

International GCSE

Physics (9–1) (Modular)

Sample Assessment Materials

Pearson Edexcel International GCSE in Physics (Modular) (4XPH1)

First teaching September 2024

First examination June 2025

First certification August 2025

Issue 1



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Introduction

The Pearson Edexcel International GCSE (9-1) in Physics (Modular) (4XPH1) is designed for use in schools and colleges. It is part of a suite of International GCSE modular qualifications offered by Pearson.

These sample assessment materials have been developed to support this qualification and will be used as the benchmark to develop the assessment students will take.

The sample assessment materials in this document are derived from the existing Edexcel International GCSE (9-1) in Physics qualification, which is linear in design.

Both linear and modular routes are designed to provide the same level of demand overall while offering candidates a choice of assessment options. In the modular qualification, candidates are able to sit and resit individual units in different series.

Note: Within International GCSE (9-1) in Physics (Modular), assessments are referred to as units. This is to support the modular nature of the qualification as each individual assessment is entered for as a separate unit.

General marking guidance

- All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark scheme – not according to their perception of where the grade boundaries may lie.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification/indicative content will not be exhaustive. However, different examples of responses will be provided at standardisation.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, a senior examiner must be consulted before a mark is given.
- Crossed-out work should be marked **unless** the candidate has replaced it with an alternative response.

Subject specific marking guidance

Symbols and terms used in the mark scheme:

- Round brackets (): words inside round brackets are to aid understanding of the marking point but are not required to award the point
- Curly brackets { }: indicate the beginning and end of a list of alternatives (separated by obliques) where necessary, to avoid confusion
- Oblique /: words or phrases separated by an oblique are alternatives to each other and either answer should receive full credit
- ecf: indicates error carried forward which means that a wrong answer given in an early part of a question is used correctly in a later part of a question.

You will not see 'owtte' (or words to that effect). Alternative correct wording should be credited in every answer unless the mark scheme has specified otherwise.

The Additional Guidance column is used for extra guidance to clarify any points in the mark scheme. It may be used to indicate:

- what will not be accepted for that marking point, in which case the phrase 'do not accept' will appear alongside the relevant marking point
- it might have examples of possible acceptable answers which will be adjacent to that marking point.

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

Pearson Edexcel International GCSE (9–1)

Sample assessment material for first teaching 2024

Time 1 hour 40 minutes

Paper
reference

4WPH1/1P

Physics (Modular) UNIT 1

You must have:

Ruler, calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this unit is 90.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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FORMULAE

You may find the following formulae useful.

energy transferred = current \times voltage \times time

$$E = I \times V \times t$$

$$\text{power} = \frac{\text{work done}}{\text{time taken}}$$

$$P = \frac{W}{t}$$

$$\text{power} = \frac{\text{energy transferred}}{\text{time taken}}$$

$$P = \frac{W}{t}$$

(final speed)² = (initial speed)² + (2 \times acceleration \times distance moved)

$$v^2 = u^2 + (2 \times a \times s)$$

pressure \times volume = constant

$$p_1 \times V_1 = p_2 \times V_2$$

$$\text{force} = \frac{\text{change in momentum}}{\text{time taken}}$$

$$F = \frac{(mv - mu)}{t}$$

change in thermal energy = mass \times specific heat capacity \times change in temperature

$$\Delta Q = m \times c \times \Delta T$$

Where necessary, assume the acceleration of free fall, $g = 10 \text{ m/s}^2$.

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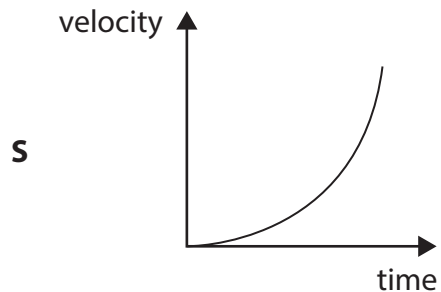
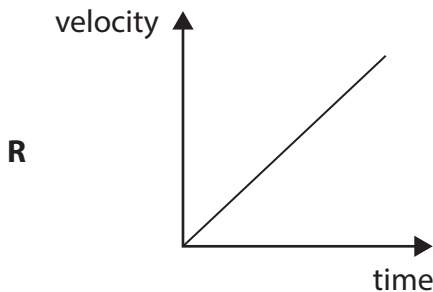
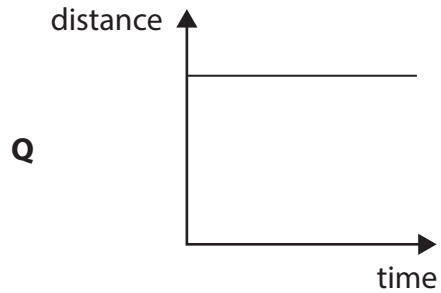
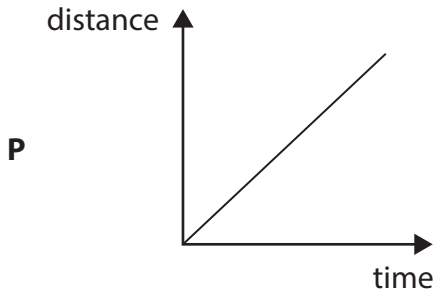
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Answer ALL questions.

