

GREENLAWNS HIGH SCHOOL
FINAL EXAMINATION
CHEMISTRY
IX – 27/2/24

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 most correct option as a answer to the questions from the given options.
(Do not copy the question, Write the correct answer only.)

[15]

(i) One torr is equivalent to

- | | |
|---------------|------------------|
| (a) 1ml of Hg | (b) 1mm of Hg |
| (c) 1cm of Hg | (d) 0.01cm of Hg |

(ii) Which amongst the following is a not a monoatomic gas?

- | | |
|------------|--------------|
| (a) Helium | (b) Argon |
| (c) Neon | (d) Fluorine |

(iii) Gas which is responsible for acid rain.

- | | |
|---------------------|----------------------|
| (a) NO ₂ | (b) CO ₂ |
| (c) CO | (d) H ₂ S |

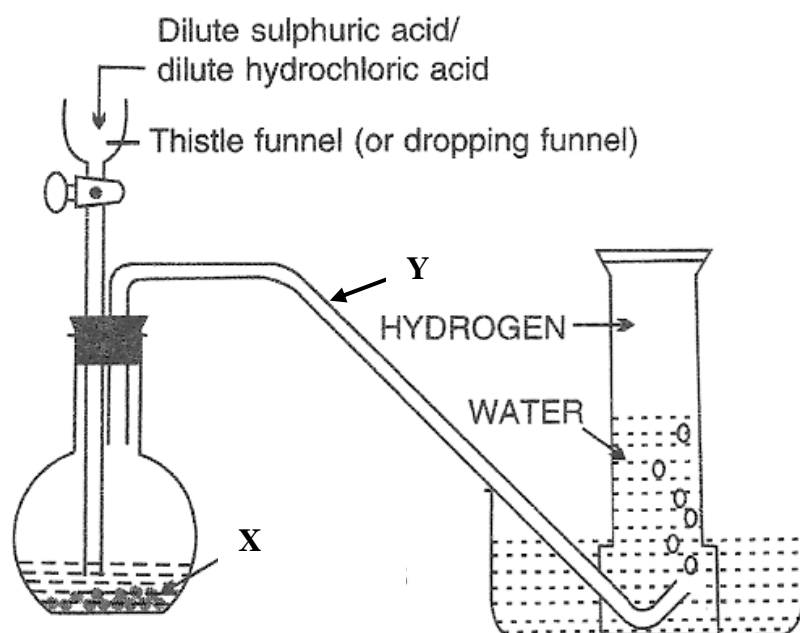
- (iv) Identify an element among the following.
- (a) H_2S (b) H_2SO_4
(c) H_2O (d) H_2
- (v) Metal which react with cold water to liberate hydrogen gas.
- (a) Aluminium (b) Magnesium
(c) Zinc (d) Calcium
- (vi) In reactivity series of metals, element placed between Pb and Cu is a
- (a) metal (b) non-metal
(c) metalloid (d) transition metal
- (vii) Identify the salt produced which forms precipitate in the reaction given below
- $$\text{CaCl}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + 2\text{NaCl}$$
- (a) CaCl_2 (b) NaCl
(c) CaCO_3 (d) Na_2CO_3
- (viii) _____ occurs when the vapour pressure of the crystal exceeds the vapour pressure of the atmospheric humidity.
- (a) deliquescent (b) deliquescence
(c) efflorescent (d) efflorescence
- (ix) Isotope of hydrogen with formula ${}^2_1\text{H}$ is known as
- (a) protonium (b) protium
(c) tritium (d) deuterium
- (x) Acid which cannot be used in the preparation of H_2 gas due to its oxidizing property.
- (a) HCl (b) H_2SO_4 (c) HNO_3 (d) H_2CO_3

- (xi) L.P.G. gas contains mostly
- (a) methane (b) ethane
(c) octane (d) propane
- (xii) Chemical responsible for ozone depletion is.
- (a) CFCl_3 (b) CH_2Cl_2
(c) CHCl_3 (d) CFI_3
- (xiii) For same mass of a gas when temperature is kept constant and the pressure is systematically increased the volume correspondingly
- (a) increases (b) remains constant
(c) decreases (d) first increase and then decrease
- (xiv) Identify the oxidising agent.
- (a) Cl_2 (b) CO
(c) HCl (d) H_2S
- (xv) Post transition elements (group 13 to 16) are mostly
- (a) strong metals and metalloids (b) strong non-metals and metalloids
(c) weak non-metals and metalloids (d) weak metals and metalloids

Question 2

- (i) Select the correct answer from the brackets to complete the following statements. [5]
- (a) _____ cannot be used in the preparation of hydrogen using dil. acids.
[lead / pure zinc]
- (b) Glauber's salt is _____. [$\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ / $\text{Na}_2\text{SO}_4 \cdot 5\text{H}_2\text{O}$]
- (c) _____ is used as a solvent in extraction of chlorophyll.
[alcohol / aldehyde]

- (d) _____ isotope of carbon is used to find the atomic mass of an element.
[C¹² / C¹⁴]
- (e) Ammonia molecule contains _____ lone pair.
[single / double]
- (ii) The diagram shows an experimental set up of laboratory preparation of hydrogen gas. [5]



