Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

PHYSICS **0625/32**

Paper 3 Theory (Core) **February/March 2019**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m/s^2).

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

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ERRATUM NOTICE
TO BE OPENED ON THE DAY OF THE EXAMINATION

FOR THE ATTENTION OF THE EXAMINATIONS OFFICER AND INVIGILATOR

TO BE GIVEN TO CANDIDATES WITH THE QUESTION PAPER

Turn to **page 9.**

Question 6(a) reads:

Fig. 6.1 shows a cross-section of the inside of an electric oven.

Question 6(a) should read:

Fig. 6.1 is a diagram of the inside of an electric oven. The diagram shows a side view of the oven.

This document consists of **1** printed page.

Cambridge Assessment International Education

1 Fig. 1.1 shows a set of masses made from the same material.

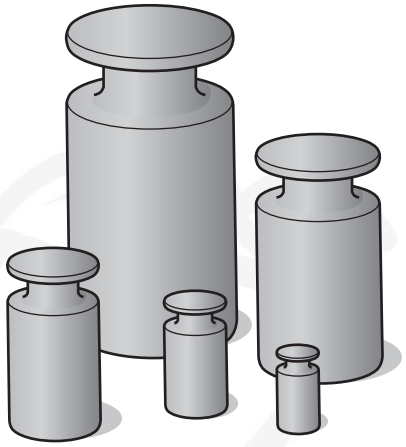


Fig. 1.1

(a) Identify the quantity that is the same for all the masses.

Tick **one** box.

- ☐ density
- ☐ volume
- ☐ weight

[1]

(b) The largest mass is 2.5 kg.

State the number of grams in 2.5 kg.

2.5 kg = ... g [1]

(c) The three largest masses are 2.5 kg, 1.0 kg and 0.5 kg.

Calculate the combined **weight** of these three masses. Include the unit.

weight = ... [4]

[Total: 6]

2 Fig. 2.1 shows students getting onto a school bus.

Fig. 2.1

(a) A student describes part of the journey.

The bus accelerates from rest at a constant rate for 10 s. It reaches a maximum speed of 10 m/s.

The bus maintains a constant speed of 10 m/s for 60 s.

The bus then decelerates at a constant rate for 15 s, until it stops.

On Fig. 2.2, draw the speed-time graph for this part of the journey made by the bus.

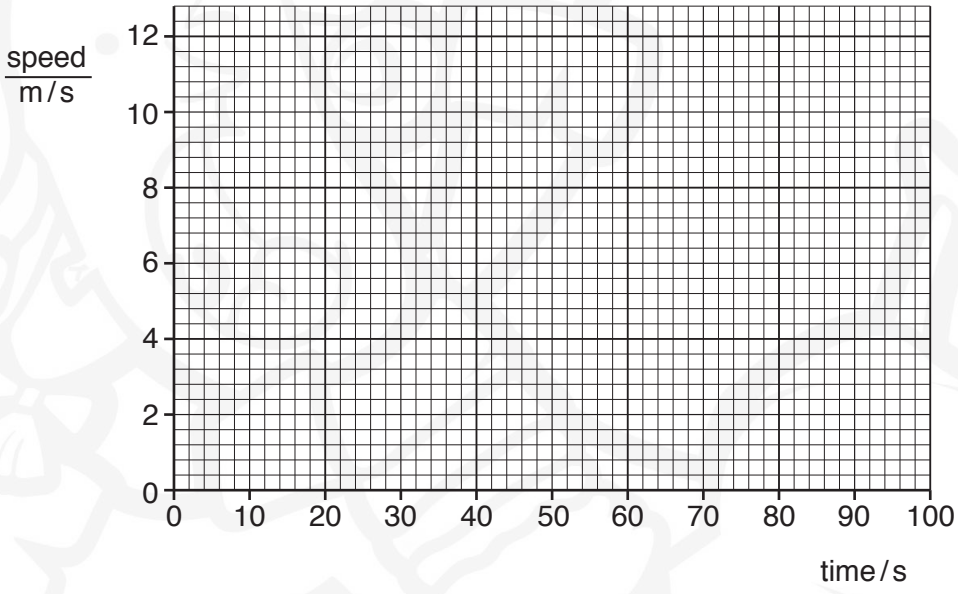


Fig. 2.2 [5]

(b) On another part of the journey, the average speed of the bus is 7.5 m/s.