Some questions must be answered with a cross . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

1 The motion of an object can be represented using graphs.

(a) The graphs, P, Q, R and S, show different types of motion.



The table lists some types of motion.

Place one tick (✓) in each row of the table to show which graph represents which type of motion.

(4)

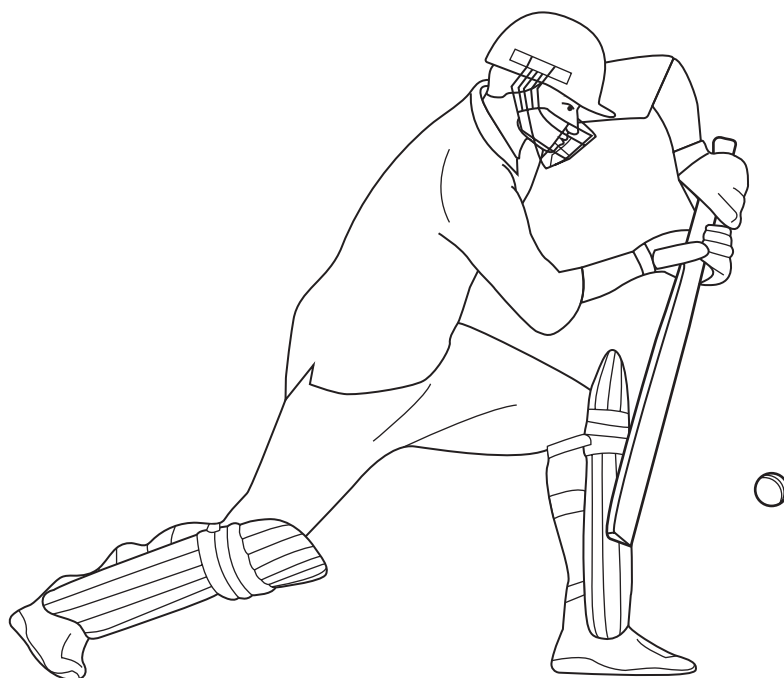
Types of motion	Graph			
	P	Q	R	S
constant acceleration				
increasing acceleration				
moving at constant velocity				
stationary				

(b) State the feature of a velocity-time graph that can be used to determine the distance travelled by an object.

(1)

(Total for Question 1 = 5 marks)

2 Cricket is a sport played with bats and balls.



- (a) (i) A cricket player hits a ball with a bat. Before the ball is hit, it is moving to the **left** with a momentum of 4.2 kg m/s .

The bat is contact with the ball for 0.012 s .

After the ball is hit, it moves to the **right** with a momentum of 6.7 kg m/s .

Calculate the mean force the bat exerts on the ball and state the direction of the force.

(3)

mean force = N

direction

- (ii) State the magnitude and direction of the mean force the **ball** exerts on the **bat**.

(1)

magnitude of mean force = N

direction of force

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(b) The cricket player wears padded protective equipment.

This protective equipment reduces the risk of injury to the player if they are struck by the cricket ball.

Explain how this protective equipment reduces the risk of injury to the player.

Use ideas about momentum in your answer.

(3)

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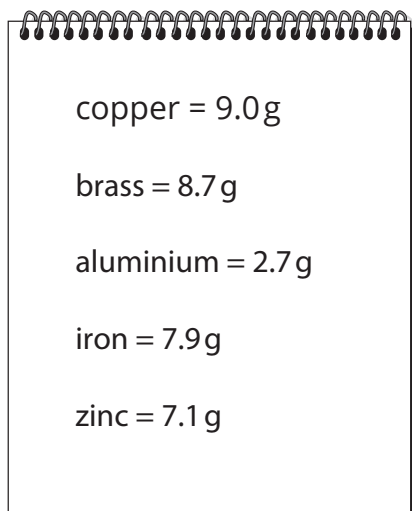
(Total for Question 2 = 7 marks)

3 A student is given five metal cubes, each with a volume of 1.0cm^3 .

Each cube is made from a different metal.

