

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**GATEWAY SCIENCE**  
**PHYSICS B**

Unit 2 Modules P4 P5 P6 (Foundation Tier)

**FRIDAY 20 JUNE 2008**

Morning  
 Time: 1 hour

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

--	--	--	--	--

Candidate  
 Number

--	--	--	--

**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.
- 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 **60**.
- A list of physics equations is printed on page two.

**FOR EXAMINER'S USE**

Section	Max.	Mark
A	20	
B	20	
C	20	
<b>TOTAL</b>	<b>60</b>	

This document consists of **23** printed pages and **1** blank page.

## 2

### EQUATIONS

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

$$v = u + at$$

$$s = \frac{(u + v)}{2} t$$

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

$$\frac{V_p}{V_s} = \frac{N_p}{N_s}$$

Answer **all** the questions.

**Section A – Module P4**

1 This question is about static electricity.

Olivia has a special type of dusting brush.

Look at the picture.



© OCR

She shakes the brush and dusts the table.

The brush attracts dust from the table.

(a) (i) Why does the brush now attract dust?

.....  
 .....[1]

(ii) Suggest **one other** way in which static electricity can be useful.

.....  
 .....[1]

(b) Static electricity can be a nuisance.

(i) Complete the sentences, using words from the list.

- |                |                  |              |                 |
|----------------|------------------|--------------|-----------------|
| <b>charged</b> | <b>conductor</b> | <b>earth</b> | <b>electron</b> |
| <b>neutral</b> | <b>insulator</b> | <b>live</b>  |                 |

Olivia walks on a nylon carpet.

Nylon is an .....

She becomes .....

Olivia gets a shock when she touches a water tap.

This is because it is connected to ..... [3]

(ii) Static electricity can make clothes cling to your skin.

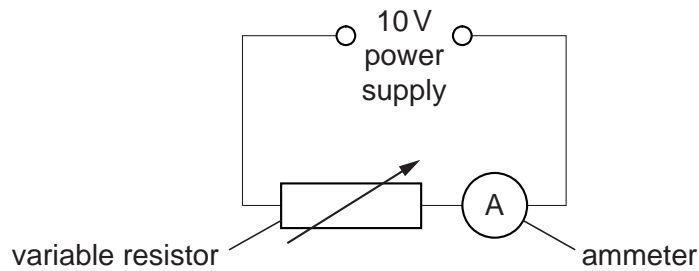
Suggest **one other** way in which static electricity can be a nuisance.

.....  
.....[1]

[Total: 6]

2 This question is about electricity.

Moira connects the following circuit.



She adjusts the variable resistor.

(a) The current decreases.

How did the resistance of the circuit change?

Choose from the list.

- decreased      increased      stayed the same**

answer .....[1]

(b) The reading on the ammeter is 2.5A.

The voltage across the variable resistor is 10V.

Calculate the resistance of the variable resistor.

The equations on page 2 may help you.

.....  
.....  
.....

answer .....ohms [2]

[Total: 3]

3 There are three types of nuclear radiation.

(a) Which types of nuclear radiation can pass through the skin?

..... and .....[1]

(b) (i) People who work with nuclear radiation have to wear protective clothing.



They must make sure that they are not exposed to too much radiation.

Give **one** reason why.

.....  
.....[1]

(ii) Write down **one** use of nuclear radiation.

.....  
.....[1]

(c) Background radiation is always present in the environment.

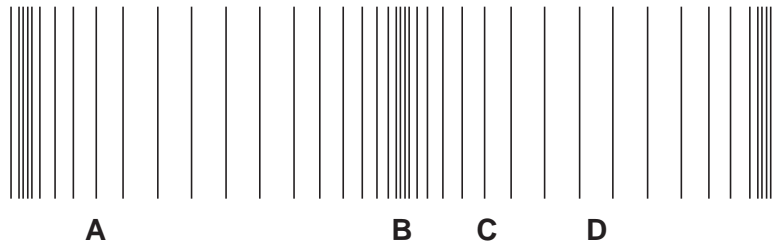
Where does this radiation come from?

