DOT POINT

WACE PHYSICS UNITS 1 AND 2

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Contents

Words to Watch

account, account for State reasons for, report on, give an account of, narrate a series of events or transactions.

analyse Interpret data to reach conclusions.

annotate Add brief notes to a diagram or graph.

apply Put to use in a particular situation.

assess Make a judgement about the value of something.

calculate Find a numerical answer.

clarify Make clear or plain.

classify Arrange into classes, groups or categories.

comment Give a judgement based on a given statement or result of a calculation.

compare Estimate, measure or note how things are similar or different.

construct Represent or develop in graphical form.

contrast Show how things are different or opposite.

create Originate or bring into existence.

deduce Reach a conclusion from given information.

define Give the precise meaning of a word, phrase or physical quantity.

demonstrate Show by example.

derive Manipulate a mathematical relationship(s) to give a new equation or relationship.

describe Give a detailed account.

design Produce a plan, simulation or model.

determine Find the only possible answer.

discuss Talk or write about a topic, taking into account different issues or ideas.

distinguish Give differences between two or more different items.

draw Represent by means of pencil lines.

estimate Find an approximate value for an unknown quantity.

evaluate Assess the implications and limitations.

examine Inquire into.

explain Make something clear or easy to understand.

extract Choose relevant and/or appropriate details.

extrapolate Infer from what is known.

hypothesise Suggest an explanation for a group of facts or phenomena.

identify Recognise and name.

interpret Draw meaning from.

investigate Plan, inquire into and draw conclusions about.

justify Support an argument or conclusion.

label Add labels to a diagram.

list Give a sequence of names or other brief answers.

measure Find a value for a quantity.

outline Give a brief account or summary.

plan Use strategies to develop a series of steps or processes.

predict Give an expected result.

propose Put forward a plan or suggestion for consideration or action.

recall Present remembered ideas, facts or experiences.

relate Tell or report about happenings, events or circumstances.

represent Use words, images or symbols to convey meaning.

select Choose in preference to another or others.

sequence Arrange in order.

show Give the steps in a calculation or derivation.

sketch Make a quick, rough drawing of something.

solve Work out the answer to a problem.

state Give a specific name, value or other brief answer.

suggest Put forward an idea for consideration.

summarise Give a brief statement of the main points.

synthesise Combine various elements to make a whole.

Introduction

What the book includes

This book provides questions and answers for each dot point in the syllabus for WACE Physics Units 1 and 2:

Unit 1 Thermal, Nuclear and Electrical Physics

- Topic 1 Heating Processes
- Topic 2 Ionising Radiation and Nuclear Reactions
- Topic 3 Electrical Circuits

Unit 2 Linear Motion and Waves

- Topic 1 Linear Motion and Force
- Topic 2 Waves

Format of the book

The book has been formatted in the following way:

1.1 Subtopic from syllabus.

1.1.1 Assessment statement from syllabus.

1.1.1.1 First question for this assessment statement.

1.1.1.2 Second question for this assessment statement.

The number of lines provided for each answer gives an indication of how many marks the question might be worth in an examination. As a rough rule, every two lines of answer might be worth 1 mark.

How to use the book

Completing all questions will provide you with a summary of all the work you need to know from the syllabus. You may have done work in addition to this with your teacher as extension work. Obviously this is not covered, but you may need to know this additional work for your school exams.

When working through the questions, write the answers you have to look up in a different colour to those you know without having to research the work. This will provide you with a quick reference for work needing further revision.