Calculate the distance the bus travels in 150 s.

distance = ... m [3]

[Total: 8]

3 A load is attached to a spring, as shown in Fig. 3.1. Two arrows indicate the vertical forces acting on the load. The spring and the load are stationary.

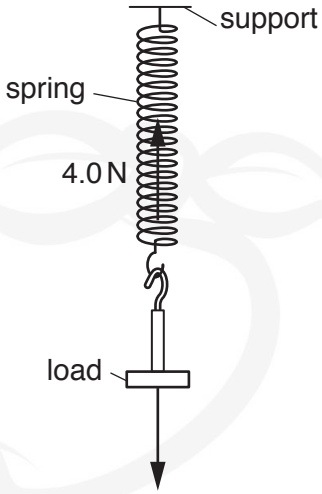


Fig. 3.1

(a) (i) State the name of the force acting vertically downwards.

..... [1]

(ii) The vertical force that acts upwards is 4.0 N.

State the value of the force acting vertically downwards.

force = ... N [1]

(b) The load is pulled downwards and then released. The load moves up and down.

Fig. 3.2 represents the vertical forces acting on the load at some time after it is released.

Fig. 3.2

Calculate the resultant force on the load and state its direction.

resultant force = ... N

direction = ...
[2]

(c) (i) State the principle of conservation of energy.

.....

..... [1]

(ii) Eventually the load stops moving up and down.

Describe and explain why the load stops moving. Use your ideas about conservation of energy.

.....

.....

.....

..... [2]

[Total: 7]

4 Fig. 4.1 shows a truck lifting a heavy load.

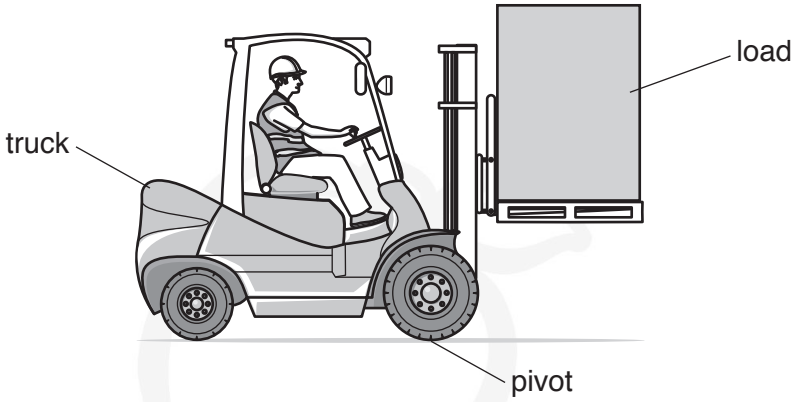


Fig. 4.1

(a) (i) The truck is stationary. Identify the quantities that determine the work done as it lifts the load.

Tick the box next to each correct quantity.

- ☐ distance
- ☐ force
- ☐ time

[1]

(ii) Draw a ring around the unit for work done from the list.

joule newton pascal watt [1]

(b) Identify the quantities that determine the power of the truck.

Tick the box next to each correct quantity.

- ☐ energy transferred
- ☐ temperature
- ☐ time

[1]

(c) The truck has a pivot near the front wheel. Fig. 4.2 represents the pivot and the vertical forces acting on the truck.

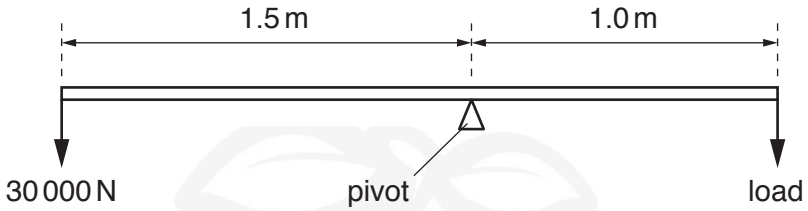


Fig. 4.2

The truck is in equilibrium.

Calculate the load.

load = ... N [3]

(d) Fig. 4.3 shows another truck lifting a pile of identical bricks.