.....  
.....[1]

[Total: 4]

4 This question is about longitudinal waves.

(a) Look at the diagram representing a longitudinal wave.



Complete the following sentences.

Choose from the list.

**A                      B                      C                      D**

(i) The centre of a rarefaction is shown by letter ..... [1]

(ii) A wavelength is the distance between letter ..... and letter ..... [1]

(b) Ultrasound is a longitudinal wave.

Write down **one** use of ultrasound.

.....  
 ..... [1]

[Total: 3]

5 (a) **Fossil fuel** power stations use coal, gas or oil.

What fuel do **nuclear** power stations use?

.....[1]

(b) Describe the main stages in the production of electricity in a nuclear power station.

.....  
.....  
.....  
.....[3]

[Total: 4]

## Section B – Module P5

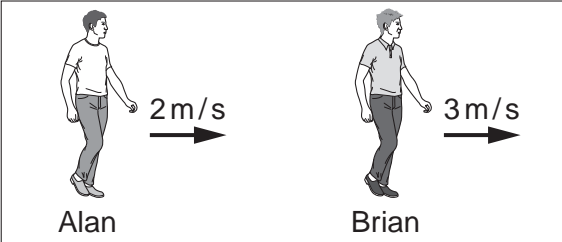
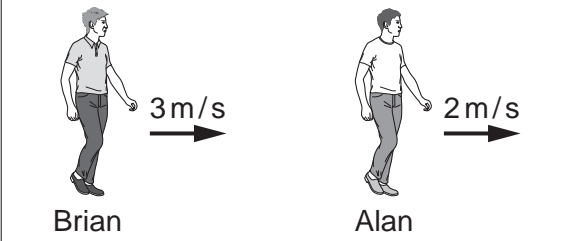
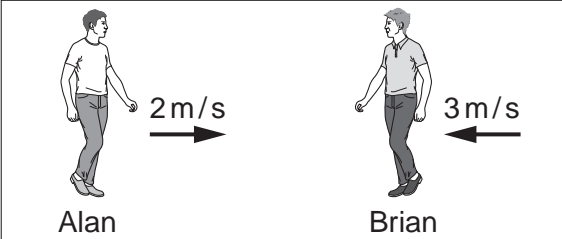
6 This question is about vectors.

(a) The diagrams show two people walking.

Alan walks at  $2\text{ m/s}$  and Brian walks at  $3\text{ m/s}$ .

Which diagram shows the **highest relative** velocity between them?

Put a tick (✓) in the box next to the correct answer.

	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

[1]



(b) Sally walks at a constant **speed**.




Denise walks at a constant **velocity**.

The table shows three paths.

Put a tick (✓) in the table if the path could have been taken by **Sally**.

Put a tick (✓) in the table if the path could have been taken by **Denise**.

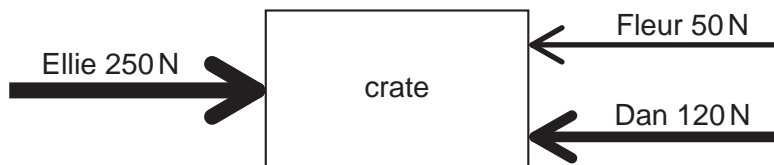
One tick has been done for you.

path taken	Sally at constant speed	Denise at constant velocity
	✓	
		
		

[3]

(c) Dan, Ellie and Fleur are pushing a large crate.

The diagram shows the size and direction of the forces they are using.



What is the resultant of these forces on the crate?

Put a tick (✓) in the box next to the correct answer.

