



The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2080

Grade: - XI

Set A

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Chemistry

Time:-3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

Group A

Multiple choice question group

Choose the best alternative to the following multiple choice questions. [1×11=11]

- The valency of Al in AlCl_3 is?
a. 3 b. 4 c. 2 d. 5
- In ideal gas equation $PV = nRT$, the value of R depends on
a. nature of gas b. temperature of gas
c. heat capacity of gas d. units of measurement
- In one experiment 0.5 g of H was found to combine with 7.99 g of O and in another experiment 0.22 g of H was found to combine with 3.52 g of O. Which law of chemical combination do these data illustrate?
a. law of multiple proportions b. law of constant proportions
c. law of conservation of mass d. Law of equivalent proportions
- Charle's law relates between
a. Pressure and Volume b. Pressure and temperature
c. Volume and temperature d. Pressure, volume and temperature
- Heavy water is used as
a. Drinking water. b. Blood purifier c. washing water d. Moderator
- Which of the following is an acidic oxide?
a. Fe_2O_3 b. P_2O_5 c. Cu_2O d. CaO
- Brass is an alloy of
a. Cu and Sn b. Zn and Sn c. Cu and Zn. d. Cu and Al
- An example of oxide ore is
a. Galena. b. Cinnabar c. Calamine. d. Bauxite
- Vital Force Theory was proposed by
a. Hermann Kolbe b. Friedrich Wohler c. J J Berzelius d. Le Bel
- Among the following, which is the functional group of aldehyde?
a. $-\text{COOH}$ b. $-\text{CHO}$ c. $-\text{OH}$ d. $-\text{NH}_2$
- The IUPAC name of the compound $\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{NH}_2$
a. Pent-3-enamine b. Hex-2-en-1-amine c. Pentamine d. Pent-2-en-1-amine

Group B

Short question answer group.

[5× 8 =40]

Attempt all the questions

- A gas is said to be ideal if it obeys all the assumption of Kinetic theory of gas. (4+1)

- Write down the postulates of kinetic molecular theory of gases.
- Write down the values of temperature and pressure at NTP.

OR

The relationship between the volume and pressure of the gas was given by Robert Boyle. (1+1+3)

- State Boyle's law.
- How can we prove $P_1V_1=P_2V_2$?
- Draw three isotherms to prove this law.

- Stoichiometry is the branch of chemistry that deals with the mass and volume relationship in a reaction. (2+2+1)
 - Which law relates combination of gases by volume? State the law.
 - State and illustrate law of multiple proportions.
 - How law of conservation of mass states about the mass during reaction?
- Thomas Graham proposed a law regarding diffusion of gases which has important use in methane gas detector. (1+1+3)
 - State Graham's law of diffusion?
 - How the rate of diffusion relates with the molecular weight of the gases?
 - What time will it take to diffuse 300 mL of oxygen gas through a pore when 600 mL of nitrogen gas diffuses at 180 seconds?
- Johan Dalton (1801) studies about the relationship to the total pressure of gaseous mixture with the partial pressure of the individual gases in the mixture.
 - State Dalton's law of partial pressure. (1)
 - Derive the equation and prove $P = P_a + P_b + P_c$ (3)
 - Write down any one application of Dalton's law of partial pressure. (1)
- A binary compound of oxygen with other elements are called oxides which are classified on the basis of geometric structure or acidic or basic or neutrality.
 - What are metallic oxides? (1)
 - Na_2O is basic oxide while ZnO is amphoteric. Justify. (2)
 - Why ozone is more reactive than oxygen? (1)
 - Write any one industrial use of oxygen. (1)

OR

In 1934, an American scientist Harold C. Urey got Nobel Prize for separating deuterium isotope of hydrogen by physical methods.