The student measures the mass of each cube to determine the density of each metal.

These are the student's results for the mass of each cube.



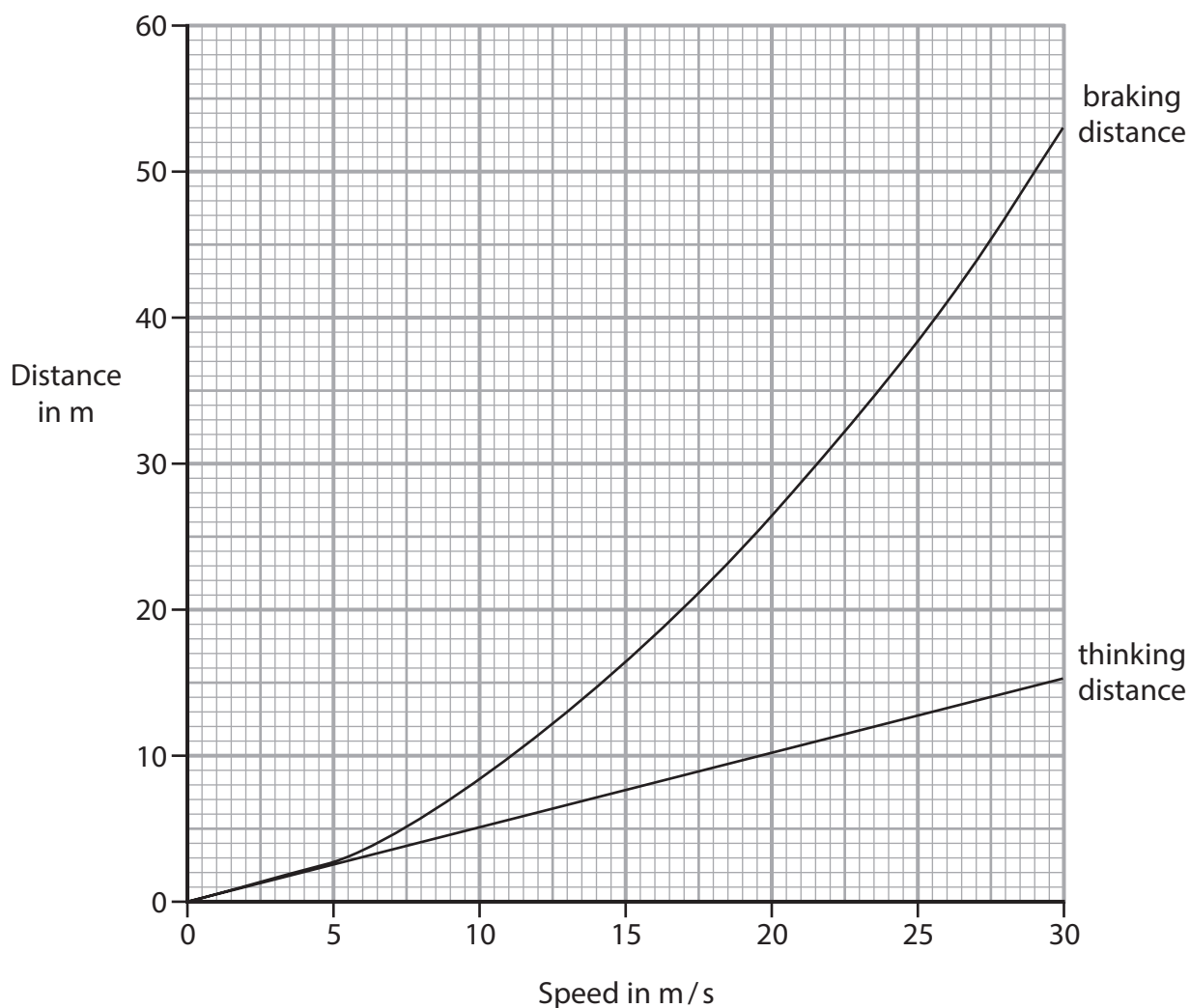
Draw a results table of the student's results.

Include a column to show the density of each metal in g/cm^3 .

(4)

(Total for Question 3 = 4 marks)

- 4 The graph shows how the thinking distance and the braking distance vary with the speed of a car.



- (a) Which of these does **not** affect thinking distance?

(1)

- A alcohol consumed by the driver
- B condition of the road
- C speed of the car
- D tiredness of the driver

- (b) Which of these would increase the braking distance of the car?