- 170 N to the left
- 250 N to the right
- 420 N to the left
- 420 N to the right
- 80 N to the right

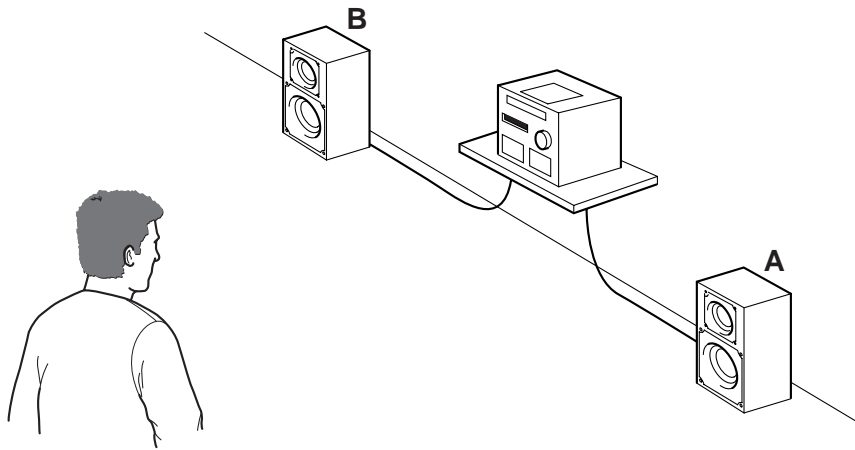
[1]

[Total: 5]

**10**  
**BLANK PAGE**

**PLEASE DO NOT WRITE ON THIS PAGE**

7 Sam is listening to the sound from two loudspeakers.



He walks from speaker **A** to speaker **B**.

Each loudspeaker is producing a note of the same loudness and frequency.

Put ticks (✓) in the boxes next to the **three** correct statements.

Sam hears nothing.

Sam only hears sound in his right ear.

The loudness of the sound he hears is constant.

The loudness of the sound he hears is sometimes louder.

The loudness of the sound he hears is sometimes quieter.

There is interference between the sound waves from the two loudspeakers.

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

[3]

[Total: 3]

8 Marie is on holiday and listening to her radio.

(a) What is the wavelength of the radio wave likely to be?

Put a (ring) around the correct answer.

1.5 mm

1.5 cm

1.5 km

[1]

(b) The aerial in Marie's radio is **not** in line of sight with the radio transmitter.

Why does Marie's radio receive a signal?

Put a tick (✓) in the box next to the correct answer.

Radio waves are absorbed by the Earth's atmosphere.

Radio waves are affected by the Earth's gravitational field.

Radio waves are reflected by the Earth's upper atmosphere.

Radio waves travel in straight lines.

[1]

(c) Marie's radio needs an **aerial** to receive the radio signal.

What does she need to receive the signal for her satellite television?

Put a (ring) around the correct answer.

amplifier

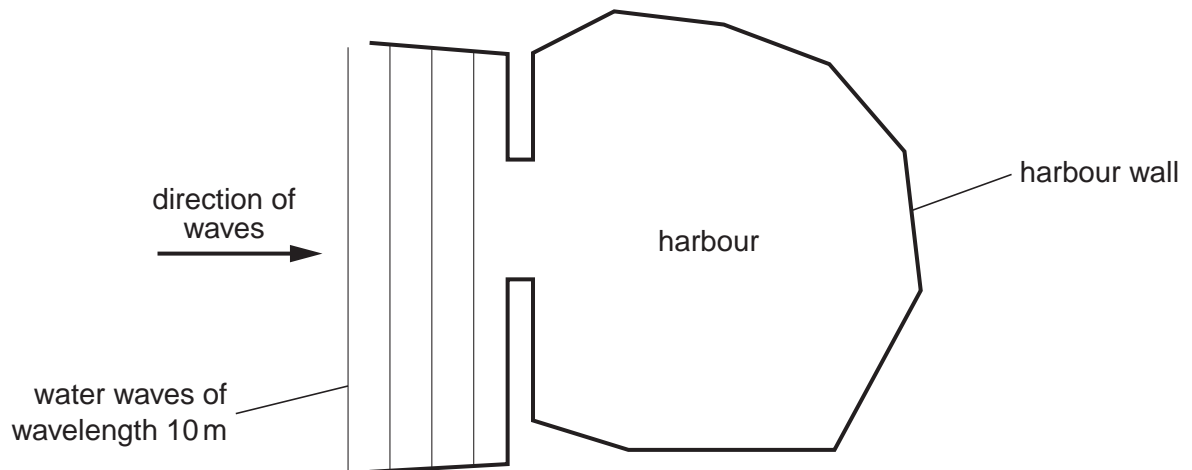
dish

microwave transmitter

transformer

[1]

(d) Marie is watching water waves as they enter a harbour.



