

iG Chem 1 EQ 15w to 01s By SubT 50marks

Q# 1/ iGCSE Chemistry/2015/s/Paper 31/ Q6

(c) Gases diffuse, which means that they move to occupy the total available volume.

(i) Explain, using kinetic particle theory, why gases diffuse.

.....

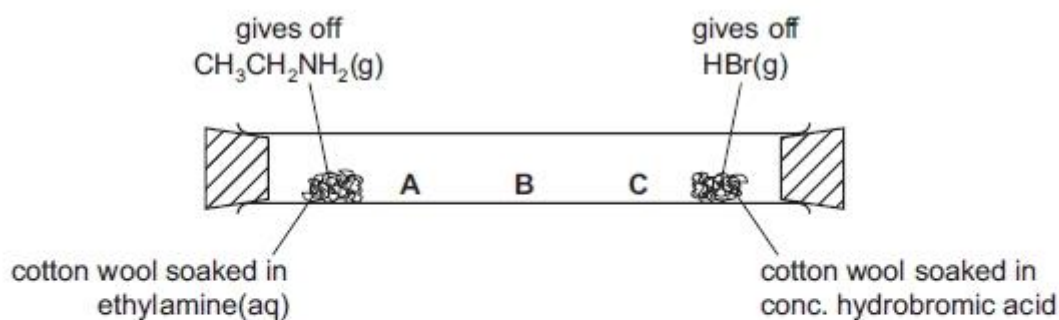
.....

..... [2]

(ii) When the colourless gases hydrogen bromide and ethylamine come into contact, a white solid is formed.



The following apparatus can be used to compare the rates of diffusion of the two gases ethylamine and hydrogen bromide.



Predict at which position, A, B or C, the white solid will form. Explain your choice.

.....

.....

..... [3]

Q# 2/ iGCSE Chemistry/2014/s/Paper 31/Q3 (c)

(iii) Suggest another method, other than diffusion, by which helium could be separated from the mixture of gases in natural gas.

..... [1]

Q# 3/ iGCSE Chemistry/2014/s/Paper 31/

3 (a) Different gases diffuse at different speeds.

(i) What is meant by the term *diffusion*?

.....

..... [1]

(ii) What property of a gas molecule affects the speed at which it diffuses?

..... [1]



- (b) Helium is a gas used to fill balloons. It is present in the air in very small quantities. Diffusion can be used to separate it from the air.

Air at 1000 °C is on one side of a porous barrier. The air which passes through the barrier has a larger amount of helium in it.

- (i) Why does the air on the other side of the barrier contain more helium?

..... [1]

- (ii) Why is it an advantage to have the air at a high temperature?

.....
..... [1]

Q# 4/ iGCSE Chemistry/2012/w/Paper 31/

- 7 Both strontium and sulfur have chlorides of the type XCl_2 . The table below compares some of their properties.

	strontium chloride	sulfur chloride
appearance	white crystals	red liquid
formula	$SrCl_2$	SCl_2
melting point/°C	874	-120
boiling point/°C	1250	59
conductivity of liquid	good	poor
solubility in water	dissolves to form a neutral solution	reacts to form a solution of pH 1

- (a) (i) Use the data in the table to explain why sulfur chloride is a liquid at room temperature, 25°C.

.....
..... [2]

Q# 5/ iGCSE Chemistry/2010/s/Paper 31/

- 2 Ozone is a form of oxygen. Ozone is present in the upper atmosphere and it prevents dangerous solar radiation from reaching the Earth's surface. Some of the chemicals that diffuse into the upper atmosphere decompose ozone. Chemicals that have this effect are methane (CH_4), chloromethane (CH_3Cl) and an oxide of nitrogen (NO_2).

- (i) Which of these three chemicals diffuses the most slowly? Give a reason for your choice.

.....
.....
..... [2]



Q# 6/ iGCSE Chemistry/2006/w/Paper 3/

2 The table shows the melting points, boiling points and electrical properties of the six substances A to F.

substance	melting point / °C	boiling point / °C	electrical conductor at room temperature	electrical conductor of substance dissolved in water
A	961	2193	good	does not dissolve
B	113	444	does not conduct	does not dissolve
C	0	100	very poor	very poor
D	803	1465	does not conduct	good
E	-5 to -10	102 to 105	good	good
F	-85	-60	does not conduct	does not dissolve

(i) Which **three** substances are solids at room temperature?

..... [1]

(iii) Which **one** is a gas at room temperature?

