

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
PHYSICS A**

A332/01

Unit 2 Modules P4 P5 P6 (Foundation Tier)

TUESDAY 29 JANUARY 2008

Afternoon
Time: 40 minutes

Candidates answer on the question paper.

Additional materials (enclosed):

None

Calculators may be used.

Additional materials: Pencil
Ruler (cm/mm)



Candidate
Forename

Candidate
Surname

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **42**.
- A list of physics equations is printed on page two.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	5	
2	4	
3	4	
4	4	
5	4	
6	2	
7	4	
8	5	
9	3	
10	3	
11	4	
TOTAL	42	

This document consists of **16** printed pages.

TWENTY FIRST CENTURY SCIENCE EQUATIONS Useful Relationships

Explaining Motion

- speed = $\frac{\text{distance travelled}}{\text{time taken}}$
- momentum = mass \times velocity
- change of momentum = resultant force \times time for which it acts
- work done by a force = force \times distance moved by the force
- change in energy = work done
- change in GPE = weight \times vertical height difference
- kinetic energy = $\frac{1}{2} \times \text{mass} \times [\text{velocity}]^2$

Electric Circuits

- resistance = $\frac{\text{voltage}}{\text{current}}$
- $\frac{V_p}{V_s} = \frac{N_p}{N_s}$
- energy transferred = power \times time
- power = potential difference \times current
- efficiency = $\frac{\text{energy usefully transferred}}{\text{total energy supplied}} \times 100\%$

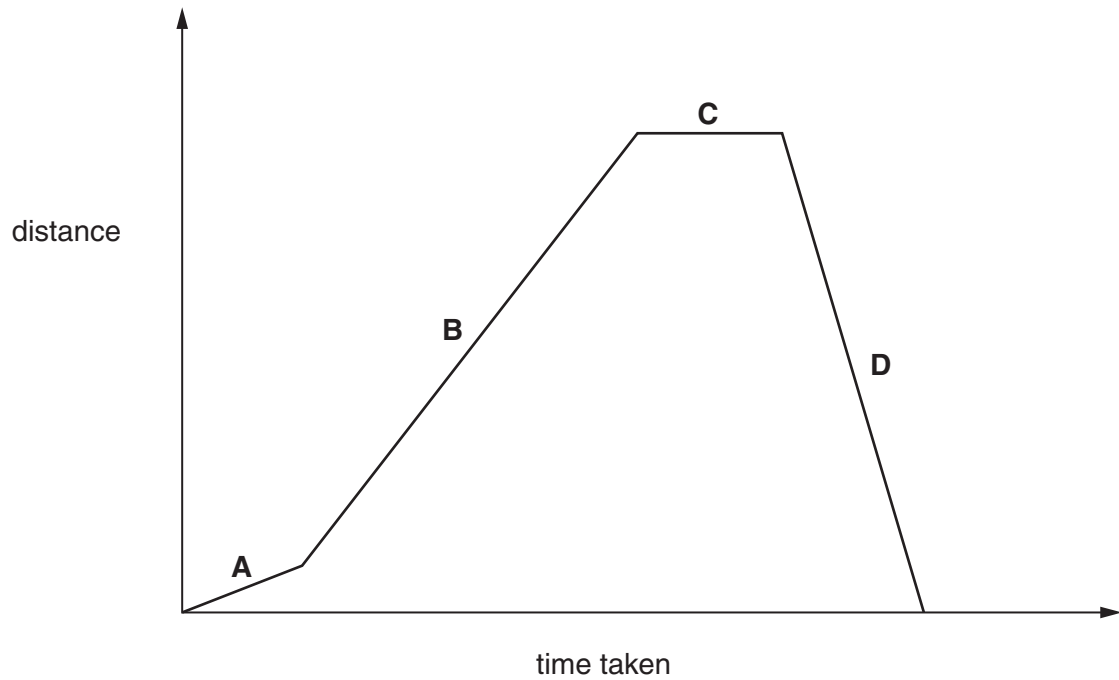
The Wave Model of Radiation

- wave speed = frequency \times wavelength

Answer **all** the questions.