The waves enter the harbour.

**Draw** on the diagram to show what happens to the waves.

[2]

[Total: 5]

9 Isaac looks through a magnifying glass.

The type of image he sees is **virtual**.

(a) What type of image is produced by a camera lens?

.....[1]

(b) Where is the image produced in a camera?

.....[1]

(c) What type of lens is used in a camera?

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

**concave**

**convex**

**diverging**

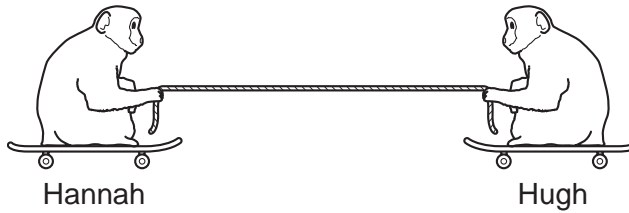
**plane**

[1]

[Total: 3]

10 (a) Two monkeys, Hannah and Hugh, are sitting on skateboards.

They are each holding one end of a rope.



Describe what happens when Hannah gives a sharp pull on the rope.

In your answer, write about

- what happens to Hannah
- what happens to Hugh
- why this happens.

.....

.....

.....

.....[3]

(b) Geoff hits a cricket ball with a bat.

This is an example of a **collision**.

Write down **one** other example of a collision from a different sport.



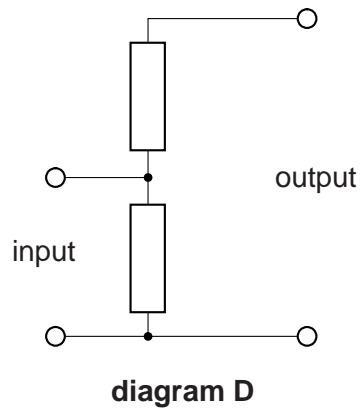
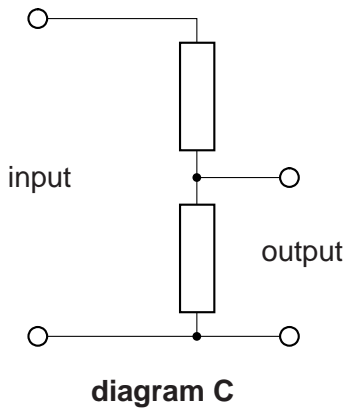
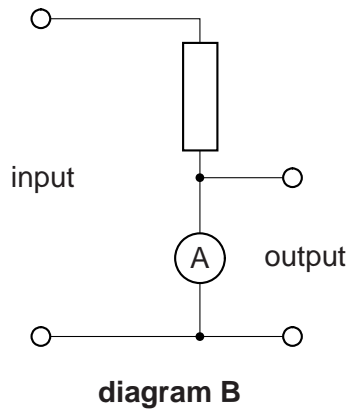
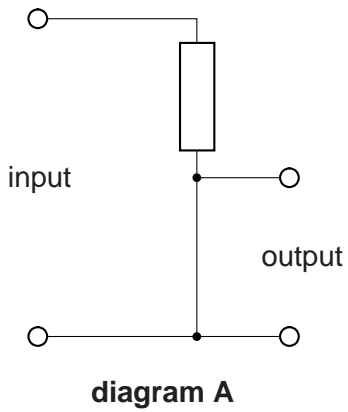
sport .....

collision between ..... and .....[1]

[Total: 4]

Section C – Module P6

11 (a) Look at the four electrical diagrams.



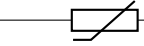
Which diagram shows a potential divider circuit?