(1)

- A faster reaction time of the driver
- B ice on the road
- C more powerful brakes
- D tyres with more grip

(c) Determine the stopping distance of the car when the speed of the car is 20 m/s. (3)

stopping distance = m

(d) (i) State the formula linking average speed, distance moved and time taken. (1)

(ii) Determine the reaction time of the driver of the car. (3)

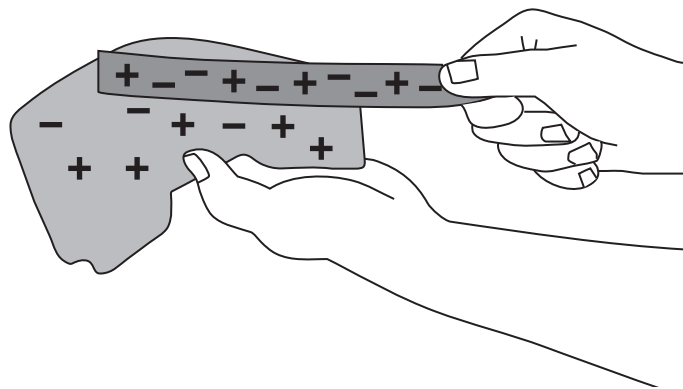
reaction time = s

(e) Calculate the mean braking acceleration of the car as it brakes to a stop from an initial speed of 30 m/s. (4)

acceleration = m/s^2

(Total for Question 4 = 13 marks)

5 A student charges a plastic rod by rubbing it with a cloth.



The rod becomes negatively charged.

(a) (i) Which statement explains how the rod becomes negatively charged?

(1)

- A the rod gains positively charged electrons
- B the rod loses positively charged electrons
- C the rod gains negatively charged electrons
- D the rod loses negatively charged electrons

(ii) Describe how the student could demonstrate that the rod is charged.

(2)

(b) The student has several other rods made from different kinds of plastic.

Some rods can be charged positively and some can be charged negatively.

Describe an experiment to show that different rods can have different types of charge.

You may draw a diagram to help your answer.

(3)

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(Total for Question 5 = 6 marks)

6 The photograph shows a solar power farm.



(Source: © Alessandro Pierpaoli/Shutterstock)

(a) Discuss the advantages and disadvantages of using solar power rather than fossil fuels to generate electricity.

(4)

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(b) Solar panels produce direct current (d.c.).

The National Grid in many countries operates on alternating current (a.c.).

Describe the difference between direct current (d.c.) and alternating current (a.c.).

(2)

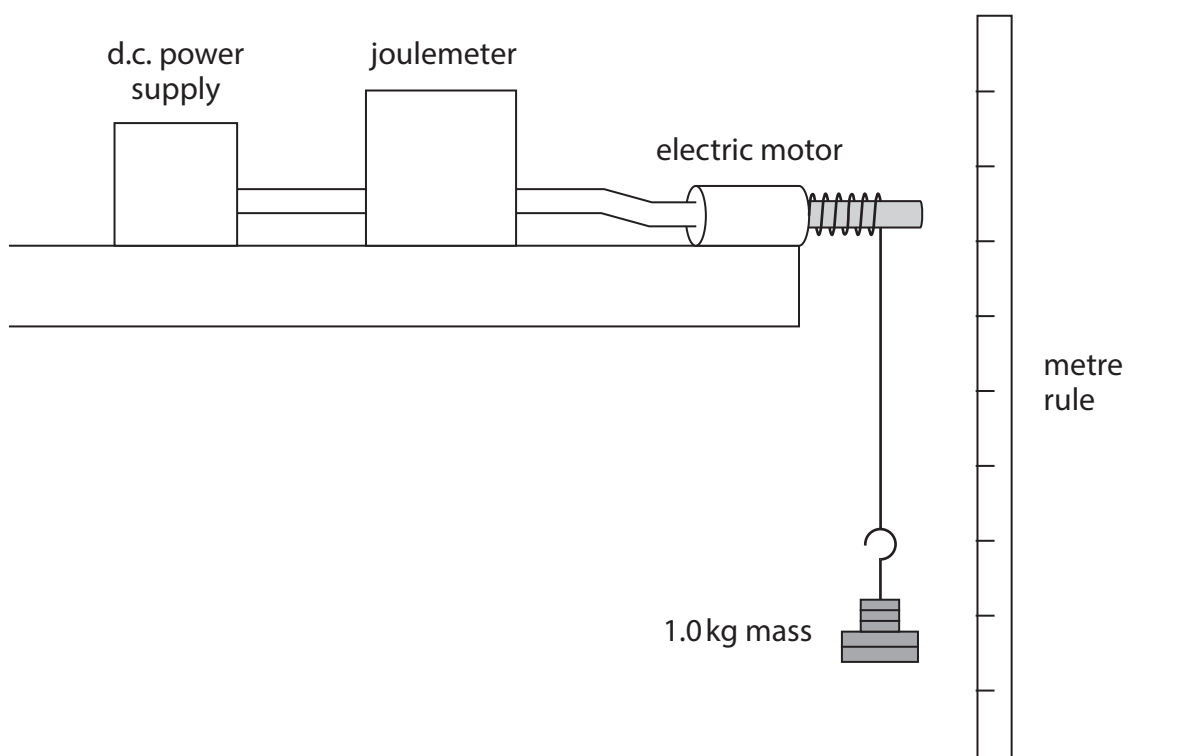
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(Total for Question 6 = 6 marks)