- 1 Dan goes to buy a newspaper for his granddad in the morning. He walks in a straight line to the shop and back.

(a) The graph shows the distance Dan is from home and the time it takes.



Complete the table below.

Each letter may be used once, more than once or not at all.

what Dan is doing	part of the graph (A, B, C or D)
standing still	
walking at his fastest speed	
at the shop buying the newspaper	
walking with a negative velocity	

[4]

(b) Dan is walking, so he has momentum.

The equation linking momentum, mass and velocity is:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

Dan has a mass of 60 kg.

At one time his velocity is 2 m/s.

Which of the following is his momentum?

Put a **ring** around the correct answer.

30

58

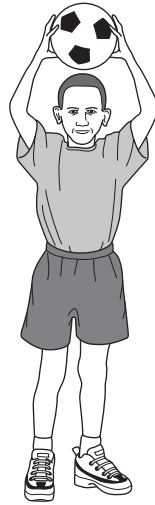
62

120

[1]

[Total: 5]

2 Bobby is playing with a ball.



Complete the following sentences.

Choose words from this list.

distance

kinetic

mass

potential

weight

Bobby lifts the ball up from the ground above his head.

To calculate the work done you must multiply the force by the

When Bobby holds the ball above his head it has more gravitational energy.

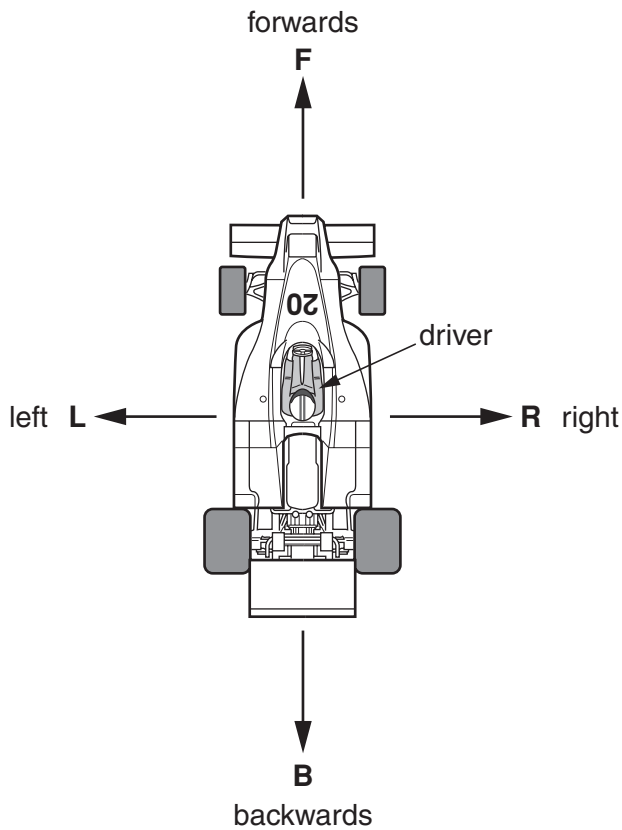
Bobby lets the ball fall to the ground.

The ball speeds up and gains energy.

The ball is pulled down by its [4]

[Total: 4]

3 A driver in a car experiences forces in different directions as he drives forwards.



(a) (i) The car speeds up in a straight line.

Which force, **F**, **R**, **L** or **B**, does the car exert **on the driver**?

answer [1]

(ii) The car slows down **and** turns left.

Which two forces, **F**, **R**, **L** or **B**, does the car exert **on the driver**?