- (a) Label X and Y in the above figure.
- (b) Write precaution related to the **position** of a thistle funnel.
- (c) Why is it necessary to take precaution related to position of thistle funnel.
- (d) **Liquid** which can replace water in the collection of pure dry hydrogen?
- (iii) Match the following [5]
- | | |
|------------------------------|------------------------------|
| (a) CFC | 1. transpiration |
| (b) CH ₄ | 2. Break down by U.V. lights |
| (c) NO ₂ | 3. troposphere |
| (d) O ₃ | 4. bacterial decay |
| (e) H ₂ O vapours | 5. Anerobic respiration |
| | 6. aerosol |

(iv) Give formulas of the **impurity/impurities** removed by the following chemicals during laboratory preparation of H_2 gas. [5]

- (a) Washer bottle 1 filled with KOH : _____
- (b) Washer bottle 2 filled with $AgNO_3$: _____ ; _____
- (c) Washer bottle 3 filled with $Pb(NO_3)_2$: _____
- (d) U-tube containing $CaCl_2$: _____

(v) Strip of the elements shown below belongs to period 3. Answer the questions related to the movements in period 3 and elements in period 3. [5]

11 Na Sodium 22.989	12 Mg Magnesium 24.305	13 Al Aluminium 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulphur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
Left				Right			

- (a) Give one **similarity** as we move from **left** to **right** in period 3.
- (b) What happens to the number of **valance electrons** as we move from **right** to **left**.
- (c) Mention the transition in metallic properties as we move from **left** to **right**.
- (d) Name the **metalloid** present in period 3.
- (e) Name the **least** reactive metal present in period 3.

SECTION B

Question 3

- (i) 100 cm³ of a gas enclosed in a vessel maintained at a pressure of 1400 Torr, is allowed to expand to 250 cm³ under constant temperature. What would be its pressure? [2]
- (ii) Calculate relative molecular mass of Mg(CH₃COOH)₂ [Mg=24, C=12, H=1, O=16] [3]
- (iii) Give reason for : Soft water is more suitable for use in laundries. [1]
- (iv) Draw the atomic orbital structure of H₂O molecule. (represent e⁻ with dot and cross) [2]
- (v) Write the name of the gaseous products obtained when carbonate of mercury is thermally decomposed. [2]

Question 4

- (i) Calculate the molecular mass of (NH₄)₂SO₄. [N=14, H=1, S=32, O=16] [2]
- (ii) Calculate the volume of one mole of oxygen at 27°C and 4 atmosphere pressure. The molar volume of oxygen at STP is 22.4L. [3]
- (iii) Give a **disadvantage** of using biofuels as a renewable energy source. [1]
- (iv) Explain the **salient features** of modern periodic table w.r.t. groups. [2]
- (v) Write balanced chemical equation for extraction of zinc and copper **metals** from their respective **oxides** using hydrogen gas as a reducing agent. [2]

Question 5

- (i) Calculate the relative molecular mass of sulphuric acid. [2]
- (ii) 2L of a gas at 5°C is heated till both its volume and pressure are doubled. Find the new temperature. [3]
- (iii) Why water is regarded as a universal solution. [1]
- (iv) Reaction 1 : between copper sulphate solution and zinc metal. Write the balanced chemical reaction of reaction 1. Reaction 2 : between the metal **displaced** in reaction 1 and AgNO₃ solution. Predict the compound formed in the second reaction. [2]
- (v) Explain photolysis of oxygen in atmosphere and write the equation for the same. [2]

Question 6

- (i) What will be the minimum pressure required to compress 550 dm³ of air at 3 bar to 200 dm³ temperature remaining constant. [2]
- (ii) Calculate the percentage mass of water in CuSO₄.5H₂O. [Cu=63, H₂O=18] [3]
- (iii) How are electrovalent compounds formed? [1]
- (iv) Rewrite the balanced chemical reactions with required conditions if any : [2]
- (a) $\text{Na}_2\text{CO}_3 + \text{Ca}(\text{HCO}_3)_2 \rightarrow \text{_____} + \text{NaHCO}_3$
- (b) $\text{Mg}(\text{HCO}_3)_2 \rightarrow \text{_____} + \text{H}_2\text{O} + \text{CO}_2$
- (v) Give two drawbacks of Dobereiner's triads as a method of classification of elements. [2]

Question 7

- (i) Calculate the percentage composition of carbon and hydrogen in CH₄. [C=12] [2]
- (ii) Pressure of a gas at S.T.P. is tripled and the temperature is raised to 819K. What is the final volume of the gas? [3]
- (iii) Define green house gases. [1]
- (iv) Write the balanced equations for the production of **water gas** and production of **hydrogen** from the water gas formed. [2]
- (v) How the **unreacted** CO and CO₂ **formed** is removed chemically in Bosch process. [2]

Question 8

- (i) A sample of helium has a volume of 500 cm³ at 373K. Calculate the temperature at which the volume will become 260 cm³. Assume that the pressure is constant. [2]
- (ii) $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{_____}$ (is a **synthesis** reaction). Write the product and Calculate the percentage composition of carbon in the product formed. [3]
- (iii) Give properties of ozone gas which can be sensed by human **sense organs**. [1]
- (iv) $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow 2\text{HCl} + \text{S}$ is a redox reaction. [2]
- (a) Identify the **reducing agent** in the above reaction.
- (b) Reactant which undergoes **reduction** in the above reaction.
- (v) Draw the atomic orbital structure of MgO molecule. (show e⁻ as **dot and cross**) [2]