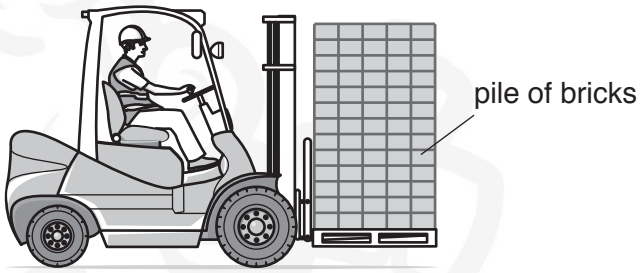


Fig. 4.3

(i) On Fig. 4.3, draw a cross to indicate the centre of mass of the pile of bricks. [1]

(ii) The truck can tilt the pile of bricks backwards, as shown in Fig. 4.4.

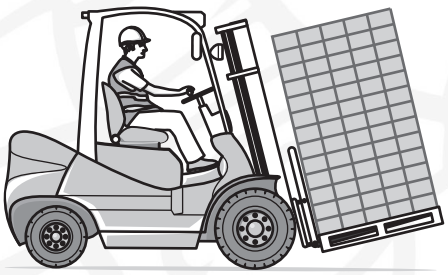


Fig. 4.4

Explain how tilting the pile of bricks backwards makes the truck more stable.

.....

.....

.....

..... [1]

[Total: 8]

5 Fig. 5.1 shows part of a solar farm. The solar panels tilt and rotate.

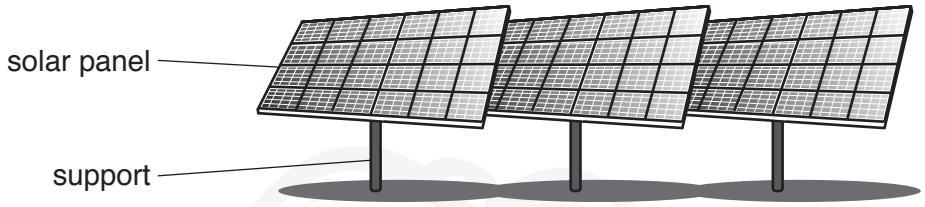


Fig. 5.1

(a) The solar farm converts energy from a source into a different, useful form of energy.

State the energy source and the useful form of energy.

source .....

useful form of energy .....

[2]

(b) Solar farms have advantages and disadvantages.

(i) State **two** advantages of a solar farm.

1. .....

2. .....

[2]

(ii) State **one** disadvantage of a solar farm.

..... [1]

(c) Suggest why it is useful that the panels can tilt and rotate.

.....

..... [1]

[Total: 6]

6 **(a)** Fig. 6.1 shows a cross-section of the inside of an electric oven.

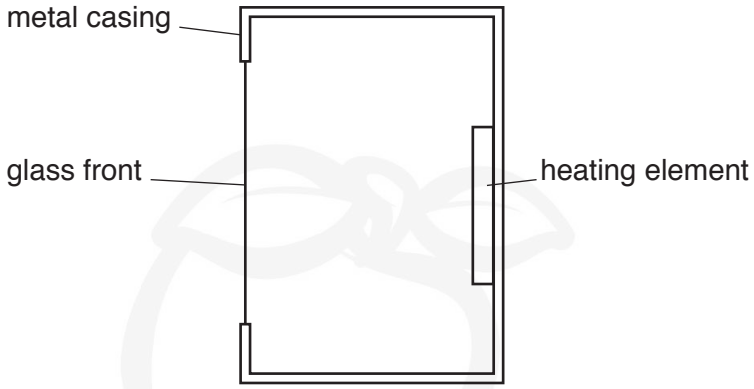


Fig. 6.1

The heater is switched on.

(i) On Fig. 6.1, draw two arrows to show how thermal energy moves throughout the oven by convection. [2]

(ii) Explain how thermal energy moves throughout the oven by convection. Use your ideas about density and expansion.

.....

.....

.....

..... [3]

(iii) Use a word from the box to complete the sentence.

conduction	expansion	insulation	radiation

Thermal energy travels at the speed of light by ..... [1]

(b) The oven is in a kitchen that is fitted with a smoke detector.

Warm, moving air can carry smoke particles.

Suggest the best position for the smoke detector in the kitchen.