..... and [2]

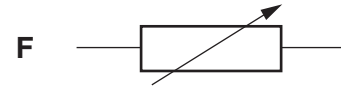
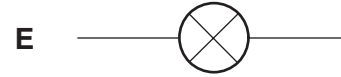
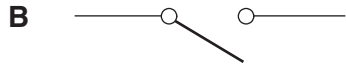
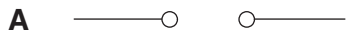
(b) The car speeds up in a straight line.

Which force, **F**, **R**, **L** or **B**, does the driver exert **on the car**?

answer [1]

[Total: 4]

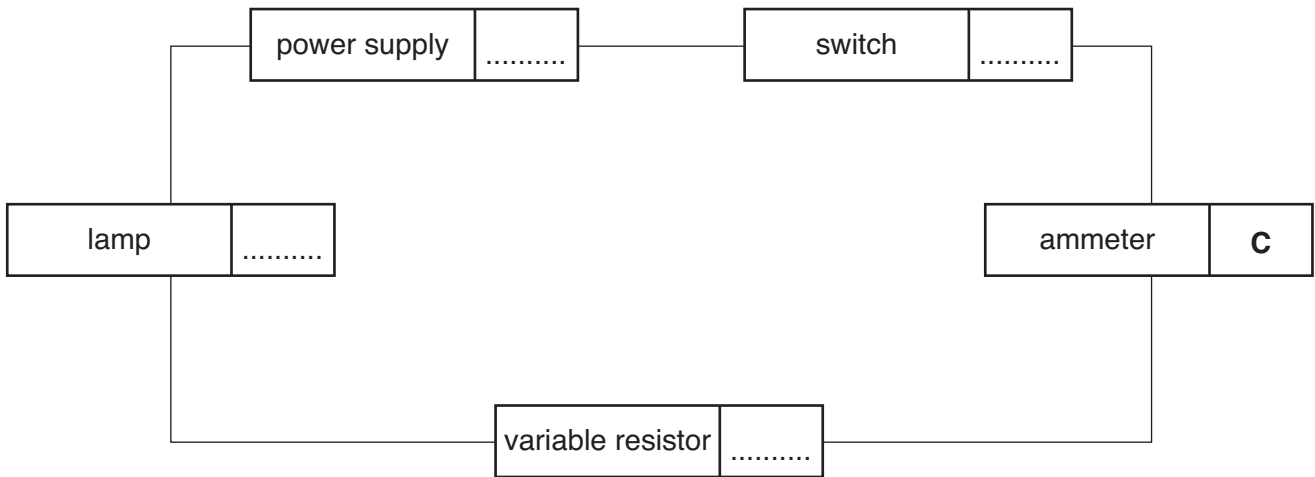
4 Here are some circuit symbols for electrical components.



This circuit uses some of the components.

Write the **letter** for each component symbol in the correct box in the circuit.

One has been done for you.



[4]

[Total: 4]

5 The most commonly used model of electric circuits uses ideas about current and electrons.

Complete the sentences. Choose statements from this list.

a flow of charge

a repulsive force

a continuous loop

an attractive force

a negative charge

(a) An electron has

(b) In a circuit the electrons move in

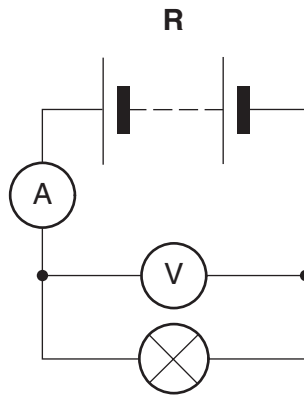
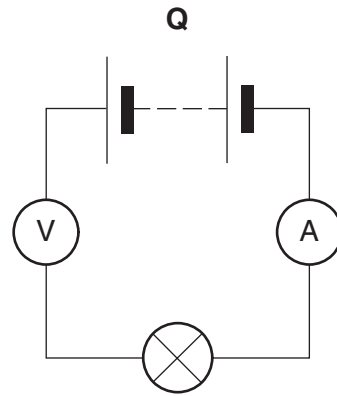
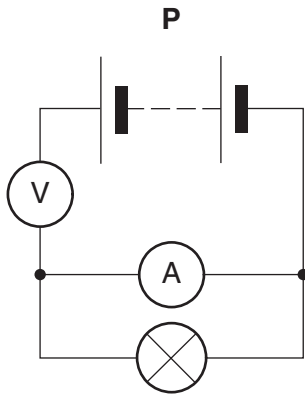
(c) Electric current is