..... [1]

(iv) Which **two** substances are liquids at room temperature?

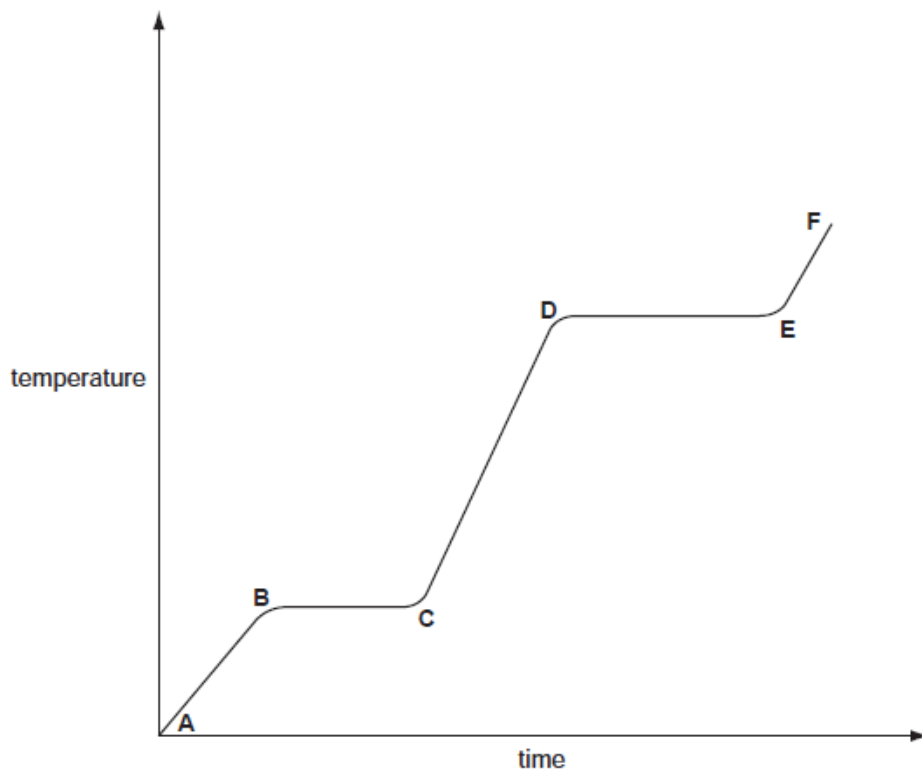
..... [1]

Q# 7/ iGCSE Chemistry/2005/w/Paper 3/

2 Ethanoic acid is a colourless liquid at room temperature. It has the typical acid properties and forms compounds called ethanoates.

(a) A pure sample of ethanoic acid is slowly heated from 0°C to 150°C and its temperature is measured every minute. The results are represented on the graph below.





(i) Name the change that occurs in the region D to E.

..... [1]

(ii) What would be the difference in the region B to C if an impure sample had been used?

..... [1]

(iii) Sketch on the graph how the line would continue if the acid was heated to a higher temperature. [1]

(iv) Complete the following table that compares the separation and movement of the molecules in regions C to D with those in E to F.

	C to D	E to F
separation (distance between particles)
movement of particles	random and slow
Can particles move apart to fill any volume?

[5]



Q# 8/ iGCSE Chemistry/2005/s/Paper 3/ QIGCSE Chemistry/201

- (d) Traces of chlorine can be separated from bromine vapour by diffusion.
Which gas would diffuse the faster and why?

.....
..... [2]