Choose from **A**, **B**, **C** or **D**.

answer .....

[1]



(b) Sometimes a **thermistor**  is used in a potential divider circuit.

Finish the sentence. Choose your answer from this list.

**current**

**potential**

**temperature**

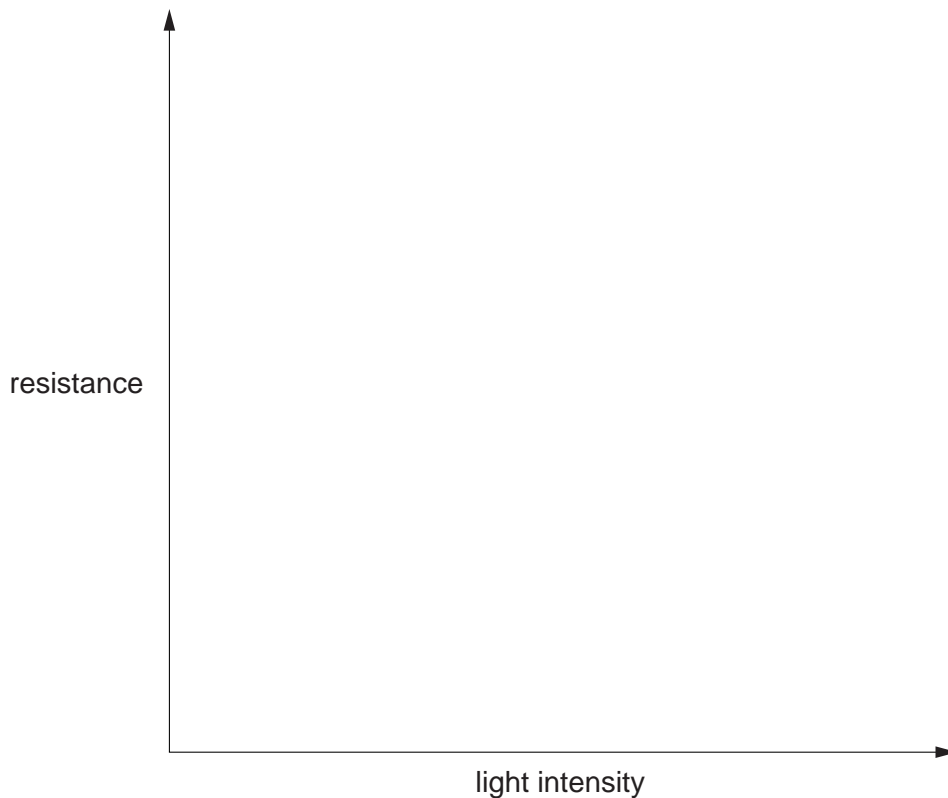
**voltage**

The resistance of a thermistor changes when the ..... changes. [1]

(c) An LDR can be used instead of one of the fixed resistors of a potential divider circuit.

Sketch a graph to show how the resistance of an **LDR** changes when the light intensity changes.

Use the axes below.



[2]

[Total: 4]

12 (a) Symbols are used to represent electronic components.

What do these symbols represent?

Choose from this list.


capacitor

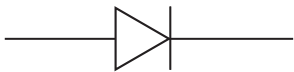
cell

diode

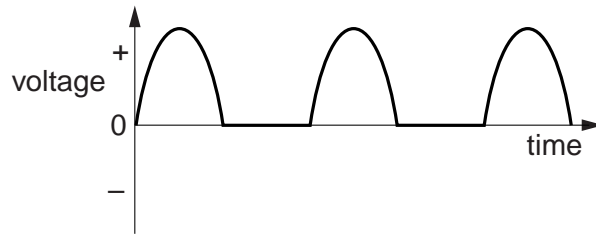
LDR

switch

(i)  .....[1]

(ii)  .....[1]

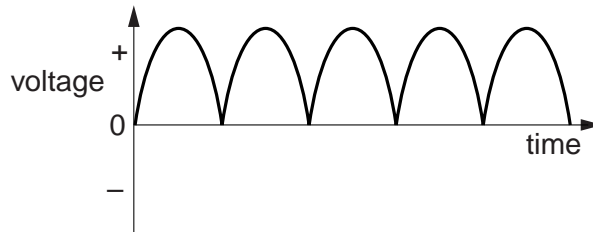
(b) This diagram represents half-wave rectification.



