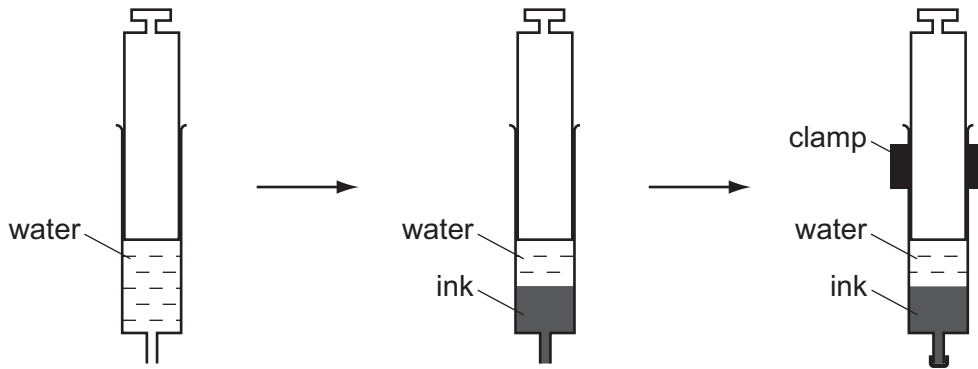


CAMBRIDGE LOWER SECONDARY CHECKPOINT  
PRACTICE QUESTIONS & MARK SCHEMES

Stage 8 / Subject: Physics

Topic: Pressure and Diffusion/ Diffusion- Set-1

- 1 A student half-filled a syringe with water.  
She then carefully drew up some blue ink into the syringe so that it formed a separate layer below the water.  
She then left the syringe in a clamp for twenty hours.



After twenty hours the blue colour of the ink had spread throughout the water.

- (a) Use the kinetic particle theory to explain these observations.

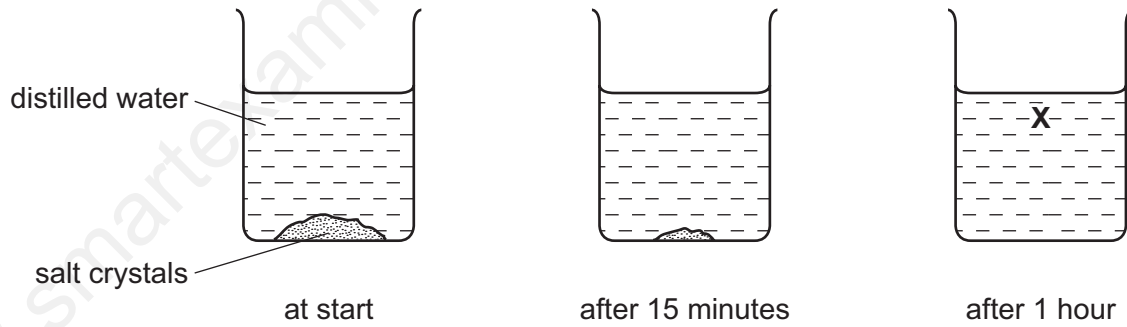
.....  
.....  
..... [2]

## MARKING SCHEME:

- (a) Any 2 of:  
diffusion /  
ink particles move /  
water particles or molecules move /  
movement of particles is random /

[2]

**2** A student placed some crystals of salt at the bottom of a beaker of distilled water. She left the contents of the beaker to stand for one hour. The diagram below shows her observations.



After one hour, all the salt had disappeared but the solution at point **X** tasted salty.

**(a)** Use the kinetic particle theory to explain these observations.

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..... [4]

## MARKING SCHEME:

Any 4

In solid salt the particles can't move / fixed;

salt dissolves / dissolving;

(because) forces between particles / ions (in solid) are overcome;  
diffusion;

salt particles in solution move;

randomly;

water particles moving;

water and salt particles (constantly) colliding;

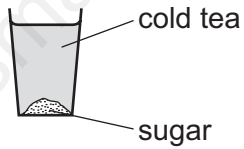
salt particles spread themselves out or mix with water; [4]

3

A student placed a spoonful of sugar in the bottom of a glass of cold tea and left it undisturbed for several minutes.

After 2 minutes, she used a straw to taste some of the tea from the top of the glass. It did not taste sweet.

After 10 minutes, the sugar had disappeared and the solution at the top of the glass tasted sweet.



at the start



after 2 minutes



after 10 minutes

(a) Use the kinetic particle theory to explain these observations.

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.....

..... [4]

## MARKING SCHEME:

(a) Any four of: [4]

- sugar dissolves
- sugar particles become separated or water molecules get in between sugar particles
- diffusion
- movement of particles (in solution)
- random (movement)
- (sugar) particles constantly collide with (water) molecules
- particles (in solution) spread out / separate
- ALLOW: particles move from concentrated to dilute (sugar) solution

**4**

Aluminium and gallium are in Group III of the Periodic Table.

(a) The heat from your hand is sufficient to melt gallium.  
Describe the change in state from solid to liquid in terms of the kinetic particle theory.  
In your answer include

- the difference in arrangement and closeness of the particles in a solid and a liquid,
- the difference in the motion of the particles in a solid and a liquid.

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..... [5]

## MARKING SCHEME:

(a) Any four of: [4]

- in solid, particles are arranged regularly (or are ordered)/ in a lattice
- in solid, particles are close together
- in solid, particles are not moving/only vibrate/ are in fixed position
- in liquid, particles randomly arranged/disordered/ have random motion
- in liquid, particles slide over each other/ move slowly
- in liquid, particles are close together

IGNORE: particles are closer together

Any one of: [1]

- during melting, particles become less ordered
- during melting, particles start moving/ move more/ move faster

IGNORE: during melting, particles get further apart

NOTE: there must be a reference to particles to score marks



## MARK SCHEME:

<p><i>Any 3 of:</i></p> <ul style="list-style-type: none"><li>• diffusion;</li><li>• (bulk) movement of particles from high to low concentration;</li><li>• particles are in constant motion;</li><li>• (movement of particles is) random;</li><li>• bromine particles spread (throughout the solvent particles)/ bromine particles mix up (with solvent);</li></ul>	<p><b>3</b></p>	<p><b>A</b> particles move (from place to place)</p> <p><b>A</b> particles collide with each other / particles hit into each other</p>
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**6** Many flowers produce volatile oils. These oils are responsible for the sweet scent (perfume) of many flowers.

(a) What does the term *volatile* mean?

..... [1]

(b) A teacher placed some highly-scented flowers at the front of the class. At first, the students at the back of the class could not smell the scent. After two minutes they could smell the scent.

Use the kinetic particle theory to explain these observations.

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.....  
..... [3]

## MARK SCHEME:

(a)	evaporates easily/vaporises readily;	1	<b>A</b> has a low boiling point/evaporates at room temperature
(b)	<i>Any three of:</i> <ul style="list-style-type: none"><li>• movement of particles;</li><li>• diffusion;</li><li>• particles collide with each other / particles bounce off each other;</li><li>• spreading out of particles;</li><li>• random (movement of particles);</li><li>• (particles move) from higher to lower concentration;</li></ul>	3	