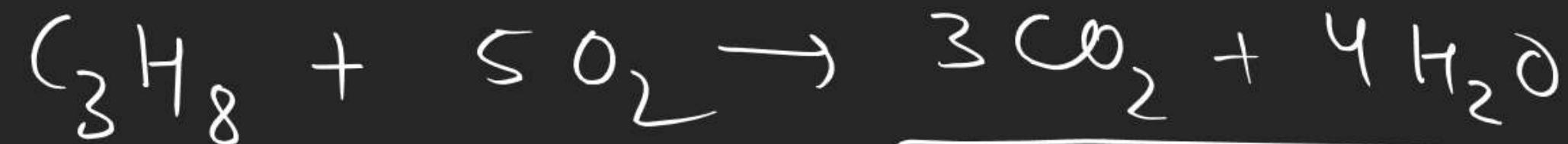


Ideal Gas

(35)

1 : $\frac{9}{2}$

$$\left(\frac{2}{11} \times 6\omega\right) \quad \left(\frac{9}{11} \times 6\omega\right)$$



1w 500 ml

3w	400 ml
----	--------

Ideal Gas

(36)



10ml

10Y

10 $\frac{x}{2}$

X

$$10Y = 30$$

$$\underline{Y = 3}$$

$$5x = 10$$

$$\underline{x = 2}$$

Ideal Gas

S-I
29

10 gm

18 gm H₂O

118 gm H₂SO₄

30 gm

$$\frac{18}{10} \times 30 = 5.4 \text{ gm}$$

34.6 gm H₂O

35.4 gm H₂SO₄

Ideal Gas

(32)



1

$$\left(x + \frac{y}{4}\right)$$

x lit

$$x + \frac{y}{4} = 6$$

$$x = 4$$

V

$$V \left(x + \frac{y}{4}\right) = 6V$$

$$Vx = 4V$$

Ideal Gas

(7)

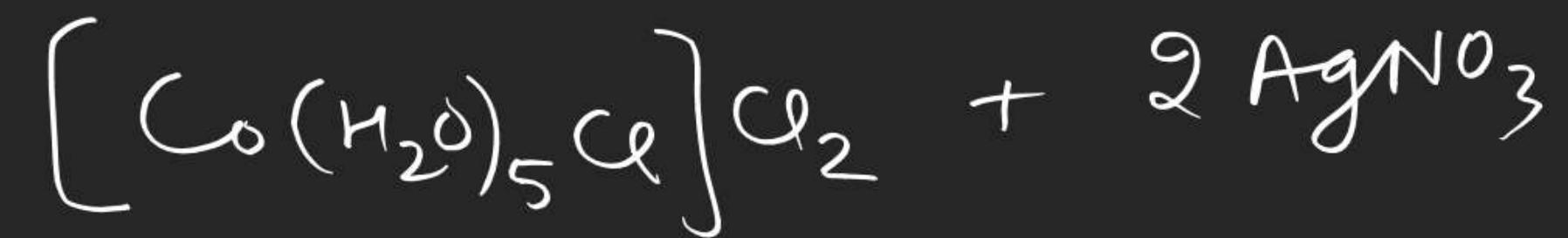
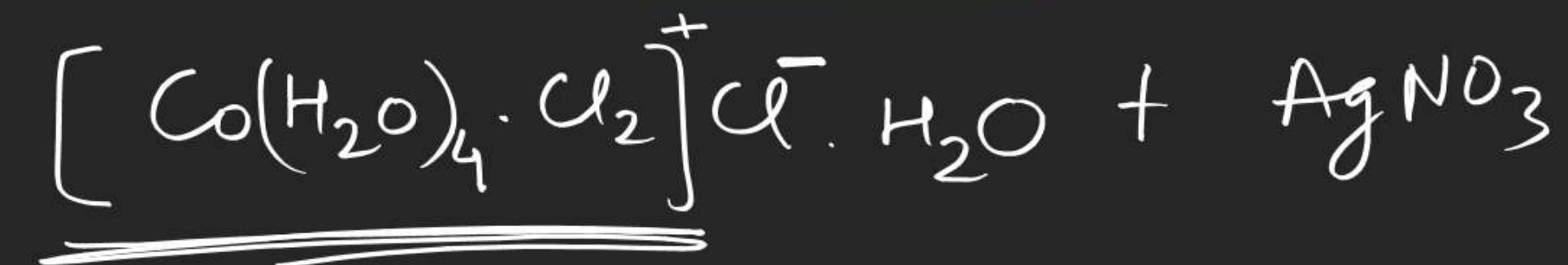
$$0.1840 \text{ gm}$$

$$\left(\frac{758-14}{760} \right) \times \left(\frac{30}{100} \right) = \underline{n} \times 0.0821 \times 287$$

$$\therefore N = \frac{n \times 28}{0.1840} \times 100$$

Ideal Gas

(14)