7 A student uses this apparatus to investigate how the efficiency of an electric motor varies with its input voltage.



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This is the student's method.

- connect the electric motor to a d.c. power supply and a joulemeter
- attach a 1.0 kg mass to the electric motor using a length of string
- set the voltage of the power supply to 10V and switch on the power supply
- switch off the power supply when the mass has been lifted through a distance of 50 cm
- record the input energy to the motor from the joulemeter
- calculate the energy transferred to the gravitational store of the mass
- calculate the efficiency of the motor

The student repeats this process, setting the power supply to a different voltage each time.

(a) Give **two** control variables for the investigation.

(2)

1

2

(b) Show that the gravitational store of the 1.0 kg mass increases by 5.0 J when it is lifted through a distance of 50 cm.

(2)

(c) The table shows the student's results.

Power supply voltage in V	Joulemeter reading in J	Motor efficiency (%)
3.0	99.4	5.0
3.5	25.5	19.6
4.0	16.5	30.3
5.0	13.5	37.0
6.0	12.6	39.7
8.0	12.8	39.1
10.0	12.7	

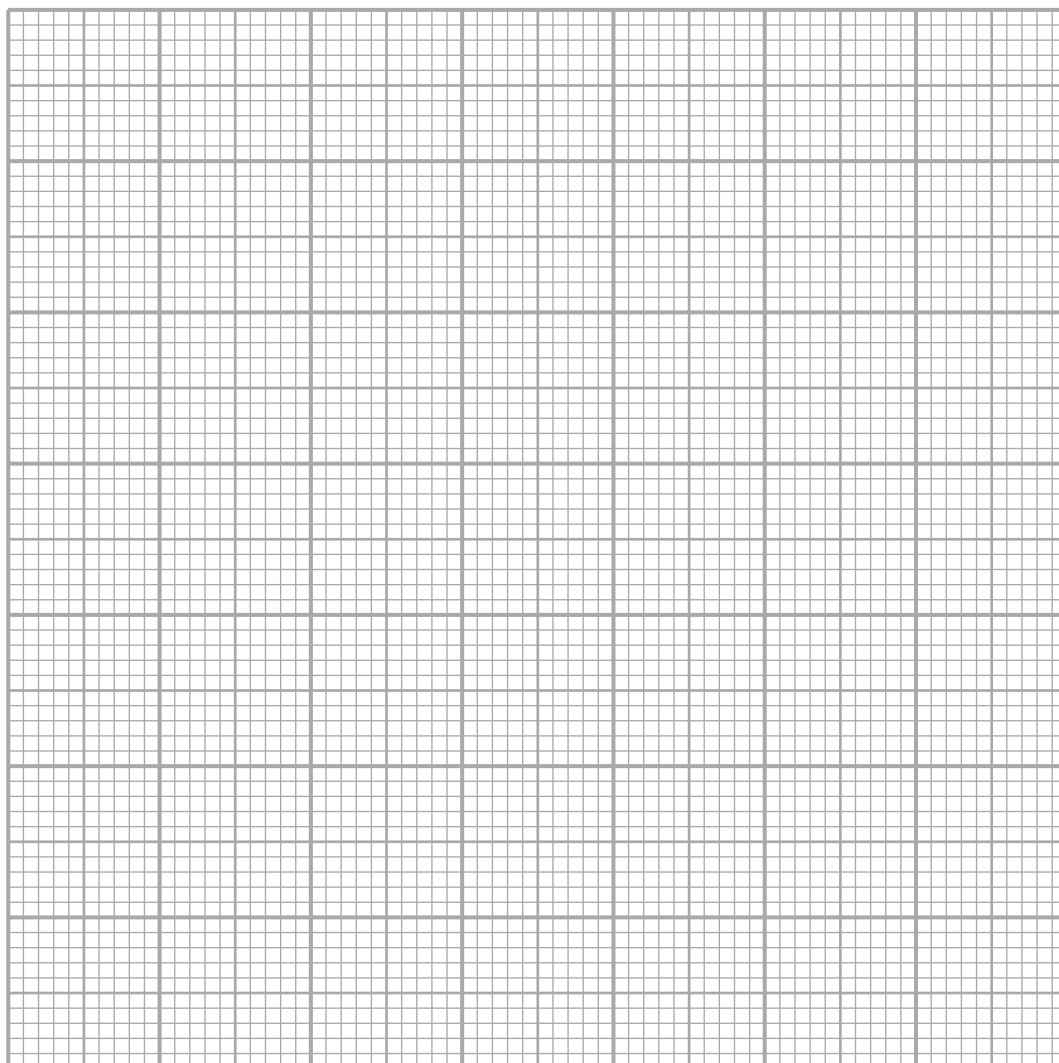
(i) Calculate the motor efficiency when the power supply is set to a voltage of 10V.

