

1 - Simpler

Kinetic Theory - {Questions}

A Physicist

1 mark = 1 technical point or idea or fact

Labelled diagrams can help you sort out + explain ideas

DON'T just be content with your first version!

1. Expansion

(a) How does kinetic theory explain why a liquid expands with increasing temperature? 3

(b) Explain briefly how a mercury thermometer works. 3

Ext (c) What is a bimetallic strip and where is it used? 3

2. Latent heat

How does kinetic theory explain why a liquid cools as it evaporates? 3

3. Diffusion

How does kinetic theory explain how the smell of food reaches you at the other end of the house? 3

4. Conduction

(a) Why are gases such poor conductors of heat? 2

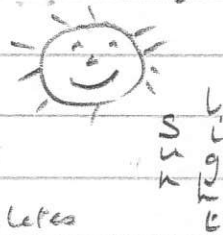
(b) Why are metals such good conductors of heat compared to other solids like glass, plastic etc.? 2

5. Convection

The diagram shows a simple solar heating system. The water circulates as shown - no pump is needed.

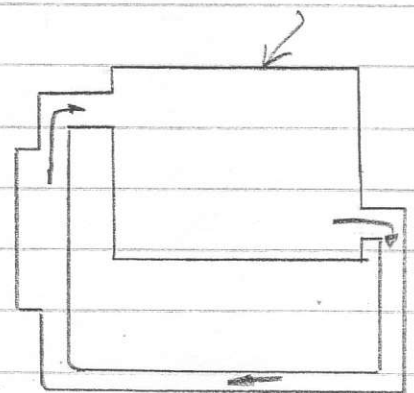
The heated water steadily accumulates in the tank.

Can you explain how it works? (4)



SUNLIGHT

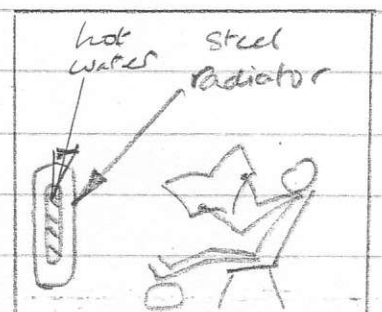
hot water tank



6. Absolute zero

(a) Why is there an Absolute zero minimum temperature, but no Absolute maximum? (2)

(b) Why can we never reach Absolute zero? (2)



©

The
9.98 + 10.13
enjoy.
x14

7. And finally....

How is the Heat Energy transferred from the hot water to the person? (4). Total / 31.

Kinetic Theory - 1 - Answers

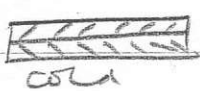
H Physics

1. (a) - particles/atoms vibrating ^① - amplitude $\uparrow$ with $\uparrow$ temp ^①
 - each particle takes up more room ^① /3

- (b) - mercury/alcohol expands with $\uparrow$ temp ^①

- liquid column gets longer ^① - we measure column length ^①

(c)



- brass
- iron

- 2 metals ^①



brass
expands
more ^①

- thermostats, temp. control ^①

[9]

2. - Higher energy particles escape ^①

- remaining particles have less energy each ^①

- they are cooler ^①

[3]

3. - air particles in constant random moving + mixing ^①

- food particles move + mix with air ^①

- food particles spread through the air and go up your nose ^①

- 4 (a) - gas particles v. rarely contact each other ^①

- so do not pass on heat/kinetic energy well ^①

- (b) - metal atoms have free electrons ^①

- ... which carry heat/kinetic energy atom - atom ^①

[4]

5. - sunlight heats water, $\therefore$ expands ^①, gets less dense ^①

- cooler, denser water sinks ^①, heated water rises ^①

- hottest, least dense water stays at the top of the tank (4)

6. (a) - cooler atoms vibrate less quickly / less amplitude ^①

- as you cool a substance its atoms come to a dead stop

- You cannot go slower than stationary

- There is no upper limit to atoms' speed

the speed of light?

- (b) - to cool an object you must bring it

- in contact with something colder ^①

- you cannot get colder than absolute 0. ^①

7. by... - conduction through steel ^①

- radiation through the air ^①

- convection of rising air ^①

- circulation of warmed air round room ^①

[4]

©

FW

10.98