NaCl

 $\text{Na}^+ \text{Cl}^-$ CaCl₂ Ca^{2+} 2Cl^-

$$100 \times 0.1 = 10 \text{ mmol}$$

$$= 6 \times 10^{23} \times 10 \times 10^{-3}$$

$$= 6 \times 10^{21}$$

Ag Cl

 12×10^{21} 6×10^{21}

Ideal Gas

150.06 M0.042 MN → M0.018 M

$$(0.018) \times \frac{50}{1000} \text{ moles} \times 60$$

3

$$\text{states of Matter} = \underbrace{\text{Ideal Gas}}_{\downarrow} + \text{Real gas}$$

State (solid, liquid or gas) of a substance depends mainly on following two factors

- ① Intermolecular attractions
- ② Translational Kinetic Energy

Difference b/w solid / liquid / gas

Properties

1) Intermolecular attraction

2) Translational Kinetic Energy

3) Volume

4) Shape

5) density

6) diffusion nature

Solid

very high

very low

fixed

fixed

very high

very low

liq

high

moderate

fixed

not fixed

high

moderate

gas

low or very low

very high

not fixed

not fixed/Not defined

low low

very high

Ideal Gas



diffusion = tendency to
mix up



Gas Laws

① Boyle's law: \rightarrow At a given temperature, pressure of a given amount of gas is inversely proportional to its volume.

$$P \propto \frac{1}{V} \quad (n \& T = \text{const})$$

$$P = \frac{C}{V}$$

$$\underline{PV = \text{Const}}$$

Ideal Gas

⑪ Charles's law : → At constant Pressure , Volume of a given amount of gas is directly proportional to its absolute temperature

$$(V \propto T) \quad (\text{when } n \& P = \text{const})$$

$$V = CT$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

Ideal Gas

	0°C	1°C	2°C	10°C
	273 ml	274 ml	275 ml	283 ml
	546 ml	548 ml	550 ml	566 ml

Vol of a gas increases or decreases by $\frac{1}{273}$ times its volume at 0°C , per degree change in temperature

Charles' law :

$$V_f = V_0 + \frac{1}{273} V_0 \times t$$

$$V_f = V_0 \left(1 + \frac{t}{273}\right) = V_0 \frac{273 + t}{273}$$

$$V_f = \frac{V_0}{273} T$$

$$V_f \propto T$$

$$T(K) = 273 + t(^{\circ}C)$$

Ideal Gas

Gay-Lussac's law : \rightarrow At constant volume,
pressure of a given amount of
gas is directly proportional
to its absolute temperature

$$P \propto T \quad (\text{when } n \& V = \text{const})$$

$$P = CT$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

Ideal Gas

Avogadro's law :- At constant T, P
Volume of a gas is directly proportional to its moles

$$V \propto n \quad (\text{when } P \& T = \text{const})$$

$$V \propto \frac{1}{P} \quad (n, T = \text{const})$$

$$V \propto T \quad (n, P = \text{const})$$

$$V \propto n \quad (P, T = \text{const})$$

$$V \propto \frac{nT}{P}$$

$$V = \frac{nRT}{P}$$

$$PV = nRT$$

gas constant

0.0821 atm.lit/mol/k

8.314 J/mol/k

Ideal Gas

$$\textcircled{1} \quad (2 \text{ atm}, 3 \text{ lit}) \longrightarrow (10 \text{ atm}, V) \quad [n, T = \text{const}]$$

$$P_1 V_1 = nRT = P_2 V_2$$

$$P_2 V_2 = nRT$$

$$2 \times 3 = 10 \times V$$

$$V = 0.6 \text{ lit}$$

Ideal Gas

$$\textcircled{2} \quad (2 \text{ bar}, 3 \text{ lit}, 300 \text{ K}) \rightarrow (5 \text{ bar}, V, 450 \text{ K})$$

$$\frac{P_1 V_1}{T_1} = nR = \frac{P_2 V_2}{T_2}$$

$$\frac{P}{T} \propto \frac{V}{n}$$

$$\frac{2 \times 3}{300} = \frac{5 \times V}{450}$$

$$V = \frac{9}{5} = 1.8 \text{ lit}$$

Ideal Gas

Q. During a practical examination, an examiner filled 2 mol gas in a container of volume 8.21 lit at 300 K and asked the students to measure the pressure experimentally by manometer.

1. first, pressure measured by a naughty boy, but before passing it to next student, he secretly opened the contain for few seconds because of which $\frac{1}{10}$ th of molar escaped out.

Ideal Gas

- ② Now it was the turn of a naughty girl.
She also measured the pressure but before
passing it to next student, she secretly dented
the container due to which vol reduced
to $\frac{3}{4}$ th of original volume.
- ③ Now, it was the turn of an obedient student.
He measured it.

Ideal Gas

- ⑨ After observing all these results, the frustrated examiner threw the container inside a furnace of temperature 1200 K.
Final pressure measured by each student and final pressure of container.

Ideal Gas

$S - T$
 $O - I$
 $J - M$

Done

J-Adv

Conc terms