

CHEMISTRY
(Two hours and a quarter)

(The first 15 minutes of the examination are for reading the paper only. Candidate must NOT start writing during this time).

1. After having read the questions, you will be given two hours to answer all the questions.
 2. In this paper, there are two sections: A and B. Section A is compulsory. You are expected to attempt any five questions from section B.
 3. The intended marks for questions or parts of the questions, are given in brackets [].
 4. Read the directions to each question carefully and write all the answers in the answer sheet provided separately.
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Section A [50 marks]

Compulsory: Attempt all the questions from this section.

Question 1

- a) Each question in this section is provided with four possible options. Choose the most appropriate option and write in your answer sheet. [25]
- (i) Group IA elements are also called:
 - A. Alkali metal
 - B. Alkaline earth metal
 - C. Transition elements
 - D. Halogens
 - (ii) Which one of the following element has octet configuration:
 - A. Ne (at. No.10)
 - B. Na (at. No.11)
 - C. Cl (at. No.17)
 - D. F (at. No.9)
 - (iii) The elements arranged in the increasing order of their reactivity is:
 - A. $\text{Na} < \text{Al} < \text{Zn} < \text{Ca}$
 - B. $\text{Na} > \text{Al} > \text{Zn} > \text{Ca}$
 - C. $\text{Na} > \text{Ca} > \text{Al} > \text{Zn}$
 - D. $\text{Zn} < \text{Al} < \text{Ca} < \text{Na}$
 - (iv) Which one is a chemical change:
 - A. Ripening of fruit
 - B. Melting of ice
 - C. Sublimation of iodine
 - D. Boiling of water
 - (v) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3 \text{ --- } 93.7\text{KJ}$; This reaction is a :
 - A. Exothermic reaction
 - B. Endothermic reaction
 - C. Combustion reaction
 - D. Displacement reaction
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- (vi) A branch of chemistry that deals with the process and products that reduces the use and generation of hazardous substances is called:
- Organic chemistry
 - Environmental chemistry
 - Radio chemistry
 - Green chemistry
- (vii) The general formula of alkenes is:
- C_nH_{2n+2}
 - C_nH_{2n}
 - C_nH_{2n-2}
 - $C_nH_{2n+1}.OH$
- (viii) If the formula of ethyne is C_2H_2 , then the formula of propyne will be:
- C_3H_4
 - C_3H_6
 - C_3H_8
 - C_2H_6
- (ix) Carbon dioxide is a green house gas. This gas enters the plant via the process of:
- Respiration
 - Photosynthesis
 - Decomposition
 - Ingestion
- (x) A catalyst is a substance that:
- Alters the mechanism of reaction
 - Decreases the activation energy
 - Decreases the frequency of collision of reacting species
 - Increases the kinetic energy of reacting species
- (xi) Law of conservation of mass is called:
- Avogadro's law
 - Law of constant proportion
 - Boyles law
 - Law of indestructibility of matter
- (xii) Active metals above hydrogen in metal activity series reacts with acids and liberates:
- Oxygen gas
 - Hydrogen gas
 - Carbon dioxide gas
 - Sulphurdioxide gas
- (xiii) Which one of the following is an ionic compound:
- H_2O
 - CCl_4
 - CaO
 - CO_2

- (xiv) The ability of an atom to attract the bonded pair of electrons to itself in a molecule is called:
- Electron Affinity
 - Electro negativity
 - Ionization energy
 - Catenation
- (xv) The hydrocarbon which decolourises the orange color of Bromine water is :
- Saturated hydrocarbon
 - Unsaturated hydrocarbon
 - Isomers
 - Polymers
- (xvi) Which of the following contains coordinate bond:
- O_3
 - $BaCl_2$
 - HCl
 - H_2O
- (xvii) Molten NaCl conducts electricity due to the presence of:
- Free electron
 - Free ions
 - Free molecules
 - Atom of Na and Cl
- (xviii) Which of the following gas is used to fill the balloons:
- He
 - Ne
 - Ar
 - Xe
- (xix) The shortest period in the modern periodic table is:
- 1st period
 - 2nd period
 - 4th period
 - 3rd period
- (xx) Ionization enthalpy across a period from left to right :
- Decreases
 - Increases
 - Remains same
 - Increase and decreases
- (xxi) The rate of reaction depends on:
- Temperature
 - Pressure
 - Concentration
 - All of the above

- (xxii) Which metal is the alkaline earth metal:
 A. Aluminum
 B. Gold
 C. Barium
 D. Copper
- (xxiii) Aqua regia is a mixture of HCl and HNO₃ acid which dissolves :
 A. Zinc
 B. Iron
 C. Platinum
 D. Lead

- (xxiv) Metal which cannot displace Hydrogen gas from dilute acids is :
 A. Copper
 B. Magnesium
 C. Calcium
 D. Zinc

- (xxv) Cause of periodicity of elements is due to the periodicity in:
 A. Electronic configuration
 B. Atomic mass
 C. Atomic number
 D. Number of shells

b) Match each item under column A with the most appropriate item in column B. Rewrite the correct matching pairs in the answer sheet provided. [5]