- Explain in short about three isotopes of hydrogen. (2)
- How is heavy water physically and chemically different from ordinary water? Explain. (2)
- Mention an application of deuterium and tritium for each. (1)

- What is the reason behind the inertness of N_2 ? Explain the principle of the manufacture of ammonia along with the flow sheet diagram. (1+2+2)

7. Naturally occurring metals are generally found in combined form except gold which is found in Free State. Out of many minerals, only ores are chosen for extraction of metals.
- What are minerals and ores? Give examples. (2)
 - Every ore is mineral but every mineral is not ore. Justify. (1)
 - Distinguish metals and metalloids with their examples. (1)
 - What is alloy? Write the purpose of making alloy. (1)
8. What is functional group? Give any two examples. Write the IUPAC name of the following organic compounds: (2+1+1+1)
- $\text{CH}_3\text{-CH}_2\text{-CH=CH-CH}_2\text{-OH}$
 - $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-COOH}$
 - $\text{CH}_3\text{-CH(CH}_3\text{)-CH}_2\text{-CHO}$

Group C

Long question answer group.

[8× 3 = 24]

- Organic compounds were believed to synthesize only by living organism.
 - How would you describe “Vital Force Theory”? (2)
 - Why has this theory finally been discarded? (2)
 - Write the differences between organic and inorganic compounds. (2)
 - What is meant by catenation? Explain. (1)
 - What do you mean by tetravalency? (1)
- The ideal gas equation, which is also called perfect gas equation shows the relationship between pressure, temperature, volume and number of mole of gases.
 - Starting from Boyle’s law and Charle’s law how can you derive $PV=nRT$? (3)
 - Write the significance of universal gas constant? (1)
 - Give its value in lit atm? (1)
 - Calculate the mass of oxygen gas which occupies the volume of 320 mL at 27 C and 1520 mm of Hg pressure. (3)
- Hydrogen is the most abundant element in the universe and the tenth most abundant element in the earth's crust. Water contains about 11% by weight of hydrogen. Hydrogen is used in fuel cell or in internal combustion engine such that global warming can be controlled by introducing hydrogen as a source of fuel.
 - Write a short note about molecular hydrogen, nascent hydrogen, and atomic hydrogen for each. (3)
 - Show that nascent hydrogen is more powerful reducing agent than molecular hydrogen. Explain with two evident appropriate balanced chemical reactions. (3)
 - Which hydrogen atomic or nascent is more stable? (1)
 - Write down any two uses of hydrogen. (1)

The End



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Group A

Multiple choice question group

Choose the best alternative to the following multiple choice questions. [1×11=11]

- SO₄²⁻ is?
a. Compound b. element c. radical d. tetravalent radical
- In ideal gas equation PV = nRT, the value of R depends on
a. units of measurement b. temperature of gas
c. heat capacity of gas d. nature of gas
- In one experiment 0.5 g of H was found to combine with 7.99 g of O and in another experiment 0.22 g of H was found to combine with 3.52 g of O. Which law of chemical combination do these data illustrate?
a. law of multiple proportions b. law of constant proportions
c. law of conservation of mass d. Law of equivalent proportions
- Which of the following is Kelvin Zero temperature?
a. 0° C b. 273K c. -273° C d. 300K
- Heavy water is used as
a. Drinking water. b. Blood purifier c. washing water d. Moderator
- Which of the following is an basic oxide?
a. SO₂ b. P₂O₅ c. Cu₂O d. CO₂
- Bronze is an alloy of
a. Cu and Sn b. Zn and Sn c. Cu and Zn. d. Cu and Al
- Sulphide ore is concentrated by
a. Magnetic separation method b. Froth floatation method
c. Leaching d. Gravity separation method
- Vital Force Theory was proposed by
a. Hermann Kolbe b Friedrich Wohler c. J J Berzelius d. Le Bel
- Among the following, which is the prefix of CH₃?
a. ethyl b. methyl c. dimethyl d. methane
- The IUPAC name of the compound CH₃-CH₂-CH=CH-CH₂-NH₂
a. Pent-3-enamine b. Hex-2-en-1-amine c. Pentamine d. Pent-2-en-1-amine

Group B

Short question answer group.

[5× 8 =40]

Attempt all the questions

- a. A gas is said to be ideal if it obeys all the assumption of Kinetic theory of gas. (4+1)

- b. Write down the postulates of kinetic molecular theory of gases.
- c. Write down the values of temperature and pressure at NTP.

