28/7/2020
TUESDAY

CHEMISTRY

STD - X
class - 12

Assignment

Page no. 46 Extended Activities Answers

1) How many grams of carbon and oxygen are required to get the same number of atoms as in one gram of Helium ?

Ans) 4 g Helium in 1 mol

In 1 gram Helium $= \frac{1}{4}$ mol

$\therefore$ No. of atoms $= \frac{1}{4} \times 6.022 \times 10^{23}$

No. of atoms in 12 g C $= 6.022 \times 10^{23}$

$\therefore 6.022 \times 10^{23}$ atoms $= 12$ g

$\frac{1}{4} \times 6.022 \times 10^{23}$ atoms

$= \frac{12}{6.022 \times 10^{23}} \times \frac{1}{4} \times 6.022 \times 10^{23}$

$= 12 \times \frac{1}{4} = 3$ g

No. of atoms in 16 g oxygen $= 1 \times 6.022 \times 10^{23}$

$\therefore$ To get $\frac{1}{4} \times 6.022 \times 10^{23}$ atoms, $16 \times \frac{1}{4} = 4$ g

2) Examine the samples given.

a) 20 g He b) 44.8 L of NH_3 at STP

c) 67.2 L N_2 at STP d) 1 mol of H_2SO_4

e) 180 g of water

i) Arrange the samples in the increasing order of the number of molecules in each.

ii) What will be the ascending order of the number of atoms?

iii) What will be the mass of samples b, c, and d?

Ans) a) 20 g He $= \frac{20}{4} = \underline{5 \text{ mol}}$

No. of molecules $= 5 \times 6.022 \times 10^{23}$

No. of atoms $= 5 \times N_A \times 1$

b) 44.8 L NH_3 in STP $= \frac{44.8 \text{ L}}{22.4 \text{ L}} = \underline{2 \text{ mol}}$

No. of molecules $= 2 \times 6.022 \times 10^{23}$

No. of atoms $= 2 \times N_A \times 4$

c) 67.2 L N_2 in STP $= \frac{67.2 \text{ L}}{22.4 \text{ L}} = \underline{3 \text{ mol}}$

No. of molecules $= 3 \times 6.022 \times 10^{23}$

No. of atoms $= 3 \times N_A \times 2$

d) 1 mol H_2SO_4 = $\frac{98\,g}{98\,g}$ = 1 mol

No. of molecules = $1 \times 6.022 \times 10^{23}$

No. of atoms = $1 \times N_A \times 7$

e) 180 g water = $\frac{180\,g}{18\,g}$ = 10 mol

No. of molecules = $10 \times 6.022 \times 10^{23}$

No. of atoms = $10 \times N_A \times 3$

i) $d < b < c < a < e$

ii) $e > b > d > c > a$

iii) Mass of b = 34 g

Mass of c = 84 g

Mass of d = 98 g

3. In 90 gram of water

a) How many molecules are present in it?

b) what will be the total number of atoms?

c) what will be the total number of electrons in this sample?

Ans) 1 mol in 18 g water

a) In 90 g water $\frac{90}{18} = \underline{5 \text{ mol}}$

Molecules = $5 \times 6.022 \times 10^{23}$

b) $5 \times 6.022 \times 10^{23} \times 3$

[One water molecule contains 3 atoms]

c) No. of electroons = $5 \times 6.022 \times 10^{23} \times 10$