1) What will be the minimum pressure required to compress 500 dm³ of air at 1 bar to 200 dm³ at 30°C?

Ans) $V_1 = 500 dm^3$

$P_1 = 1 bar$

$T_1 = 273K$

$V_2 = 200 dm^3$

$T_2 = 273K$

$P_2 = ?$

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

$$\frac{500 \times 1}{273} = \frac{P_2 \times 200}{273}$$

$$P_2 = \frac{500}{200}$$

$$= 2.5 \text{ bar}$$

2) A vessel of 120 mL capacity contains a certain amount of gas at 35°C and 1.2 bar pressure. The gas is heated to 50°C at the same pressure. What would be its new volume?

Ans)   Here V_1 = 120 mL, T_1 = 30°C = 30 + 273 = 303 K, T_2 = 50°C = 50 + 273 = 323 K & V_2 = ?

Since pressure is constant, we can use Charle's law:

i.e. $V_1/T_1 = V_2/T_2$

On substituting these values, we get:
$$\frac{120}{303} = \frac{V_2}{323}$$
Or, $V_2 = \dfrac{120 \times 323}{303} = \underline{127.92 \text{ mL}}$