(i) Write down the name of the electronic component that will produce half-wave rectification.

.....[1]

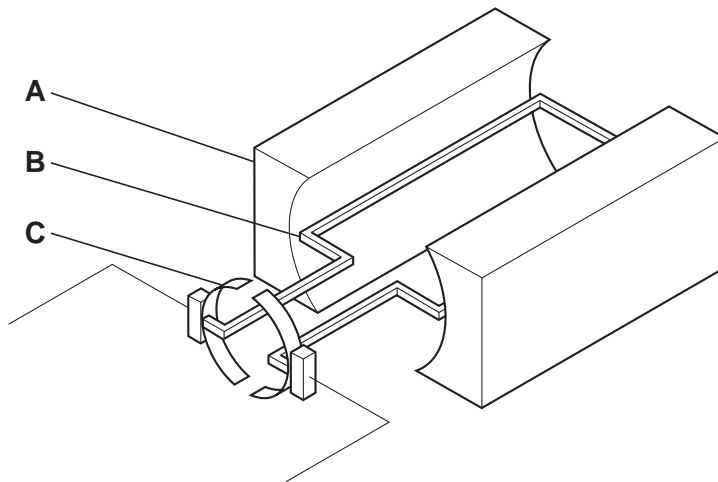
(ii) What does the following diagram represent?



.....[1]

[Total: 4]

13 Andy has made a model of a simple DC generator.



(a) Finish the table by identifying the parts of the DC generator.

Choose words from this list.

**commutator**

**coil**

**magnet**

**motor**

**transformer**

label	part of dynamo
<b>A</b>	
<b>B</b>	
<b>C</b>	

[3]

(b) Finish the sentence.

When Andy spins the coil, a ..... is induced across the coil.

[1]

(c) How is electricity generated at a power station?

Put a tick (✓) in the box next to the correct answer.

A bar magnet rotates inside coils of wire.

An electromagnet rotates around a permanent magnet.

An electromagnet rotates inside coils of wire.

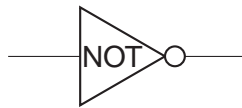
Coils of wire rotate between the poles of a permanent magnet.

Coils of wire rotate inside an electromagnet.

[1]

[Total: 5]

14 (a) Look at the diagram of a NOT gate.



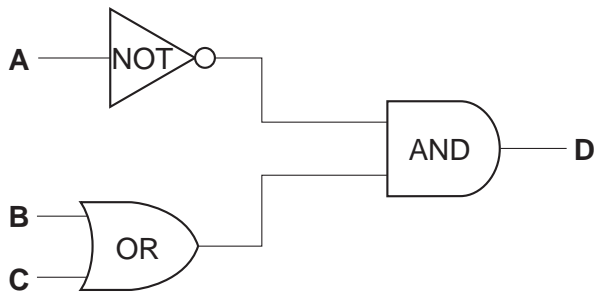
Complete the truth table for the NOT gate.

input	output

[2]

(b) Sue builds a logic circuit using three gates.

Look at the diagram.



(i) Which letters represent **input** signals?

Choose from **A, B, C** or **D**.

answer .....

[1]

(ii) Which letter represents an **output** signal?

Choose from **A, B, C** or **D**.

answer .....

[1]

(iii) Sue starts to write the truth table for the circuit she has built.

Finish the truth table for the circuit she has built.

It has been started for you.

A	B	C	D
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

[2]

(c) Logic gates can be combined to make a **latch**.

A latch is used in a burglar alarm.

What is the job of a latch?

.....

.....

.....[1]

[Total: 7]

**END OF QUESTION PAPER**

**PLEASE DO NOT WRITE ON THIS PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (OCR) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.