Estd. 1861

BOYS' HIGH SCHOOL AND COLLEGE
THIRD TERM EXAMINATION (2023-24)
CHEMISTRY (SCIENCE PAPER – II)
CLASS – IX

TIME-2HOURS **MM - 80**

*Attempt **all** questions from **Section A** and any **four** questions from **Section B**.*
The intended marks for questions or parts of questions are given in brackets [ ].

Section A (40 Marks)
*(Attempt **all** questions from this Section.)*

Question 1.
Choose the correct answer from the given alternatives- **[15]**

(i) Choose the air pollutant which is non-acidic:
(a) SO_2 (b) NO_2 (c) SO_3 (d) Ozone

(ii) What is the value of 27°C in Kelvin Scale?
(a) 300K (b) 273K (c) 373K (d) 246K

(iii) The number of bonds in methane molecule is:
(a) 3 (b) 2 (c) 1 (d) 4

(iv) Which of the following explains the reason for bursting of balloon, when kept in bright sun?
(a) Boyle's law (b) Diffusion (c) Charles' law (d) Kinetic theory

(v) An alkaline earth metal which belongs to third period is:
(a) Na (b) Mg (c) Ca (d) Be

(vi) At what temperature will the volume of a gas at 0°C be tripled? (if pressure remains constant)
(a) 819°C (b) 273°C (c) 546°C (d) 1082°C

(vii) A metal oxide that is reduced by hydrogen is:
(a) Al_2O_3 (b) Na_2O (c) CuO (d) CaO

(viii) Three pairs of electrons are shared in a molecule of:
(a) Nitrogen (b) Oxygen (c) Methane (d) Water

(ix) Typical elements are the elements of:
(a) II period (b) III group (c) III period (d) IV group

(x) Which of the following acid is responsible for pH= 5.6 of normal rain:
(a) Nitric acid (b) Sulphuric acid (c) Carbonic acid (d) Oxalic acid

(xi) Which of the following metal hydroxides are not amphoteric in nature
(a) Zn (b) Pb (c) Al (d) K

(xii) What is the effect of heating on pressure of a gas in a container?
(a) It increases (b) It decreases (c) It remains same (d) It depends on type of gas

(xiii) Which of the following is not a greenhouse gas?
(a) Carbon monoxide (b) Water vapour (c) Methane (d) Carbon dioxide

(xiv) Calculate the relative molecular mass (in amu) of $FeSO_4.7H_2O$:
(Relative atomic mass (in amu) of Fe = 56, S = 32, O = 16, H = 1)
(a) 278amu (b) 152amu (c) 378amu (d) 170amu

(xv) Which metal gives hydrogen with all of the following: water, acid and alkalis?
(a) Fe (b) Zn (c) Cu (d) Mg

Question 2.

i. Fill in the blanks: **[5]**

a) Rise in average temperature of the earth's surface is called _____.
b) All the members of group 15 have ____ electrons in their outermost orbit.
c) The molecule formed due to the sharing of electrons is called _____.
d) Drying agent like _____ is used to dry hydrogen gas.
e) Rain water containing H_2SO_4 and HNO_3 is called _____.

ii. Match the items in column I with those in column II- **[5]**

Column I	Column II
Charles's law	-273°C
Boiling point of water	$V \propto T$
Freezing point of water	$pV \propto K$
Absolute zero	373K
Boyle's law	273K

iii. Complete and balance the following: **[5]**

a. $Al + HCl \longrightarrow$ _____ + ____
b. $C + H_2O \longrightarrow$ ___ + ___

c. $O + O_2 \longrightarrow$ ___

d. $H_2O + SO_3 \longrightarrow$ _____

e. $Mg + H_2O$ (hot water) $\longrightarrow$ _____ + ___

iv. Define the following- **[5]**

a. Smog b. Oxidation c. Pollutants d. Ionic Bond e. Reducing agent

v. Answer the following: **[5]**

a. Name any two particulate pollutants.
b. Expression for combined gas equation.
c. Write chemical formula of two chemicals responsible for ozone depletion.
d. An example of amphoteric oxide
e. Relation between Kelvin and degree Celsius.

