K. E. CARMEL CMI SCHOOL, SARISHA

1st Terminal Examination 2021-22

Class: X **Subject: Chemistry** **Full Marks: 100** **Time: 2 hrs**

You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the question paper.
Time given at the head of this paper is the time allotted for writing the answers.

Attempt **all** the questions from **Section I** and **any four** questions from **Section II**
The intended marks for questions or parts of questions are given in brackets []

Section - I (40 Marks)
Attempt all the questions

Question 1

(a) Choose the correct answer from the choices given in each case. [5]

(i) Which of the following is an unsaturated compound?

A) C_6H_{14} B) C_4H_8
C) C_3H_7OH D) CH_3OH

(ii) Corrosive action of sulphuric acid on skin is due to its

A) Dehydrating character B) Exothermic nature
C) Volatile nature D) Oily nature

(iii) The longest period of periodic table is

A) First B) Second
C) Fourth D) Sixth

(iv) The most electronegative element from the following element is

A) Magnesium B) Chlorine
C) Aluminium D) Sulphur

(v) The molecule which contains a triple covalent bond is:

A) Ammonia B) Nitrogen
C) Methane D) Water

(b) Which element has: [5]

(i) two shells, both of which are completely filled with electrons?
(ii) the electronic configuration 2, 8, 6 ?
(iii) highest electron affinity?
(iv) a total of four shells with two electrons in its valence shell?
(v) twice as many electrons in its second shell as in its first shell?

(c) Fill in the blanks: [5]

(i) Acid commonly known as oil of vitriol is_____.(hydrochloric acid/sulphuric acid /nitric acid)
(ii) Succeeding members of a homologous series differ by _____(CH / CH_2 / CH_3).
(iii) Corundum is an ore of _____(Fe / Zn / Al).
(iv) An explosive prepared by using sulphuric acid is_____(tri-nitro phenol / tri-nitro toluene / RDX),
(v) Substitution reaction are characteristic reactions of_____(alkynes/alkenes/alkanes).

(d) Name the following: [5]

(i) The insoluble impurities left behind by bauxite.
(ii) Alloy of aluminium containing manganese.
(iii) Cavities in coal containing 90% methane.
(iv) A molecule that has both slight positive and slight negative charge.
(v) The product formed when conc. sulphuric acid absorbs Sulphur trioxide.

(e) Write balanced chemical equations when dilute sulphuric acid reacts with the following: [5]

(i) sodium bisulphite
(ii) cupric oxide
(iii) sodium carbonate
(iv) zinc hydroxide
(v) sodium chloride above 200 ^{0}C.

(f) With reference to the first three periods of the modern periodic table, answer the following: [5]

(i) What is the electronic configuration of the element in the third period which gains one electron to change into an anion?
(ii) What is the name given to the energy released when an atom in its isolated gaseous state accepts an electron to form an anion?
(iii) Name the element which has the highest ionization potential?
(iv) Write the formula of the sulphate of the element with atomic number 13.
(v) What features of the atomic structure accounts for the similarities in the chemical properties of the elements in group 2 of the periodic table?

(g) (i) Determine the empirical formula of the compound whose composition by mass is : 42% nitrogen, 48% oxygen and rest is hydrogen. (Atomic mass of H = 1, N = 14, O = 16). [3]

(ii) Find the percentage of water of crystallisation in copper sulphate pentahydrate. (Atomic mass of Cu =64, H=1, O=16, S=32) [2]

(h) Write structural formula from IUPAC names: [5]

(i) 5-chloropentan-2-one
(ii) Pentan-1,5-dial
(iii) 2-ethyl butan-1-oic acid
(iv) 2-ethyl pentan-1-ol
(v) 2- bromo, 4-methyl pent-2-ene

Section II (40 Marks)

Attempt any FOUR questions

Question 2

(a) (i) Which compound should be treated with soda lime to obtain ethane gas in the laboratory? Write the equation for the reaction. [2]

(ii) Write balanced equation for the complete combustion of ethane. [1]

(iii) With appropriate catalysts, ethane can be oxidized to an alcohol and an aldehyde. Name the alcohol and aldehyde. [2]

(b) The type of reaction between ethane and chlorine is different from that between ethene and chlorine. [3]

(i) What is the type of reaction that has taken place between ethene and chlorine?
(ii) What feature of the ethene structure makes such a reaction possible?
(iii) Name the product of the reaction between ethene and chlorine.

(c) What do you observe when ethene is passed through alkaline potassium permanganate solution. Give the chemical equation. [2]

Question 3

(a) Six elements A, B, C, D, E and F have the following atomic numbers. [5]
A =12, B = 17, C = 18, D = 7, E = 9, F = 11. Answer the following:
(i) Which of them has the lowest electron affinity?
(ii) Which of them has the highest electron affinity?
(iii) Which of them has the largest atomic size?
(iv) Which of these belong to the third period and has the highest ionisation energy?
(v) Arrange the elements of the same group in increasing order of ionisation energy.

(b) An element *Z* is in second period and group VI A of the Periodic Table. [5]
(i) What is the number of valence electrons in its atom?
(ii) What is its valency?
(iii) What is the name of the element?
(iv) Is it a metal or non-metal?
(v) What will be the formula of the compound of Z with sodium?

Question 4

(a) Write balanced chemical equations when hot and concentrated sulphuric acid reacts with the following: [5]
(i) Sulphur
(ii) Cane Sugar
(iii) Carbon
(iv) Copper
(v) Blue vitriol

(b) Draw the electron dot structure of the following: [2 + 2 = 4]
(i) Magnesium chloride (ii) Ammonium ion

(c) What is electrovalency? [1]

Question 5

(a) For each of the substances listed below, explain its significance in the extraction of aluminium. [3]
(i) Bauxite
(ii) Cryolite
(iii) Powdered coke

(b) An organic compound with vapour density = 94 contains: carbon = 12.67%, hydrogen = 2.13% and rest is bromine. Determine the molecular formula. [At. Mass: C = 12, H = 1, Br = 80]. [5]

(c) Name the constituent elements and one use of magnalium. [2]

Question 6

(a) Give one example in each case: [3]
- (i) Solid covalent compound
- (ii) Co-ordinate bond compound
- (iii) Liquid non-polar compound

(b) An element 'A' is a metal with a valency 3. Element 'B' is a non-metal with a valency 1. [2 + 1 = 3]
- (i) Write equations to show how 'A' and 'B' form ions.
- (ii) If 'B' is a diatomic gas, write the equation for the direct combination of 'A' and 'B' to form a compound.

(c) Within a Group, where would you expect to find the element with: [2]
- (i) the greatest metallic character?
- (ii) the largest atomic size?

(d) Draw different chain isomers of pentane. [2]

Question 7

(a) Give reasons: [5]
- (i) Ethyne is more reactive than ethene.
- (ii) Electrolytic reduction is done to obtain aluminium.
- (iii) Hydrogen chloride can be termed as a polar covalent compound.
- (iv) Electrovalent compounds conduct electricity.
- (v) Hydrocarbons are excellent fuels.

(b) Convert [5]
- (i) methane to chloroform
- (ii) ethyl chloride to ethane
- (iii) methane to formaldehyde
- (iv) ethyne to ethane
- (v) ethene to ethanol

[Internal Assessment = 20 marks]