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TENDER HEART HIGH SCHOOL, SEC-33B, CHD

CLASS:- X SUBJECT:- CHEMISTRY
CHAPTER:- 5 TEACHER:- MOHINISHA THAKUR

ANSWER-KEY

Mole Concept and Stoichiometry

Exercise 5(A)

Ans7:- $H_2S + Cl_2 \rightarrow 2HCl + S$

1 : 1 : 2

(112 cm^3) (120 cm^3)

112 cm^3 of H_2S will react with 112 cm^3 of Cl_2

Unused $Cl_2 = 120 - 112 = 8\ cm^3$

112 cm^3 of H_2S will produce $112 \times 2 = 224\ cm^3$ of HCl.

(i) Volume of gaseous product = 224 cm^3 of HCl

(ii) Resulting mixture will be product + unused gas = 224 cm^3 HCl + 8 cm^3 of unused Cl_2

Ans9:- $C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

1 : 3 : 2

(11 lit) ?

11 litres of C_2H_4 will require $11 \times 3 = 33$ lit O_2

at $T = 273°C$ and $P = 380$ mm Hg

For finding the volume O_2 at STP we will use gas equation.

Let $P_1 = 380$ mm, $T_1 = 273°C = 273 + 273 = 546\ K$

$V_1 = 33L$

STP $\rightarrow P_2 = 760$ mm, $T_2 = 273\ K$, $V_2 = ?$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$V_2 = \frac{P_1V_1T_2}{P_2T_1} = \frac{380 \times 33 \times 273}{760 \times 546} = \frac{33}{4} = 8.25 \text{ litres}$$

(P_0T_0)

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11 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
1 : 5 : 3

[Air contains 21% or around $\frac{1}{5}^{th}$ oxygen]

Air used = 500 cm^3, it means O_2 used = $500 \times \frac{1}{5} = 100 cm^3$
Now according to the ratio,
5 volumes of O_2 requires 1 volume of C_3H_8
∴ 1 volume of O_2 requires $\frac{1}{5}$ volume of C_3H_8
∴ 100 cm^3 of O_2 will require $100 \times \frac{1}{5} = 20 cm^3$ of C_3H_8

Ans13:- $H_2 + Cl_2 \rightarrow 2HCl$
1 : 1 : 2
(6L) (4L)
H_2 and Cl_2 are used in same ratio, it shows 4 lit of Cl_2 will react with 4 lit. of H_2
Unused H_2 = 6 - 4 = 2 litres
4 lit. of Cl_2 will give 4 X 2 = 8 litres of H.Cl gas
Result:- (8 litres HCl (g) + 2 litres H_2 (g))
When water is added to the resultant gases, HCl gas being highly soluble in water dissolves completely by 2 litres of H_2 (gas) is left behind.

Ans14:- $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$
4 : 5 : 4
Given that $NH_3 + O_2$ = 27 litres used
Amount of NH_3 consumed = $\frac{27}{4+5} \times 4 = \frac{27}{9} \times 4 = 12$ litres

Amount of O_2 consumed = $\frac{27}{4+5} \times 5 = \frac{27}{9} \times 5 = 15$ litres
(P.T.O)

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Ratio of NH_3 and NO are same, therefore NO produced = 12 litres.

17:- 10 litres of mixture = 60% C_3H_8 and 40% C_4H_{10}
It means C_3H_8 = 6 litres and C_4H_{10} = 4 litres

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$
$$1 : 5 : 3$$
$$(6\ lit) \quad ?$$

1 Volume of C_3H_8 will produce 3 volumes of CO_2
6 litre of C_3H_8 will produce $6 \times 3 = 18$ litre of CO_2

$$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$$
$$2 : 13 : 8$$

2 volume of C_4H_{10} will produce 8 volumes of CO_2
∴ 1 volume of C_4H_{10} will produce $\frac{8}{2} = 4$ volumes of CO_2
∴ 4 volumes or 4 litres of C_4H_{10} will produce
$4 \times 4 = 16$ litre of CO_2
Total CO_2 produced $= 18 + 16 = 34$ litres of CO_2

Ans 18:- $2C_2H_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O$
$$2 : 5 : 4$$
$$(200\ cm^3)$$

4 volume of CO_2 requires 2 volume of C_2H_2
∴ 1 volume of CO_2 will require $\frac{2}{4} \times 1 = \frac{1}{2}$ volume of C_2H_2
∴ 200 litre of CO_2 will require $200 \times \frac{1}{2} = 100$ litre C_2H_2

4 volume of CO_2 requires 5 volume of O_2
∴ 1 volume of CO_2 requires $\frac{5}{4}$ volume of O_2 (P.T.O)