Column A	Column B
i) Heating of CaCO ₃ is an E.G of	A) Stoichiometry
ii) Bad conductor of electricity	B) Exothermic reaction
iii) Ethene	c) Transition elements
iv) Elements of group 3 to 12	D) saturated hydrocarbon
v) Calculation of relative amounts of substances	E) Unsaturated hydrocarbon
	F) C _n H _{2n+2}
	G) decomposition reaction

- c) Fill in the blanks by writing suitable word(s): [5]
- (i) PVC is a very widely used.....
- (ii) Incompounds ions are arranged in a regular pattern to form a crystal lattice
- (iii) The force of attraction which binds two or more atoms together in a molecule is called.....
- (iv) Rusting of iron is aprocess
- (v) The valency of an elements down a group.....

- d) State whether the following statements are "True" or 'False'. If False Correct the statements: [5]
- (i) Biodegradable polymers decompose naturally.
- (ii) Global warming has been associated with increased depletion of Ozone layers.
- (iii) When hydrocarbon burns in air (Oxygen) it produces carbon dioxide and water vapours with liberation of heat energy.
- (iv) Plants absorb nitrate compounds from the soil and water and convert it into animal protein.

(v) Polymers are low molecular mass substances.

e) Answer the following questions:

[5]

- (i) Calculate the percentage of nitrogen found in the fertilizer ,ammonium sulphate $(\text{NH}_4)_2\text{SO}_4$
- (ii) Atomic weights :(N=14, H=1, S=32, O=16)
- (iii) Why are Alkane also known as Paraffin?
- (iv) What is a metalloid? Give an example.
- (v) What is a fossil fuel?
- (vi) Define Functional group.

f) Write down one difference between the following pairs based on the terms mentioned in the bracket. [5]

- (i) Ionic compounds and covalent compounds. {formation}
- (ii) Saturated hydrocarbon and unsaturated hydrocarbon. (type of bonds)
- (iii) Metals and non-metals. (conductivity)
- (iv) Chemical change and physical change. (example)

Section B [50 marks]

Attempt any FIVE Questions.

Question 2

(a). Define the following terms:

[3]

- (i) Catenation
- (ii) Organic compound
- (iii) Fossils

(b). Classify the following as alkanes, alkenes, alkynes:

[3]



(c). What is an addition reaction?

[2]

(d). Write the addition reaction of ethene with hydrogen.

[2]

Question 3.

(a). Atomic numbers of the elements of 3rd period is given below. Answer the questions carefully based on the data; [6]

3 rd .period Elements	Na	Mg	Al	Si	P	S	Cl	Ar
Atomic Numbers	11	12	13	14	15	16	17	18

- (i) Which element has four valence electrons?
- (ii) Which is the most reactive metal?
- (iii) Which is the most reactive non- metal?
- (iv) Which elements have valency equal to 2? Do they differ also?
- (v) Name the element which forms amphoteric oxides.
- (vi) What is the valency of chlorine?

(b). Explain 'Nitrogen Cycle' with the help of a flow diagram.

[2]

(c). Explain Global Warming and what are its causes and effects.

[2]

Question 4

(a) State two uses of the following;

[4]

- (i) Ethylene
- (ii) Fertilizer
- (iii) Polymers
- (iv) Oxyacetylene flame

- (b) Define Homologous series. [2]
 (c) If 3rd member of alkane is propane, C₃H₈, write the structural formula of Ethane and butane. [2]
 (d) What do you understand by polymerisation? [2]

Question 5

- (a) Give a balanced equation for the aerobic and anaerobic respiration. [2]
 (b) State two measures, which could be adapted to stop or at least minimize the increase in the percentage of CO₂ in air. [2]
 (c) Define the term Dative bond. [2]
 (d) An element 'X' has atomic number 20 and mass number 40. Answer the following question based on X. [1/2×8 = 4]
 (i) Write its configuration.
 (ii) What is its valency?
 (iii) Will it lose or gain electrons to be octet.
 (iv) Is it a metal or non-metal?
 (v) What is its Period number?
 (vi) What is its Group number?
 (vii) Write the symbol of the ion formed by X.
 (viii) Write the formula of the Oxide formed by X.

Question 6

- (a) Balance the following equations: [4]
 (i) $\text{HNO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$
 (ii) $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
 (iii) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
 (iv) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{HCl}$
 (b) Give reason for the following: [3]
 (c) With the help of electron dot diagram, show the formation of : [3]
 (i) Magnesium chloride, MgCl₂
 (ii) Water molecule, H₂O (At.Nos: Mg=12, H=1, O=8)

Question 7.

- (a) Write the lab. Preparation of ethyne/acetylene from calcium carbide (CaC₂) and water. [2]
 (b) In electronic concept explain Oxidation and a reduction. [2]
 (c) Give the full form for the IUPAC [2]
 (d) What is a hydrocarbon? State the branches of hydrocarbon. [2]
 (e) State the environmental hazards caused by polymers. How would you control this problem? [2]