Unit 1 Thermal, Nuclear and Electrical Physics

Unit 1 Thermal, Nuclear and Electrical Physics

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Unit 1 Thermal, Nuclear and Electrical Physics

Topic 3 Electrical Circuits

Unit 1 Thermal, Nuclear and Electrical Physics

Unit 2 Linear Motion and Waves

Unit 2 Linear Motion and Waves

Unit 2 Linear Motion and Waves

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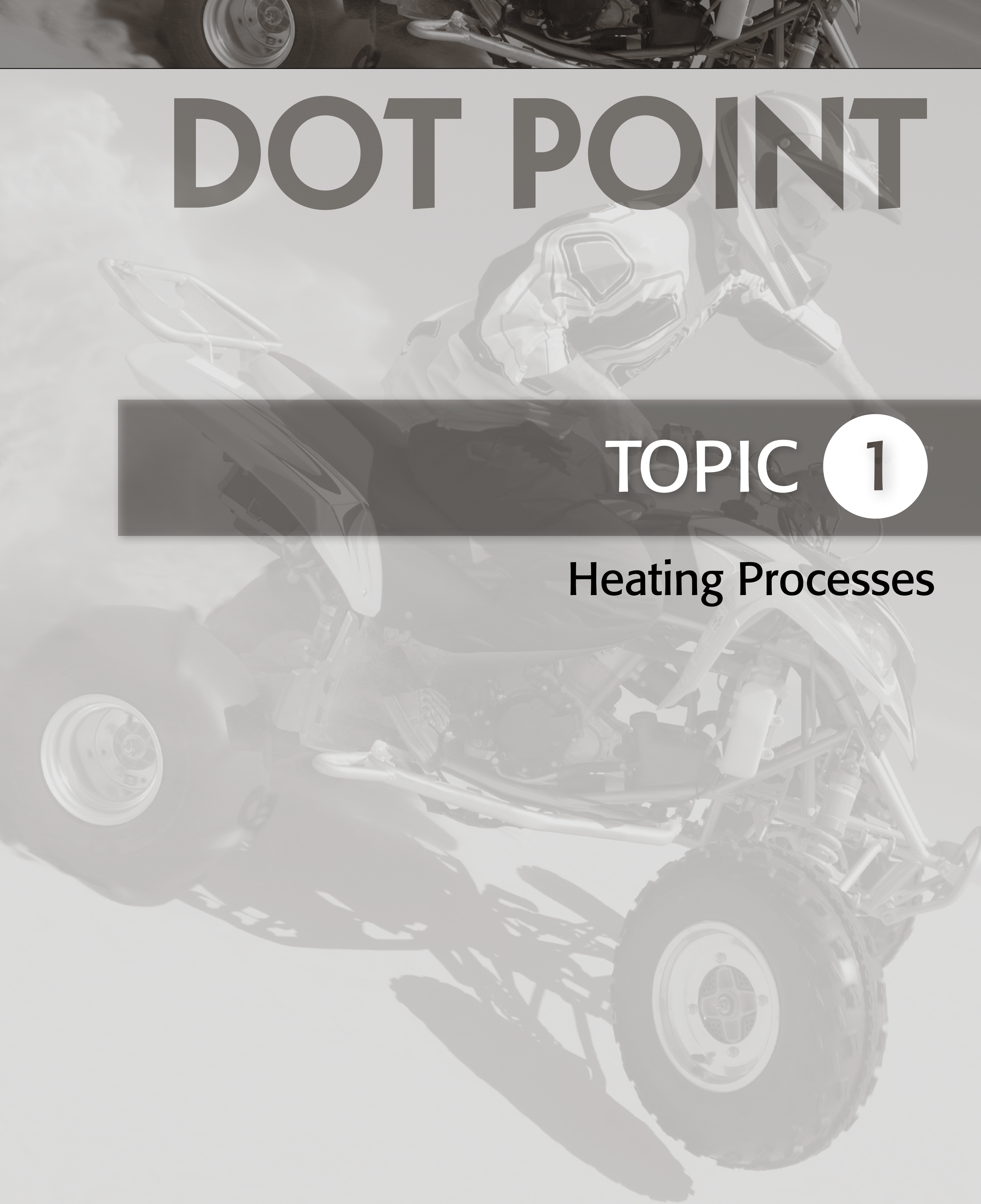
Unit 1 Thermal, Nuclear and Electrical Physics



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TOPIC 1

Heating Processes

1.1 The kinetic particle model, internal thermal energy and temperature.

1.1.1 The kinetic theory of matter.

1.1.1.1 The last column in the table gives the second halves of the sentences. Choose the correct second half for each sentence and write it in the first column of the table to summarise the kinetic theory of matter.