OR

The relationship between the volume and temperature of the gas was given by Jacques Charles. (1+1+3)

- a. State Charles' law.
- b. How can we prove T₂V₁=T₁V₂?
- c. Draw the isotherm to verify this law.

2. Stoichiometry is the branch of chemistry that deals with the mass and volume relationship in a reaction. (2+2+1)

- a. Which law relates combination of gases by volume? State the law.
- b. State and illustrate law of multiple proportions.
- c. How law of conservation of mass states about the mass during reaction?

3. Thomas Graham proposed a law regarding diffusion of gases which has important use in methane gas detector. (1+1+3)

- a. State Graham's law of diffusion?
- b. How the rate of diffusion relates with the molecular weight of the gases?
- c. What time will it take to diffuse 400 mL of nitrogen gas through a pore when 500 mL of oxygen gas diffuses at 180 seconds?

4. Johan Dalton (1801) studies about the relationship to the total pressure of gaseous mixture with the partial pressure of the individual gases in the mixture.

- a. State Dalton's law of partial pressure. (1)
- b. You are given a gaseous mixture containing 0.7 g of N₂ and 11200 mL of O₂ gas in a flask of 10 L capacity at 27°C. Calculate the Partial pressure of each gas and total pressure of mixture. (3)
- c. Give the relationship between the mole fraction and partial pressure. (1)

5. A binary compound of oxygen with other elements are called oxides which are classified on the basis of geometric structure or acidic or basic or neutrality.

- a. What are acidic oxides? (1)
- b. Na₂O is basic oxide while ZnO is amphoteric. Justify. (2)
- c. Why ozone is more reactive than oxygen? (1)
- d. Write any one method to prevent ozone layer depletion. (1)

OR

In 1934, an American scientist Harold C. Urey got Nobel Prize for separating deuterium isotope of hydrogen by physical methods.

- a. Explain in short about three isotopes of hydrogen. (2)
- b. How is heavy water physically and chemically different from ordinary water? Explain. (2)
- c. Mention an application of deuterium and tritium for each. (1)

6. What is the reason behind the inertness of N_2 ? Explain the principle of the manufacture of ammonia along with the flow sheet diagram. (1+2+2)
7. Naturally occurring metals are generally found in combined form except gold which is found in Free State. Out of many minerals, only ores are chosen for extraction of metals.
- What are minerals and ores? Give examples. (2)
 - Clay and bauxite both are minerals of aluminium but only one of them is ore. Justify. (2)
 - Distinguish metals and non-metals with their examples. (1)
 - What is amalgam? Give example (1)

8. What is functional group? Give any two examples. Write the IUPAC name of the following organic compounds: (2+1+1+1)

- $CH_3-CH(CH_3)-CH_2-CHO$
- $CH_3-CH_2-CH_2-COOH$
- $CH_3-\underset{\substack{| \\ OH}}{CH}-CH=CH-CH_3$

Group C

Long question answer group.

[8 × 3 = 24]

1. In 1815, Berzelius suggested that organic compounds were synthesized only by living organism.
- How would you describe "Vital Force Theory"? (2)
 - Why has this theory finally been discarded? (2)
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2. The ideal gas equation, which is also called perfect gas equation shows the relationship between pressure, temperature, volume and number of mole of gases.
- Starting from Boyle's law and Charles's law how can you derive $PV=nRT$? (3)
 - Write the significance of universal gas constant? (1)
 - What is the unit of R in lit atm? (1)
 - Calculate the volume occupied by 8 g of oxygen gas which at $25^\circ C$ and 1520 mm of Hg pressure. (3)
3. Hydrogen is the most abundant element in the universe and the tenth most abundant element in the earth's crust. Water contains about 11% by weight of hydrogen. Hydrogen is used in fuel cell or in internal combustion engine such that global warming can be controlled by introducing hydrogen as a source of fuel.
- Write a short note about molecular hydrogen, nascent hydrogen, and atomic hydrogen for each. (3)

- Show that nascent hydrogen is more powerful reducing agent than molecular hydrogen. Explain with two evident appropriate balanced chemical reactions. (3)
- What do you mean by 'occluded hydrogen'? (1)
- Write down any two uses of hydrogen. (1)

The End