Q# 9/ iGCSE Chemistry/2003/w/Paper 3/

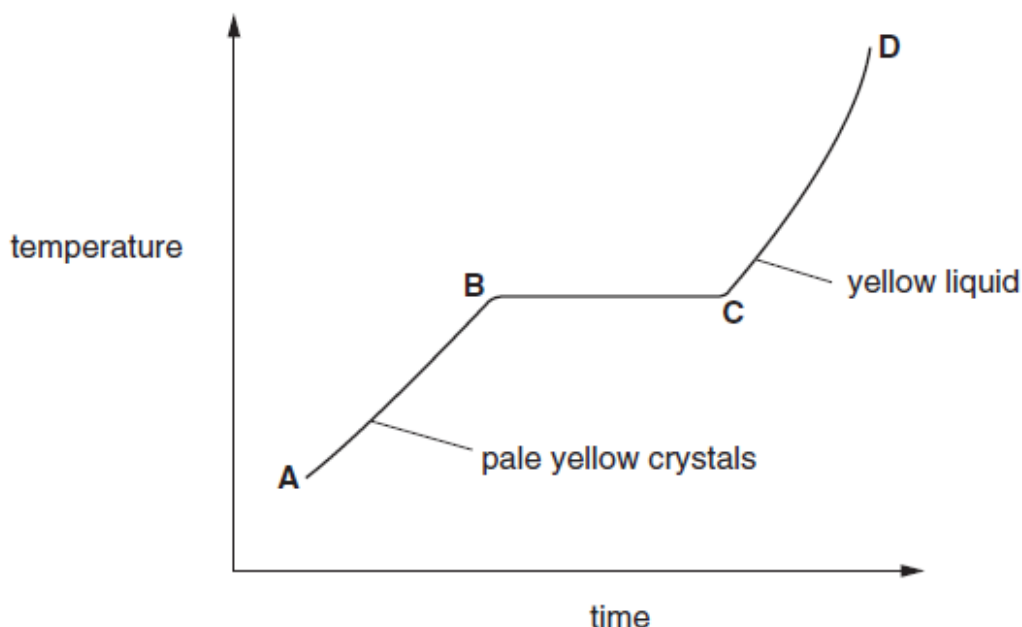
- 4 Esters occur naturally in plants and animals. They are manufactured from petroleum. Ethyl ethanoate and butyl ethanoate are industrially important as solvents.

- (a) (i) Explain the term *solvent*.

.....[1]

Q# 10/ iGCSE Chemistry/2003/s/Paper 3/ Q4

- (b) When nitrogen dioxide is cooled, it forms a yellow liquid and then pale yellow crystals. These crystals are heated and the temperature is measured every minute. The following graph can be drawn.



- (i) Describe the arrangement and movement of the molecules in the region A–B.

.....
.....

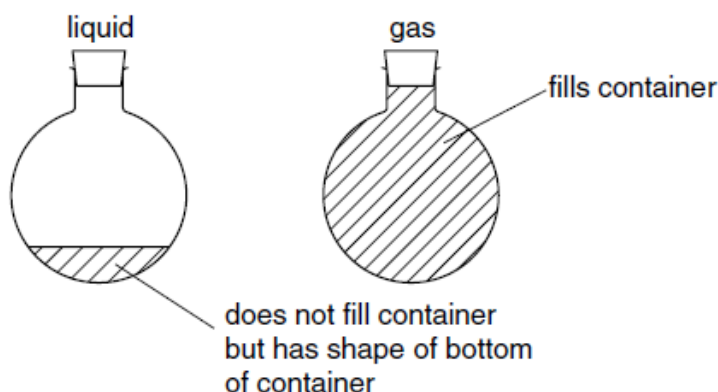
- (ii) Name the change that occurs in the region B–C

.....[4]



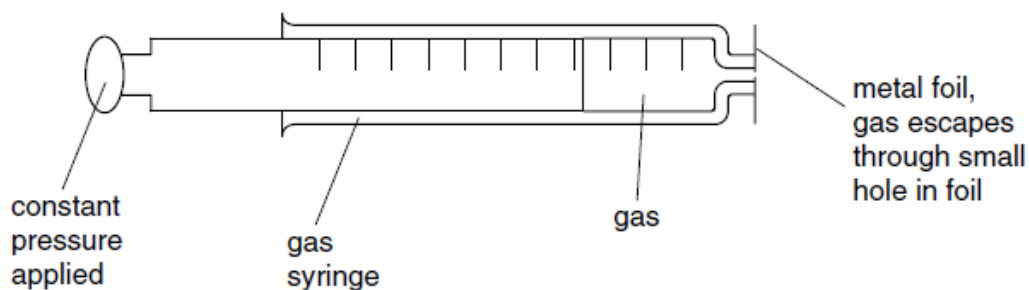
- 5 (a) The Kinetic Theory explains the properties of solids, liquids and gases in terms of the movement of particles.

Liquids and gases both take up the shape of the container but a gas always fills the container. Explain this, using the ideas of the Kinetic Theory.



.....
.....
.....
.....[4]

- (b) The following apparatus can be used to measure the rate of diffusion of a gas.



