Science

Reg.No. : ☐☐☐☐☐☐

I.Answer all the questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 35

Part-A

5 x 1 = 5

1) From the given examples, form the pair of isotopes and the pair of isobars: $_{18}Ar^{40}$, $_{17}Cl^{35}$, $_{20}Ca^{40}$, $_{17}Cl^{37}$

2) Molecular mass of Nitrogen is 28. Its atomic mass is 14. Find the atomicity of Nitrogen.

3) Gram molecular mass of Oxygen is 32g. Density of Oxygen is 1.429g/cc. Find the gram molecular volume of Oxygen.

4) 'Cl' repersents Chlorine atom, 'cl_2' represents Chlorin molecule. List out any two differences between atoms and molecules.

5) Calculate the gram molecular mass of water from the values of gram atomic mass of Hydrogen and of Oxygen. Gram atomic mass of Hydrogen = 1g Gram atomic mass of Oxygen = 16g

Part-B

7 x 2 = 14

6) Modern atomic theory takes up the wave concept, principle of uncertainty and other latest discoveries to give a clear cut picture about an atom. State the findings of modern atomic theory.

7) How will you establish the relation between vapour density and molecular mass of a gas by applying Avogadro's law?

8) Calculate the number of moles in: i) 12.046×10^{23} atoms of Copper ii) 27.95g of Iron iii) 1.51×10^{23} molecules of CO_2

9) Find the gram molecular mass of the following from the data given: i) H_2O ii) CO_2 iii) NaOH iv) NO_2 v) H_2SO_4

ELEMENT	SYMBOL	ATOMIC No.	MASS No.
Hydrogen	H	1	1
Carbon	C	6	12
Oxygen	O	8	16
Nitrogen	N	7	14
Sodium	Na	11	23
Sulphur	S	16	32

10) Complete the table given below:

| ELEMENT	ATOMIC MASS	MOLECULAR MASS	ATOMICITY
Chlorine	35.5	71	
Ozone		48	3
Sulphur	32		8

11) Calculate the number of water molecules present in one drop of water which weighs 0.18 g.

12) Fill in the blanks using the given data: The formula of Calcium oxide is CaO. The atomic mass of Ca is 40, Oxygen is 16 and Carbon is 12. i) 1 mole of Ca (____g) and 1 mole of Oxygen atom (___g) combine to form _____ mole of CaO (____g). ii) 1 mole of Ca (___g) and 1 mole of C (___g) and 3 moles of Oxygen atom (___g) combine to form 1 mole of CaCO3 (___g)

Part-C

3 x 5 = 15

13) When ammonia reacts with hydrogen chloride gas, it produces white fumes of ammonium chloride. The volume occupied by NH_3 in glass bulb A is three times more than the volume occupied by HCl in glass bulb B at STP.

Capacity = 67.2 litre

A NH₃ gas

Capacity = 22.4 litre

1 mole of HCl gas B
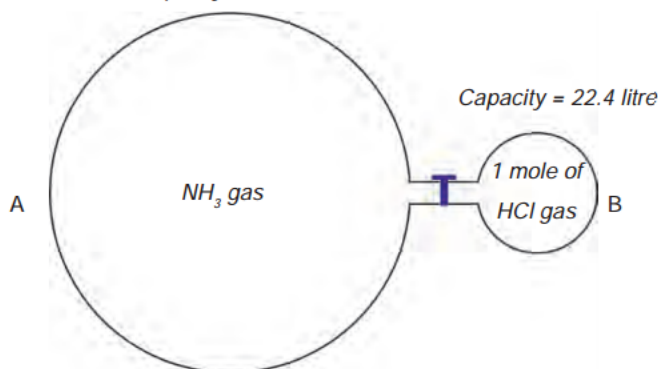
i) How many moles of ammonia are present in glass bulb A?

ii) How many grams of NH_4Cl will be formed when the stopper is opened? (Atomic mass of N = 14, H = 1, Cl = 35.5)

iii) Which gas will remain after completion of the reaction?

iv) Write the chemical reaction involved in this process.

14) Nitro glycerine is used as an explosive. The equation for the explosive reaction is $4C_3H_5((NO_3))_3 \longrightarrow 12CO_2 + 10H_2O + 6N_2 + O_2$ (Atomic mass of C = 12, H = 1, N = 14, O=16) i) How many moles does the equation show for i) Nitroglycerine ii) gas molecules produced? ii) How many moles of gas molecules are obtained from 1 mole of nitroglycerine? iii) What is the mass of 1 mole of nitroglycerine?

15) Sodium bi carbonate breaks down on heating: $2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$ (Atomic mass of Na = 23, C = 12, H = 1, O=16) i) How many moles of sodium bi carbonate are there in the equation? ii) What is the mass of sodium bicarbonate? iii) How many moles of carbon dioxide are there in this equation?

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