(d) Two negative charges are pushed apart by

[4]

[Total: 4]

6 This question is about making measurements in an electric circuit.



(a) Which circuit, **P**, **Q** or **R**, is correct for measuring the current through the lamp and the voltage across the lamp?

answer [1]

(b) Put a ring around the word which means the same as potential difference.

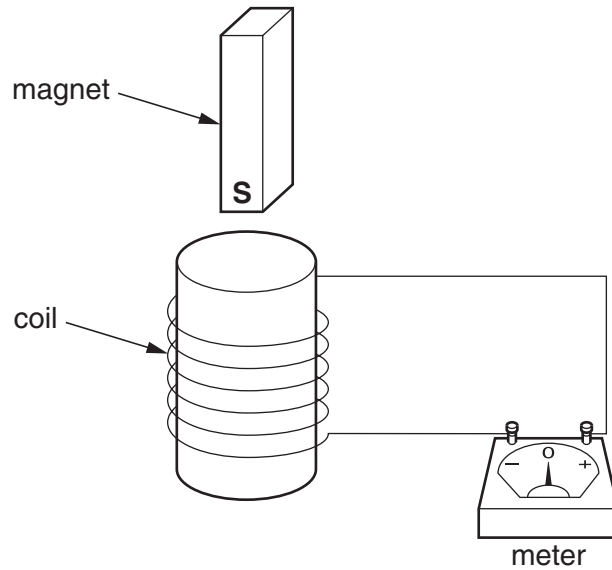
charge **current** **power** **voltage**

[1]

[Total: 2]

7 Electricity can be generated by moving a magnet in a coil of wire.

The diagram shows a magnet held above a coil of wire.



Experiments with this apparatus can show how the electricity is generated.

(a) Draw a straight line from each **experiment** to **what happens on the meter**.

The first line has been done for you.

experiment	what happens on the meter
push the South end of the magnet into the coil	needle flicks to right
pull the South end of the magnet out of the coil	needle does not move
push the North end of the magnet into the coil	needle flicks to left
hold the magnet still in the coil	

[3]

(b) What is the name for this method of producing a voltage?

Put a ring around the correct answer.

deduction

induction

reduction

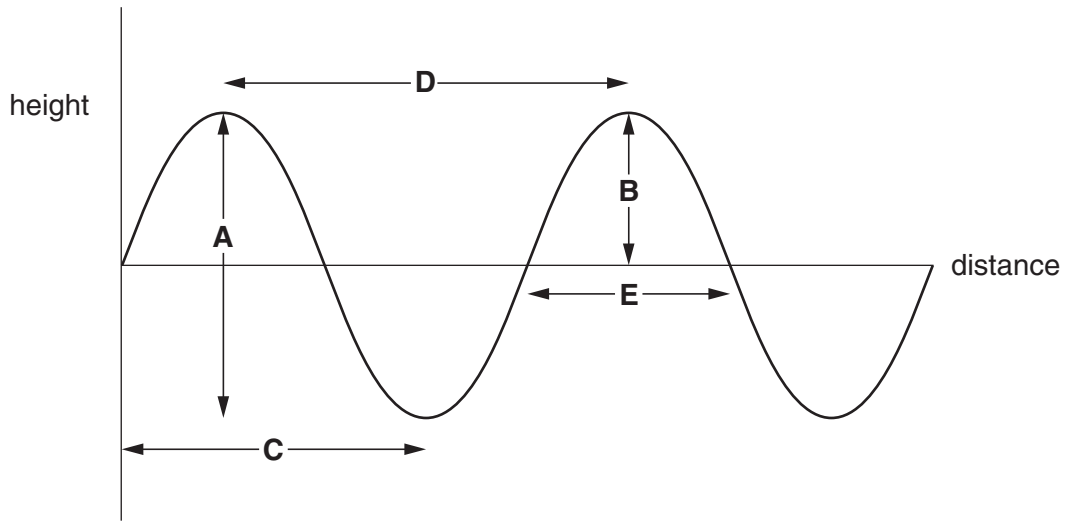
transformation

[1]