(3)

efficiency = %

(ii) Plot a graph of the motor efficiency on the y-axis against the power supply voltage on the x-axis.

(3)



(iii) Draw a curve of best fit.

(2)

(iv) Using the graph, determine the minimum power supply voltage that will allow the electric motor to operate at maximum efficiency.

(1)

power supply voltage = V

(Total for Question 7 = 13 marks)

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8 A student investigates the change of state by heating a sample of a substance.

The student starts heating the substance when it is a solid.

As they heat the substance it melts, turning into a liquid, which is then heated further.

On the axes, draw a graph that shows how the temperature of the substance changes during this heating process.

The specific heat capacity of the substance when it is a solid is greater than when the substance is a liquid.

(3)



(Total for Question 8 = 3 marks)

- 9 A student uses the circuit shown in diagram 1 to investigate how the current changes with voltage for a filament lamp.

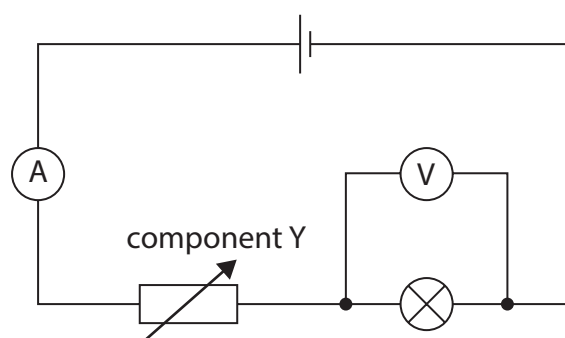


Diagram 1

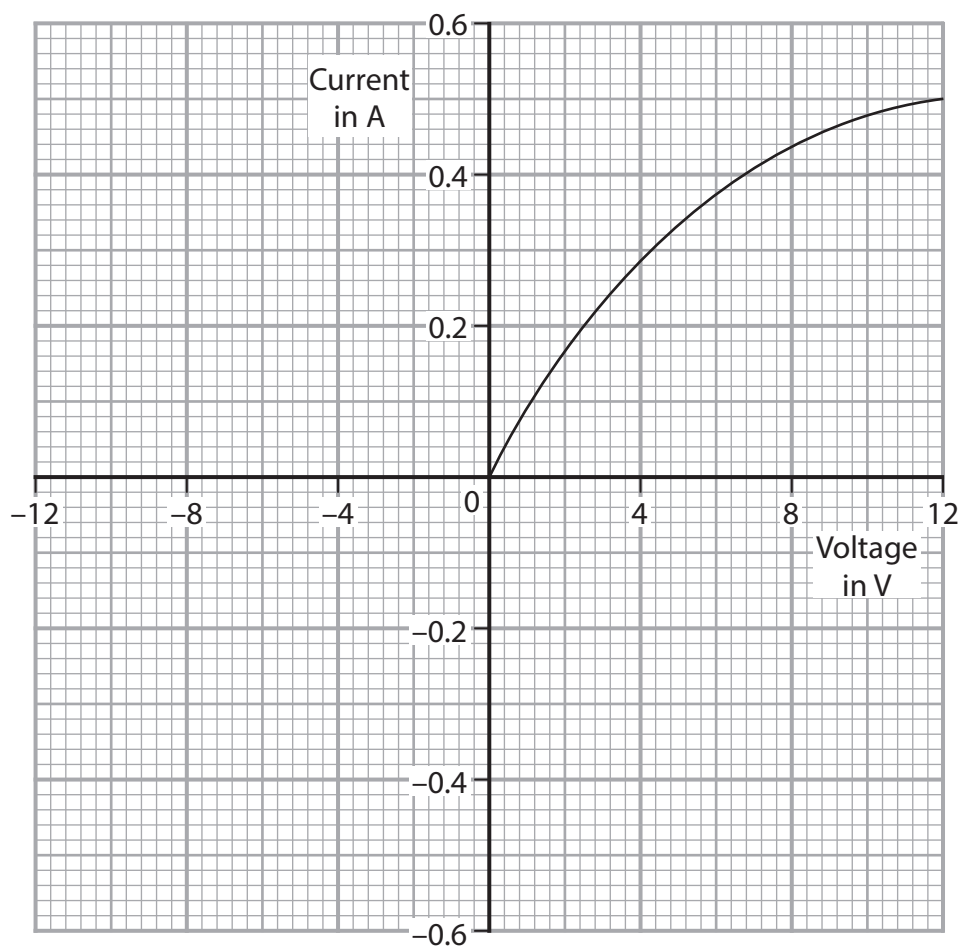
- (a) (i) Give the name of component Y.