..... [1]

[Total: 7]

[Turn over

7 Light and sound both travel as waves.

Draw a line from each statement to the correct term that describes it. One has been done for you.

statement	term
change in direction of light when entering a medium	amplitude
very high frequency sounds	dispersion
a glass prism producing a spectrum	diffraction
light spreading after passing through a narrow gap	echo
sound reflecting from a wall	longitudinal
seven colours of light	refraction
	spectrum
	ultrasound

[5]

[Total: 5]

8 **(a)** Fig. 8.1 shows an incomplete diagram of the electromagnetic spectrum.

		ultraviolet	visible light			radio waves

← higher frequency longer wavelength →

Fig. 8.1

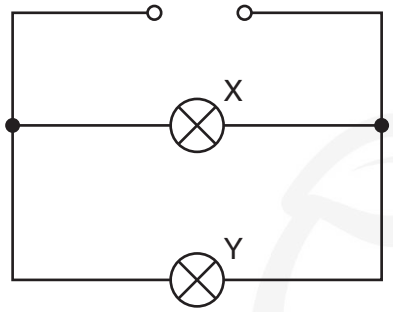
Complete Fig. 8.1 with the names of the missing types of radiation in the correct boxes. [4]

(b) State **one** use for ultraviolet radiation.

..... [1]

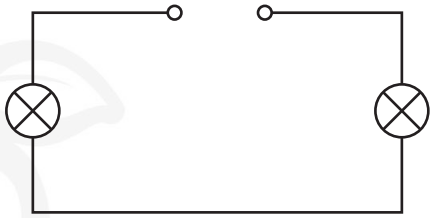
[Total: 5]

9 Fig. 9.1 and Fig. 9.2 each show an electrical circuit. Each circuit has two lamps connected to an electrical supply.



..... circuit

Fig. 9.1



..... circuit

Fig. 9.2

(a) State the term used to describe each electrical circuit. Write the term under each circuit. [2]

(b) State **two** disadvantages of the circuit in Fig. 9.2.

1. .....

2. .....

[2]

(c) Redraw the circuit in Fig. 9.1 with switches that will turn lamps X and Y on and off independently of each other.

[2]

(d) Fig. 9.3 shows another circuit.

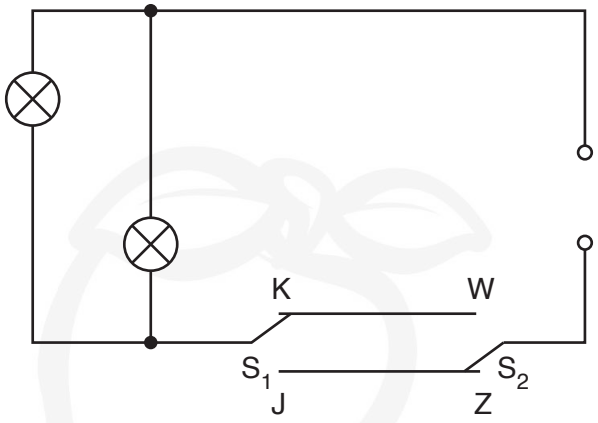


Fig. 9.3

The lamps can be turned on and off using two different switches S_1 and S_2.

Complete the table stating when the lamps are on or off. The first one has been done for you.

switch positions		lamps on or off
S_1	S_2	
K	Z	off
K	W	
J	W	
J	Z	

[3]

[Total: 9]

10 Fig. 10.1 shows the apparatus for an experiment on electrostatics.

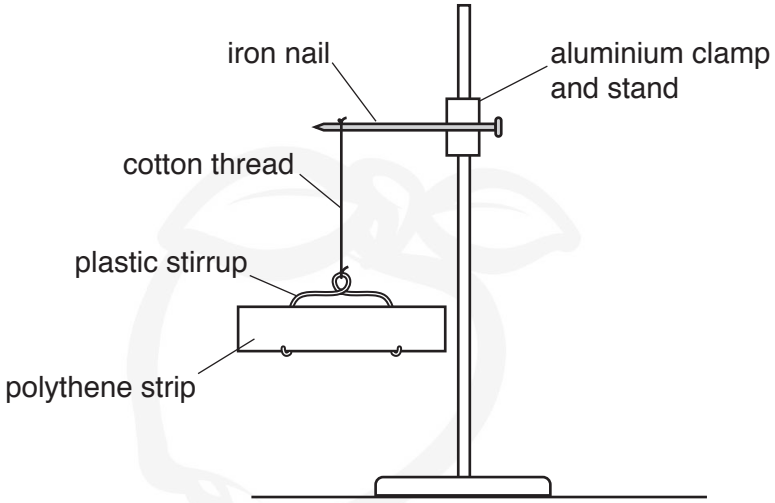


Fig. 10.1

(a) Identify the pieces of equipment that are electrical conductors and those that are electrical insulators. Draw a line from each piece of equipment to the correct box.

aluminium clamp and stand	conductor
plastic stirrup	
iron nail	insulator
cotton thread	

[1]

(b) State and explain how the polythene strip can be given a negative charge.

