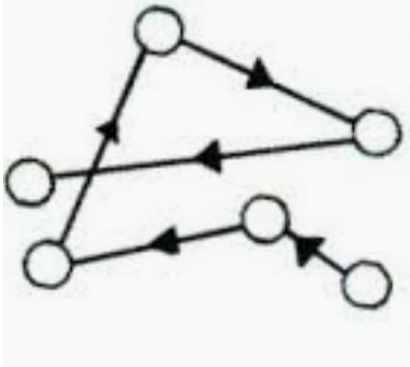
Brownian motion

Define Brownian motion:

Brownian motion is the random movement of large molecules due to their collision with the faster moving smaller molecules.

Following is a diagram for brownian motion



APPLICATION BASED QUESTIONS:

1 **(a)** Dust particles in the air move around in a random way.

(i) What term describes the random movement of the dust particles?

..... [1]

(ii) Identify the particles in the air which cause the random movement of the dust particles.

..... [2]

(iii) Explain why the dust particles move in this way.

.....

.....

..... [2]

MARKING SCHEME:

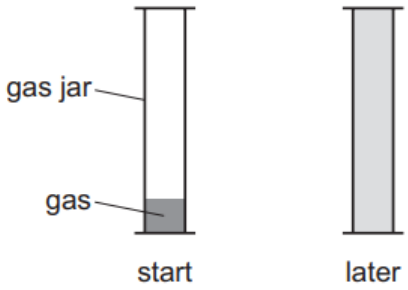
(a)(i)	Brownian (motion)	1
(a)(ii)	molecules	1
	nitrogen / N_2 / N **OR** oxygen / O_2 / O	1
(a)(iii)	nitrogen **OR** oxygen (particles) collide with / bombard / hit the dust (particles)	1
	(the bombarding particles) move **randomly**	1

APPLICATION BASED QUESTIONS:

2 When chlorine gas, Cl_2, is put into a gas jar, it spreads out to fill the gas jar.

When bromine gas, Br_2, is put into a gas jar, it also spreads out to fill the gas jar.

The process takes longer for bromine gas than for chlorine gas.



(i) What term describes the way that the gas particles spread out?

..... [1]

(ii) Use **data** from the Periodic Table to explain why bromine gas takes longer to fill a gas jar than chlorine gas.

.....

.....

..... [2]

(iii) Explain why increasing the temperature increases the rate at which the gas particles spread out.

.....

..... [1]

MARKING SCHEME:

(i)	diffusion	1
(ii)	Br_2 has an M_r of 160 **AND** Cl_2 has an M_r of 71 / bromine has an A_r of 80 **AND** chlorine has an A_r of 35.5	1
	(heavier) bromine (molecules / particles) diffuses more slowly	1
(iii)	particles have more energy / move faster	1