[Total: 4]

8 Water waves and sound waves are different.

(a) This is a diagram of a water wave.



(i) Which letter, **A**, **B**, **C**, **D** or **E**, shows the amplitude of the wave?

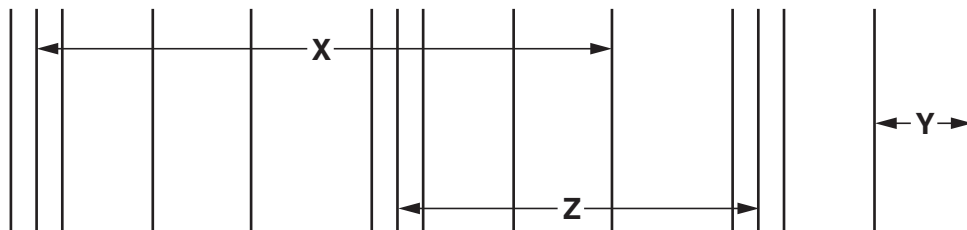
answer

(ii) Which letter, **A**, **B**, **C**, **D** or **E**, shows the wavelength of the wave?

answer

[2]

(b) Sound waves are shown differently.



Which letter, **X**, **Y** or **Z**, shows a wavelength?

answer [1]

- (c) Draw a straight line from each **name** to its **wave type** and draw another straight line from each **name** to its **description**.

wave type

name

description

transverse

sound wave

particles move
at right angles to
wave direction

longitudinal

water wave

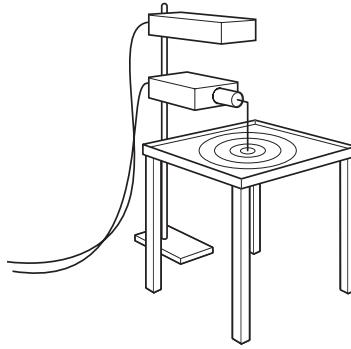
particles move in
same direction as
wave

particles do not
move at all

[2]

[Total: 5]

9 Susan is experimenting with water waves in a ripple tank.



She draws some diagrams to show different wave properties.

Draw a straight line from each **diagram** to the **wave property** it shows.

diagram	wave property
	<p style="text-align: center;">refraction</p>
	<p style="text-align: center;">interference</p>
	<p style="text-align: center;">reflection</p>
	<p style="text-align: center;">diffraction</p>

[3]

[Total: 3]

10 Information can be sent using analogue or digital signals. Here are four different signals.



(a) Which diagram, **A**, **B**, **C** or **D**, shows an analogue signal?

answer [1]

(b) Which diagram, **A**, **B**, **C** or **D**, shows a digital signal with no noise?

answer [1]

(c) Signal **D** is the **output** from an amplifier. Which diagram, **A**, **B** or **C**, shows the input signal to the amplifier?

answer [1]

[Total: 3]

11 Here are different parts of the electromagnetic spectrum.

gamma radiation

infrared

microwaves

radio waves

ultraviolet

visible light

X-rays

(a) Put the parts of the electromagnetic spectrum in order of **increasing wavelength**.

The first one has been done for you.

↓ shortest wavelength longest wavelength	gamma radiation

[3]

(b) Photons with the highest frequency have the most energy.

Write down the name of the part of the spectrum that has photons with the most energy.

answer [1]

[Total: 4]

END OF QUESTION PAPER

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