberation of hydrogen sulphide gas. (iron (III) sulphide / iron(II) sulphide)

(iii) Match the following

[5]

- | | |
|------------------------------|--|
| (a) alkynes | 1. No. of molecules in 22.4 dm ³ of carbon dioxide at S.T.P |
| (b) alkane | 2. An element with electronic configuration 2,8,8,3 |
| (c) iron | 3. C _n H _{2n+2} |
| (d) 6.023 x 10 ²³ | 4. C _n H _{2n-2} |
| (e) metal | 5. The metal that forms two types of ions |

(iv) Identify the following

[5]

- Catalyst used during Contact process.
- An organic acid which on reaction with concentrated Sulphuric acid, produces two oxides of Carbon.
- The energy released when an electron is added to a neutral gaseous isolated atom to form a negatively charged ion.
- The tendency of an atom to attract electrons towards itself when combined in a covalent compound.
- The number of shells in the third period.

(v) (a) Draw the structural formula for each of the following :

[5]

- 2, 2 dimethyl pentane
- methanol
- Iso propane

(b) Write the IUPAC name for the following compounds :

- acetaldehyde
- acetylene

SECTION B

Question 3

- (i) How would you convert : [2]
- (a) Ethylene to 1, 2-dibromoethane
 - (b) Ethylene to ethyl bromide?
- (ii) Distinguish between the following pair of compounds using test given within bracket : [2]
- Sodium nitrate (NaNO_3) and sodium sulphite (Na_2SO_3) [using dilute sulphuric acid]
- (iii) Elements X, Y and Z have atomic number 6, 9 and 12 respectively. Which one ? [3]
- (a) forms an anion.
 - (b) forms a cation.
 - (c) has four electrons in its valence shell
- (iv) What do you observe when: [3]
- (a) Nitric acid is dropped over heated saw dust.
 - (b) Nitrogen dioxide is passed through acidified freshly prepared Ferrous sulphate solution.
 - (c) Concentrated Sulphuric acid is slowly added from the sides of the test-tube containing a solution of Nitrate and equal volume of freshly prepared Ferrous sulphate solution.

Question 4

- (i) Give the chemical formula of : (a) Crayolite (b) Fluorspar [2]
- (ii) The equation $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$, represents the catalytic oxidation of ammonia. If 100 cm³ of ammonia is used, calculate the volume of oxygen required to oxidise the ammonia completely. [2]
- (iii) Give three reactions to show reducing property of ammonia. [3]

- (iv) Nitric acid cannot be concentrated beyond 68% by the distillation of a dilute solution of HNO_3 . Explain why? [3]

Question 5

- (i) State two relevant observations, for each of the following: [2]
- (a) Ammonium hydroxide solution is added to copper (II) nitrate solution in small quantities and then in excess.
 - (b) Ammonium hydroxide solution is added to zinc nitrate solution in minimum quantities and then in excess.
- (ii) Carbonic acid gives an acid salt but hydrochloric acid does not. Explain. [2]
- (iii) Identify the particles present in following solutions and name them [3]
- (a) Ferric sulphate solution
 - (b) Potassium hydroxide solution
 - (c) Sodium carbonate
- (iv)

Ethane, Ethene, Ethanoic acid, Ethyne, Ethanol

From the box given above name :

- (a) The compounds with $-\text{OH}$ as a part of its structure.
- (b) The compounds with $-\text{COOH}$ as a part of its structure.
- (c) The compound with homologous series with general formula, C_nH_{2n} .

Question 6

- (i) Under the same conditions of temperature and pressure, you collect 2 litres of Carbon dioxide, 3 litres of Chlorine, 5 litres of Hydrogen, 4 litres of Nitrogen and 1 litre of Sulphur dioxide. In which gas sample will there be [2]
- (a) the greatest number of molecules?

(b) the least number of molecules?

Justify your answer.

(ii) Write the empirical formula and molecular formula of acetic acid. [2]

(iii) (a) What should be the physical state of Lead bromide if it is electrolysed? [3]

(b) What particles are present in pure Lead bromide?

(c) Write the equations for the reactions which take place at the electrodes during the electrolysis of Lead bromide.

(iv) Acidulated water is electrolysed in Hofmann's voltameter to liberate two gases. In this context answer the following questions. [3]

(a) Name the gases evolved at each electrode.

(b) What is the material used for electrodes?

(c) What is the ratio of gases evolved by volume?

Question 7

(i) For each of the salts *A*, *B*, *C* and *D* suggest a suitable method of preparation which relates to its description given below: [2]

(a) '*A*' is a sodium salt.

(b) '*B*' is an insoluble salt.

(Do not describe the procedure for the preparation. Only the appropriate method.)

(ii) Why do atoms combine? [2]

(iii) Write balanced chemical equation to support each of the statement given below (use only dilute sulphuric acid). [3]

(a) Basic oxide of Mg + Acid \rightarrow Salt + Water

(b) Amphoteric oxide of Zn + Acid \rightarrow Salt + Water

(c) Alkali of Na + Acid \rightarrow Salt + Water

(iv) Write balanced chemical equations:

[3]

(a) Ethyl alcohol is dehydrated.

(b) Ethyl chloride reacts with aqueous Potassium hydroxide.

(c) Ethanol is oxidised with acidified Potassium dichromate.

Question 8

(i) What is the essential difference in the nature of compounds when two combining atoms

[2]

(a) differ much in their electro-negativities ?

(b) don't differ much in their electro-negativities?

(ii) By drawing an electron dot diagram, show the formation of ammonium Ion.
[Atomic No.: N = 7 and H = 1]

[2]

(iii) Following questions are pertaining to laboratory preparation.

[3]

(a) Name the acid used for the preparation of hydrogen chloride gas in the laboratory. Why is this particular acid preferred over other acids?

(b) Reaction of hydrogen chloride gas when it comes in contact with ammonia.

(c) Write the balanced chemical equation to show the lab preparation of HCl
(temp. < 200°C)

(iv) Choose the correct word which refers to the process of electrolysis from A to F, to match the description 1 to 3.

[3]

A : Oxidation B : Cathode C : Electrolyte D : Anode

E : Electrolysis F : Reduction

(1) Can conducts electricity in aqueous or in molten state _____.

(2) Loss of electron taking place at one of the electrodes is called _____.

(3) A reducing electrode is _____.