GAS LAWS

1.

$P_1V_1 = P_2V_2$ [1m]

Substituting the values

$2 \times 8 = P_2 \times 10$ [1m]

$$P_2 = \frac{2 \times 8}{10} = 1216 \text{ mm of Hg}$$ [1m]

The pressure that must be maintained = 1216 mm of Hg

[Total 3m]

2.

$P_1V_1 = P_2V_2$ [1m]

Substituting the values

$P_1 \times 600 = 4 \times 2400$ [1m]

$$P_1 = \frac{4 \times 2400}{600} = 12160 \text{ mm of Hg}$$

Initial pressure =12160 mm of Hg [1m]

[Total 3m]

3.

$P_1 V_1 = P_2 V_2$ (at constant temp.)(1mk)
$4 \times 1 = 1 \times ½$; (1mk)
V_2 = 4cm3. (1mk)

4.

(a) Is the temperature at which a body is assumed to have

zero internal energy / volume; (1mk)

(b) Read gases have molecules with definite volume

while idea molecules have no volume; (1mk)

Molecules of real gases white for ideal gas it is assumed

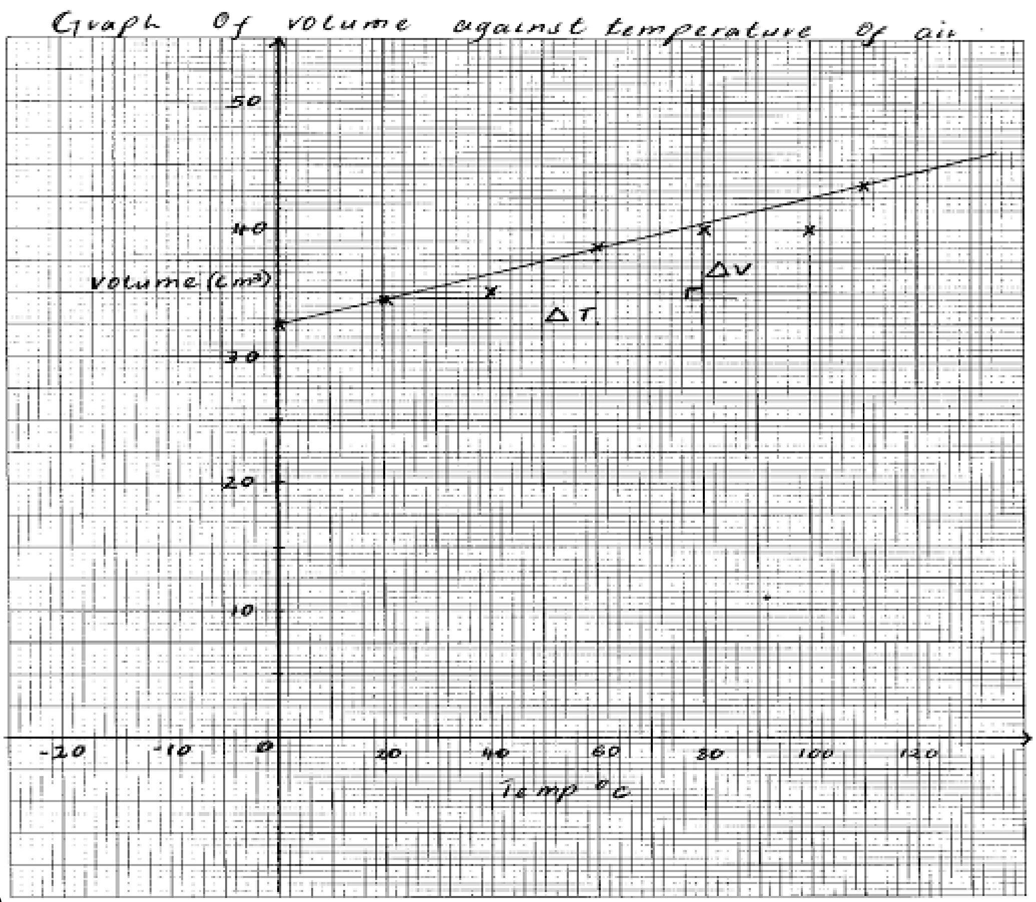
There exists no force between then; (1mk)

(c) (i) A - I S - I P - 2 C - 1 (3mks)

(ii) Slope = (1mk)

= (1mk)

= 0.1103 cm3/0C



(1mk)

(iii) Real gases get liquefied before zero volume is reached (1mk)

- The molecules of real gases have definite volume; (1mk)

5.

(a) (i) (molecules) hit the wall/cylinder B1
any other point to explain large pressure, e.g. small distance between molecules or hit often/frequently or many hit walls each sec or hit/move fast B1
(ii) greater distance between molecules or fewer hit (per sec) or fewer molecules (in cylinder) or molecules leave cylinder B1
(b) P 1 V 1 = P 2 V 2 or PV = constant B1
0.002. 200 = 1. V or 0.4 seen C1
0.398 or 0.4 m 3 A1 6

6.

V_1 = 400 ml V_2 = 600 ml

T_1 = 15°C + 273 = 288 K [1m]

$$\text{Applying Charles' Law } \frac{V_1}{T_1} = \frac{V_2}{T_1}$$

Substituting the values

$$T_2 = \frac{288 \times 600}{400}$$ [1m]

T_2 = 432 K [1m]

T_2 in degree Celsius = 432 - 273 =159°C [1m]

[Total 4m]

7.

V_1 =400 ml, V_2 =300 ml

T_1 = (227°C + 273) = 500 K T_2 = ?

$$\text{Applying Charles' Law } \frac{V_1}{T_1} = \frac{V_2}{T_2}$$

[1m]

Substituting the values

$$T_2 = \frac{500 \times 300}{400}$$

T_2 = 375 K [1m]

T_2 in degree Celsius = 375 - 273 =102°C [1m]

Alteration of temperature = 227°C - 102°C = 125°C

The temperature should be reduced by $125^{o}C$. [1m]

[Total 4m]