

# Gases

1. Explain the following in terms of the kinetic model of a gas.

(a) When the volume of a gas is reduced at constant temperature the pressure increases.

Volume reduced  $\Rightarrow$  mols hit walls more often  $\Rightarrow$  rate of change of momt. increase  $\Rightarrow P \uparrow$

(b) When the temperature of a gas is reduced at constant volume the pressure decreases.

Temp reduced  $\Rightarrow$  KE of mols less  $\Rightarrow$  velocity of molecules  $\Rightarrow$  rate of change of momt less  $\Rightarrow$  force exerted less  $\Rightarrow P \downarrow$

(c) When the volume of a gas is suddenly reduced the temperature increases.

Work is done on the gas  $\rightarrow$  increase KE of mols  $\Rightarrow$  increase T of gas

2. If the speed of a molecule is  $600 \text{ ms}^{-1}$  and it travels  $10^{-7} \text{ m}$  between collisions how many collisions does it make per second?

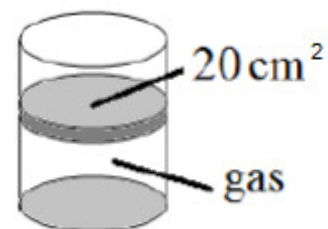
$$\frac{600}{10^{-7}} = 6 \times 10^9 \text{ collisions per sec.}$$

3. The pressure of a gas is  $5 \text{ kPa}$ , what force will be exerted on a piston of area  $20 \text{ cm}^2$ .

$$P = \frac{F}{A} \quad F = P \times A$$

$$= 5 \times 10^3 \times 20 \times 10^{-4}$$

$$= 100 \times 10^{-1} \text{ N} = 10 \text{ N}$$



Formula  
 $P = F/A$