.....

.....

..... [2]

(c) Describe how the apparatus in Fig. 10.1 could be used to demonstrate that the polythene strip has a negative charge.

.....

.....

..... [2]

[Total: 5]

11 Fig. 11.1 shows a relay.

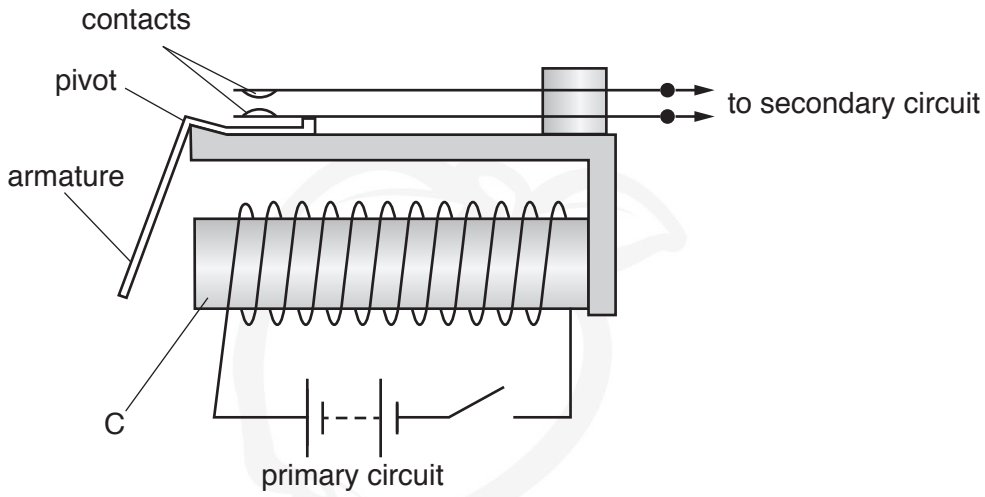


Fig. 11.1

(a) The statements describe the action of a relay. They are **not** in the correct order.

P Current in the coil creates an electromagnet.

Q Secondary circuit is completed.

R Armature pivots, closing the contacts.

S Part C attracts the armature.

T The switch in the primary circuit is closed.

Place the statements in the correct order. One has been done for you.

		S		

[3]

(b) Fig. 11.1 includes the part labelled C, which is made from a metal.

State the name of the metal and explain why this metal is used in the electromagnet.

metal .....

explanation .....

.....

[2]

[Total: 5]

12 Astatine-210 is a radioactive material. The nucleus of astatine can be represented by the symbol shown.

$$^{210}_{85}\text{At}$$

(a) Complete the table to describe the nucleus of astatine-210.

type of particle	number of particles	charge on particle
neutron		
		positive

[4]

(b) Astatine-210 has a half-life of 8 hours.

(i) The count rate of a sample of astatine-210 is measured over 24 hours.

On Fig. 12.1, sketch a line to show how the count rate changes over the 24 hours.

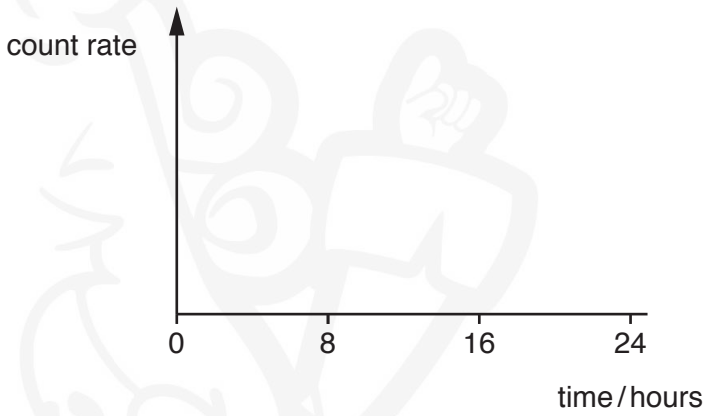


Fig. 12.1

[2]

(ii) The mass of a sample of astatine-210 is 0.500 kg.

Calculate how long it takes for 0.375 kg of the sample to decay.

decay time = ... hours [3]

[Total: 9]