Completed sentences	Second halves (not in order)
All matter is	at absolute zero.
The particles of matter are always moving except	they are held together by strong forces.
Particles in matter are held	in any direction so that gases always fill their containers.
The particles in solids cannot move freely because	are weaker than those holding particles together in solids.
Particles in solids simply vibrate	studying the properties of matter.
In liquids particles can	made up of particles which are in continuous motion.
The forces holding particles together in liquids	together by forces which vary in strength.
Particles in gases are free to move	roll over one another.
Particles in gases are	to explain and predict the behaviour of matter.
Particles of matter are far too	in their fixed positions.
We deduce the behaviour of the particles of matter by	small to be seen even under a microscope.
We use the kinetic theory of matter	not held together.

1.1.2 Kinetic theory and properties of matter.

1.1.2.1 Why can't we compress liquids and solids?
(A) They are too dense.
(B) Their particles are held together too tightly.
(C) Their particles are further apart.
(D) Their particles are already as close together as they can be.

1.1.2.2 Why can liquids be poured?
(A) Their particles are held together loosely.
(B) Their particles are not held together.
(C) Their particles can roll over one another.
(D) Their particles are held together tightly.

1.1.2.3 What will cause the particles of matter to move more slowly?
(A) Weaker forces between them.
(B) Cooling the matter.
(C) Heating the matter.
(D) Shaking the matter.

1.1.2.4 What happens to the particles of matter when it contracts?
(A) They get smaller and occupy less space.
(B) They get smaller and decrease in volume.
(C) They break the forces holding them together and spread out into a larger volume.
(D) They move more slowly, collide less violently, and move closer together.

1.1.2.5 Which is an example of diffusion?
(A) Spilt water spreading over the floor.
(B) Noticing the perfume your friend is wearing.
(C) Molten lava flowing out of an active volcano.
(D) Writing with a felt pen.

1.1.2.6 Between which particles would you expect the forces to be weakest?
(A) Between air particles.
(B) Between water particles.
(C) Between ice particles.
(D) Between lemonade particles.

1.1.2.7 Considering what you know about roll on deodorants, which statement is correct?
(A) Forces between deodorant particles and skin particles are stronger than those between deodorant particles.
(B) Forces between deodorant particles are stronger than those between deodorant and skin particles.
(C) Forces between deodorant particles are equal to those between deodorant and skin particles.
(D) Forces between deodorant particles are equal to those between skin particles.

1.1.2.8 Which particles will have the least energy?
(A) Water liquid particles at 60°C.
(B) Water vapour particles at 60°C.
(C) Water liquid particles at 50°C.
(D) Water vapour particles at 50°C.

1.1.2.9 Why do liquids diffuse more slowly than gases?
(A) Their particles are held together more firmly.
(B) Their particles are not held together.
(C) Their particles are larger.
(D) Their particles move more quickly.

1.1.2.10 Why can't solids be poured?
(A) Their particles are held together more strongly than in liquids.
(B) Their particles are not held together.
(C) Their particles are held together in fixed positions.
(D) Their particles are as close together as they can be.

1.1.2.11 Complete the following table.

	Fact	Kinetic theory explanation
(a)	Air can be compressed.	
(b)	Liquids diffuse into each other.	
(c)	Cooking odours spread throughout the house.	
(d)	You can dry yourself with a towel.	
(e)	Liquids do not fill their containers.	
(f)	Glass objects shatter when dropped onto a hard floor.	
(g)	Concrete footpaths have black rubber strips every few metres.	
(h)	Gases expand quickly when heated.	
(i)	Solids have a constant shape.	
(j)	Liquids expand when heated.	
(k)	If a soccer ball gets a hole in it, the air leaks out.	
(l)	Large bridges sit on, and are free to move on rollers at one end.	
(m)	Your breath is ‘foggy’ on a very cold day.	
(n)	A balloon expands on a hot day.	