(1)

- (ii) Give a reason why component Y is included in the circuit.

(1)

- (b) The graph shows some of the student's results.



(i) State the formula linking charge, current and time. (1)

(ii) Determine the current in the lamp when the voltage across the lamp is 10V. (1)

current = A

(iii) Calculate the charge transferred through the lamp in 30 s when the voltage across the lamp is 10V.
Give the unit. (3)

charge = unit

(iv) Calculate the time for the lamp to transfer 250 J of energy when the voltage across the lamp is 10V. (3)

time = s

(v) The student disconnects the cell and reconnects it with its terminals reversed.
Complete the graph to show how the current in the lamp varies with voltage across the lamp when the cell is connected with its terminals reversed. (2)

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- (c) The student replaces the filament lamp with a light emitting diode (LED) and replaces the cell with an alternating current (a.c.) power supply, as shown in diagram 2.

The student also removes the ammeter and voltmeter from the circuit.

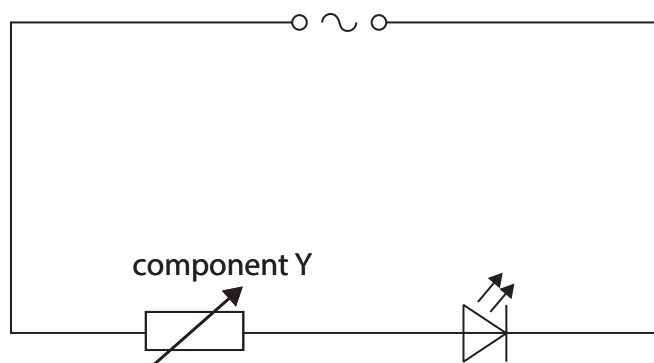


Diagram 2

Explain why the LED flashes on and off in this circuit.

(2)

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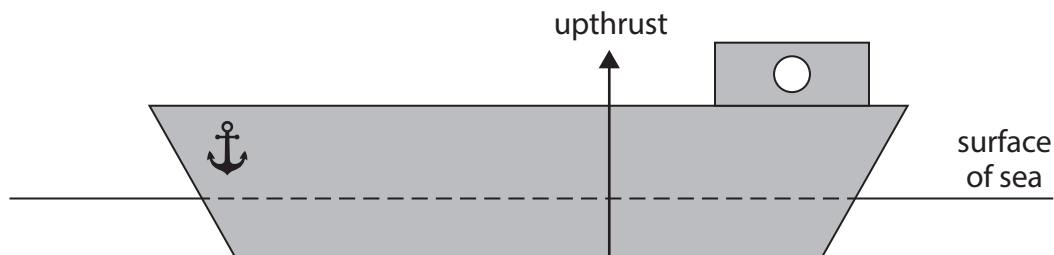
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(Total for Question 9 = 14 marks)

10 A ship floats on the sea.



- (a) The ship floats because of the forces acting on it.

The upward force acting on the ship is called upthrust.

This force is shown on the diagram.

Draw another labelled arrow on the diagram to show the other vertical force acting on the ship.

(2)

- (b) The upthrust force acting on the ship is proportional to the pressure difference between the bottom of the ship and the surface of the sea.

The pressure acting on the ship at the surface of the sea is 100 kPa.

- (i) State the formula linking pressure difference, height, density and gravitational field strength (g).

(1)

- (ii) The bottom of the ship is 15.8 m below the surface of the sea.

Show that the pressure acting on the bottom of the ship is approximately 260 kPa.

[density of seawater = 1030 kg/m^3]

(3)

(iii) Explain why the bottom of the ship is deeper below the surface of the sea when the ship is fully loaded with cargo.