Section B (40 Marks)

*(Attempt **any four** questions from this Section.)*

Question 3

i. Define **acid rain** and what is the main cause of it. **[2]**

ii. Write two defects of **modern periodic table.** **[2]**

iii. State **(a)** the **three variables** for gas laws and **(b)** the SI unit of these variables. **[3]**

iv. **Hydrogen** may be prepared in the laboratory by the action of a metal on an acid. **[3]**

a. Which of the metals **Copper, Zinc, Magnesium or Sodium** would be the most suitable?
b. Which of the **acid** you will choose: dilute Sulphuric acid, concentrated Sulphuric acid, dilute nitric acid and concentrated nitric acid? Explain why you would **not** use the acids you reject.
c. Which **drying agent** would you employ for this purpose?

Question 4

i. What are the steps involved in the formation of **nitric acid** during acid rain? **[2]**

ii. Draw the **orbit** structural diagram of **ammonia** molecule. **[2]**

iii. Comment on the similarity of **hydrogen** with **halogens.** **[3]**

iv. Answer the following**:** **[3]**

a. Name the law which studies the relationship between **pressure and volume** at constant temperature.
b. Name the law which studies the relationship between **temperature and volume** at constant pressure.
c. At a constant temperature, a gas at a pressure of 750 mm of mercury occupies a volume of 100 cm^3. If the volume is decreased by 40%, then find the new pressure.

Question 5

i. What is a **redox** reaction? Explain with the help of an **example.** **[2]**

ii. Identify and write **name** the following **elements**: **[2]**

a. An element A atomic number 7 mass numbers 14
b. B electronic configuration 2,8,8
c. C electrons 13, neutrons 14
d. D Protons 18 neutrons 22

iii. Explain the mechanism of **greenhouse effect**. Write the names of chemicals responsible for depletion of ozone layer. **[3]**

iv. Calculate **[3]**

(a) A gas is enclosed in a vessel at standard temperature. At what temperature will the volume of a gas enclosed be $1/6^{th}$ of its initial volume at constant pressure?

(b) Carbon dioxide occupies a volume of 336 cm^3 at STP. Find its volume at 20°C and a pressure of 700 mmHg.

Question 6

i. Explain the formation of **ozone** in the atmosphere. **[2]**

ii. According to the **activity series**, which of the following can successfully **displace** hydrogen? **[2]**
K/Na/Pb/Ag/Pt/Fe/Al.

iii. Define: **[3]**

a. Charles' law
b. Boyle's law
c. Absolute zero

iv. In the equations given below, identify **oxidising and reducing agents**? **[3]**

a. $H_2S + Cl_2 \rightarrow 2HCl + S$
b. $PbO + C \rightarrow Pb + CO$
c. $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

Question 7

i. What are the ways to reduce **global warming**? [2]

ii. Write **balanced reactions** for the following: [2]

a. Reaction of steam with red hot iron

b. Reaction of calcium with cold water

iii. Comment-

a. Gases have a natural tendency to **mix** with one another.

b. Gases have neither a fixed **volume** nor a fixed **shape**.

c. **Mountaineers** carry oxygen cylinders with them. [3]

iv. Calculate: [3]

The capacity of one cylinder is 4 dm^3 and that of the other is 1 dm^3; the pressure in the first cylinder is 560 mm Hg and that in the second is 1000 mm Hg. Both cylinders, containing carbon dioxide, are connected together by a tube fitted with a tap. What will be the final pressure in either cylinder on opening the tap if the temperature remains constant?

Question 8

i. **Define -** (a) global warming (b) Greenhouse gases [2]

ii. Complete the following table: [2]

S.No.	Element	Symbol	No. of protons	No. of electrons	No. of neutrons
1.	Uranium		92		146
2.	Beryllium	$^{9}_{4}Be$		4	

iii. Calculate: [3]

At 0°C and 760mm Hg pressure, a gas occupies volume of 100 cm^3. The Kelvin temperature of the gas is increased by one fifth and the pressure is increased one and a half times. Calculate the final volume of the gas.

Answer the following: [3]

a. Name the process in which water gas is used for the manufacture of hydrogen.

b. Give the balanced chemical equation for the large-scale preparation of hydrogen from water gas.

c. How is carbon dioxide removed from hydrogen production.

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