1.1.3 Temperature and the kinetic theory.

1.1.3.1 Complete the sentences in the first column of the table by matching the phrase provided with the correct alternative from the second column.

Completed sentences		Second halves (not in order)
(a)	Temperature is a measure of how fast	the faster the particles are moving.
(b)	Temperature is a measure of	solid particles at the same temperature.
(c)	The higher the temperature,	the average kinetic energy of the particles of matter.
(d)	When matter is heated its	its particles lose energy and slow down.
(e)	When matter is cooled	the extra energy they have because the particles move more freely.
(f)	Gas particles have more energy due to	the particles of matter are moving.
(g)	Similarly, liquid particles have more energy than	their state than liquid particles at the same temperature.
(h)	In both cases (f) and (g), this is due to	particles absorb energy and move faster.

1.1.3.2 In terms of the kinetic theory, identify the values of and justify the concept of an absolute zero temperature.

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1.1.3.3 Consider the following five pictures of water.

A: Ice at 0°C

B: Water at room temperature

C: Water at 0°C

(a) Rank the speed of the particles of water/ice/steam in order of moving fastest to slowest. Justify your answer.

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D: Steam at 100°C

(b) Rank the kinetic energy of the particles of water/ice/steam in order most to least. Justify your answer.

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E: Water at 100°C

(c) In which will the water particles have the most total energy? Justify your answer.

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(d) In which will the water particles have the least total energy? Justify your answer.

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(e) Steam at 100°C will actually cause more severe burns to a person than water at 100°C. Hypothesise why this is so.

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Answers

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Unit 1 Thermal, Nuclear and Electrical Physics

1.1.1.1

Completed sentences
All matter is made up of particles which are in continuous motion.
The particles of matter are always moving except at absolute zero.
Particles in matter are held together by forces which vary in strength.
The particles in solids cannot move freely because they are held together by strong forces.
Particles in solids simply vibrate in their fixed positions.
In liquids particles can roll over one another.
The forces holding particles together in liquids are weaker than those holding particles together in solids.
Particles in gases are free to move in any direction so that gases always fill their containers.
Particles in gases are not held together.
Particles of matter are far too small to be seen even under a microscope.
We deduce the behaviour of the particles of matter by studying the properties of matter.
We use the kinetic theory of matter to explain and predict the behaviour of matter.

1.1.2.1 D
1.1.2.2 C
1.1.2.3 B
1.1.2.4 D
1.1.2.5 B
1.1.2.6 A
1.1.2.7 A
1.1.2.8 C
1.1.2.9 A
1.1.2.10 C
1.1.2.11

	Fact	Kinetic theory explanation
(a)	Air can be compressed.	Air is a gas and its particles are not close together, therefore they can be pushed closer together.
(b)	Liquids diffuse into each other.	Particles in a liquid are free to roll over one another and as they do so they gradually mix or diffuse together.
(c)	Cooking odours spread throughout the house.	Gas particles from the cooking food are free to move and diffuse relatively quickly through the house.
(d)	You can dry yourself with a towel.	Water particles are not held together by strong forces and they bond to the particles in the towel with stronger forces.
(e)	Liquids do not fill their containers.	The forces between the liquid particles hold them together and prevent them from breaking free from each other (evaporating) to fill the container.
(f)	Glass objects shatter when dropped onto a hard floor.	The forces involved in the collision between the glass and the floor are stronger than the forces holding glass particles together.
(g)	Concrete footpaths have black rubber strips every few metres.	These are soft expansion joints so that in hot weather, when the concrete blocks expand they squash the rubber rather than pushing against each other and breaking.
(h)	Gases expand quickly when heated.	Gas particles are not held together and are free to move when the gas is heated. They move faster and collide with each other more violently and take up more space if it is available (if not, the pressure increases).
(i)	Solids have a constant shape.	Particles in a solid are held together by relatively strong forces.
(j)	Liquids expand when heated.	Liquid particles roll over one another faster when heated and need more room to move about.