(2)

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(Total for Question 10 = 8 marks)

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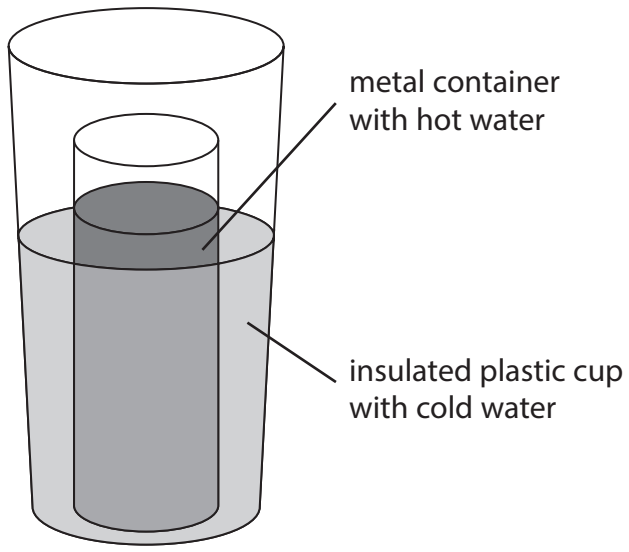
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11 A student pours a known volume of hot water into a metal container. They place the metal container into an insulated plastic cup containing an equal volume of cold water.

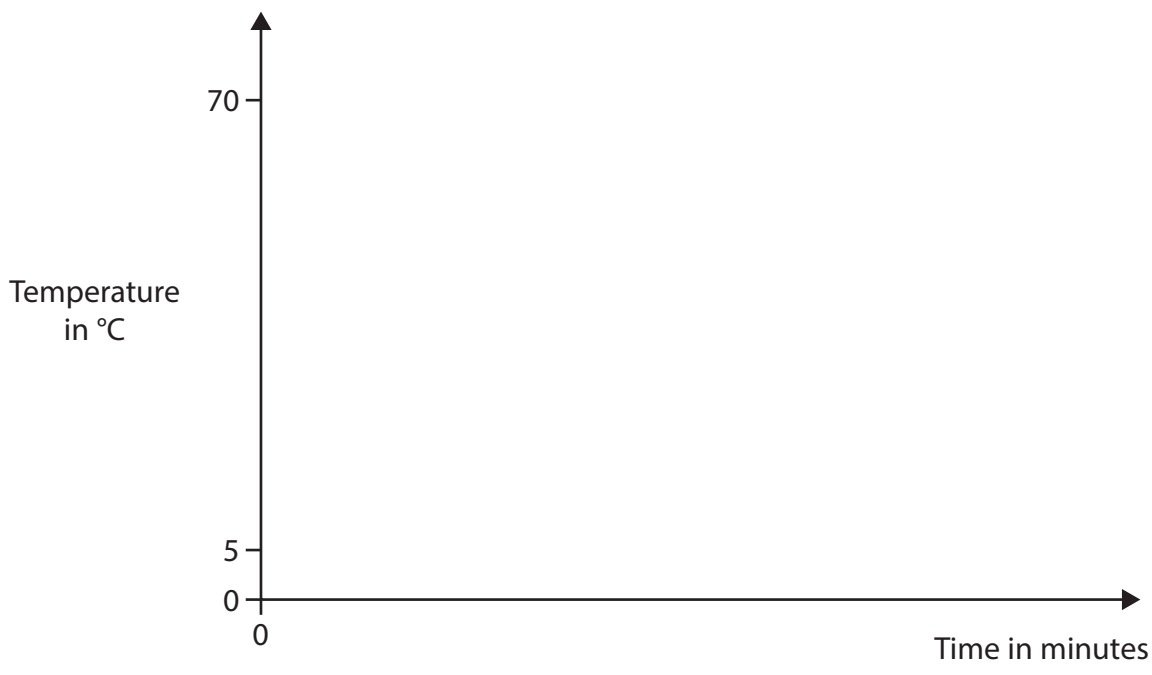


The student uses temperature probes to measure the temperatures of both the water in the metal container and the water in the plastic cup.

The hot water has an initial temperature of 70°C and the cold water has an initial temperature of 5°C .

(a) On the axes, sketch how the temperature of the hot water and the temperature of the cold water vary with time.

(4)



(b) Explain why the temperatures of the hot water and the cold water change.

You should refer to different types of thermal energy transfer in your answer.

(4)

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(c) Explain how placing a lid on the plastic cup would affect the results.

(3)

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(Total for Question 11 = 11 marks)

TOTAL FOR UNIT = 90 MARKS