- (i) What measurements would need to be taken to calculate the rate of diffusion of a gas?
.....[2]

- (ii) Which gas, carbon dioxide or sulphur dioxide, would diffuse faster?
Explain your choice.
.....
.....
.....[3]



Mark Scheme iG Chem 1 EQ 15w to 01s By SubT 50marks

Q# 1/ iGCSE Chemistry/2015/s/Paper 31/

6(c)(i)	Any two from: (particles move in) random motion; (particles) collide; (particles) move from a region of high concentration to low concentration;	2	A alternative phrases for collide A down a concentration gradient
6(c)(ii)	C; M2 it has a lower (relative) molecular mass (than HBr); M3 ethylamine diffuses faster (than HBr);	3	A ethylamine is less dense A ethylamine is a lighter molecule but I 'ethylamine is lighter' I ethylamine is a smaller molecule A ethylamine molecules or particles move faster A ECF for M2 and M3 if A is given e.g. HBr diffuses faster for M3 because it is a lighter molecule for M2 A ECF for M2 if B is given e.g. they diffuse at same rate for M3 because molecules weigh the same for M2

Q# 2/ iGCSE Chemistry/2014/s/Paper 31/Q3c

(iii) fractional distillation (1) [1]

Q# 3/ iGCSE Chemistry/2014/s/Paper 31/

3 (a) (i) (particles) spread to fill total available volume / move from high concentration to low concentration / moves down a concentration gradient (1) [1]

(ii) mass or M_r (1) [1]

(b) (i) helium atoms / molecules are lighter than molecules in air or N_2 and O_2
or helium is less dense than air or N_2 and O_2 .
or helium diffuses (through the porous barrier) faster than air or N_2 and O_2 . (1) [1]

(ii) faster rate of diffusion / molecules move faster (at high temperatures). (1) [1]

(iii) fractional distillation (1) [1]

Q# 4/ iGCSE Chemistry/2012/w/Paper 31/

7 (a) (i) melting point is below 25°C ; [1]

boiling point above 25°C ; [1]

accept: argument based on actual values

note: 25°C is between mp and bp = [2]

Q# 5/ iGCSE Chemistry/2010/s/Paper 31/

2 (i) chloromethane [1]

cond biggest molecular mass / biggest mass of one mole / its molecules
move slowest / heaviest molecule / highest density [1]

accept atomic mass if correct numerical value given

ignore it is the heaviest (gas) / biggest molecule

accept particles or molecules

not atoms



Q# 6/ iGCSE Chemistry/2006/w/Paper 3/

2 More than required number of answers – [0]

- | | | |
|-------|---------|-----|
| (i) | A, B, D | [1] |
| (ii) | D | [1] |
| (iii) | F | [1] |
| (iv) | C and E | [1] |
| (v) | A | [1] |
| (vi) | E | [1] |

Q# 7/

- | | | |
|--------|---|-----|
| (a)(i) | boiling | [1] |
| (ii) | lower temperature or
over temperature range or no plateau | [1] |
| (iii) | direct continuation of E to F | [1] |
| (iv) | close or touching far apart | [2] |
| | fast and random | [1] |
| | cannot move apart can move apart | [2] |

Q# 8/ iGCSE Chemistry/2005/s/Paper 3/ QiGCSE Chemistry/201

- | | | |
|-----------|---|-----|
| (d) | chlorine | [1] |
| | COND lower M_r or lower density or lighter molecules or molecules move faster | [2] |
| OR | lighter or based on A_r MAX [1] | |
| | smaller with no additional comment or sieve idea [0] | |
| | N.B. a total of [3] not [2] | |

Q# 9/ iGCSE Chemistry/2003/w/Paper 3/

- | | | |
|---|--------------------------------------|-----|
| 4 | (a) (i) in which something dissolves | [1] |
|---|--------------------------------------|-----|

Q# 10/ iGCSE Chemistry/2003/s/Paper 3/ Q4

- | | | |
|---------|--|-----|
| (b) (i) | close or tightly packed | [1] |
| | ordered or lattice | [1] |
| | vibrational | [1] |
| | NOT forces | |
| (ii) | melting or freezing or fusion or solidification | [1] |

Q# 11/ iGCSE Chemistry/2002/s/Paper 3/Q5 (a)

Particles are free to move in both liquids and gases,
so they can change their shape;

In a gas, there are no bonds between particles, so they are free to assume the volume of the container

In a liquid the particles are connected together by bonds, so can only change their shape, not their volume

Total 4 marks

5 (b) (i)

Time taken

For volume to decrease 2 marks

(ii) Carbon dioxide

Because it has a M_r of 44, SO_2 has an M_r of 64

Molecules with smaller mass diffuse more quickly

3 marks

