OXFORD

INTERNATIONAL
AQA EXAMINATIONS

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL GCSE

PHYSICS

Paper 1

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a pencil and a ruler
- a scientific calculator
- the Physics Equations Sheet (enclosed).

Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you worked out your answer.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

Information

- The maximum mark for this paper is 90.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.

Answer **all** questions in the spaces provided.

Do not write outside the box

0 1 Atomic clocks are very accurate clocks.

Atomic clocks use the isotope caesium-133.

The symbol for the isotope caesium-133 is

$$^{133}_{55}Cs$$

0 1 . 1 How many protons does an atom of caesium-133 have in its nucleus?

Tick (✓) **one** box.

[1 mark]

- 55 ☐
- 78 ☐
- 133 ☐
- 188 ☐

0 1 . 2 How many neutrons does an atom of caesium-133 have in its nucleus?

Tick (✓) **one** box.

[1 mark]

- 55 ☐
- 78 ☐
- 133 ☐
- 188 ☐

Do not write outside the box

0 1 . 3 An atom of caesium-133 contains protons and electrons.

Explain why an atom has no overall charge.

[2 marks]

0 1 . 4 Caesium-133 is an isotope of caesium.

Complete the sentence using the answers from the box.

[2 marks]

atoms	**electrons**	**ions**	**neutrons**	**protons**

Different isotopes of an element have the same number of _____ ,

but a different number of _____ .

0 1 . 5 The atoms of caesium emit electromagnetic waves with a frequency of 9 190 000 000 Hz.

The speed of electromagnetic waves is 300 000 000 m/s.

Calculate the wavelength of the waves.

Give your answer to 3 significant figures.

Use the Physics Equations Sheet.

[4 marks]

Wavelength = _____ m

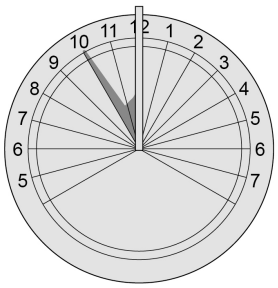
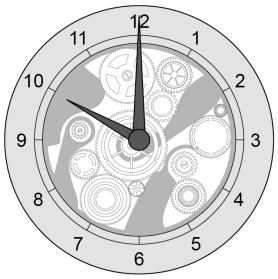
Turn over ►

Do not write outside the box

Clocks have changed over time.

Table 1 shows data for three different clocks.

Table 1

			
Type of clock	Sundial	Analogue clock	Digital clock
Year invented	4000 BCE	996 CE	1956 CE

0 1 . 6 What is the resolution of the digital clock shown in **Table 1**?

Tick (✓) **one** box.

[1 mark]

1 second ☐

1 minute ☐

1 hour ☐

0 1 . 7 How has the resolution of clocks changed as new types of clock were invented?

[1 mark]

0 1 . 8 Suggest a reason for this change in resolution.

[1 mark]

13

Do not write outside the box

0 2 The eyes of a monkey have the same structure as the human eye.

0 2 . 1 **Figure 1** shows a diagram of the human eye.

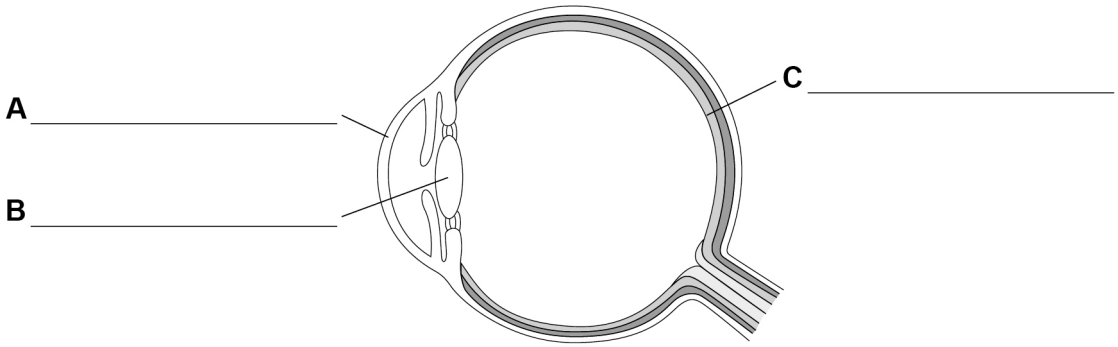
Label the parts of the eye.

Choose the answers from the box.

[2 marks]

ciliary muscle	**cornea**	**iris**	**lens**	**pupil**	**retina**

Figure 1



Question 2 continues on the next page

Do not write outside the box

Figure 2 shows a type of monkey called an owl monkey.

Owl monkeys are awake during the night.

Figure 2

0 2 . 2 Explain why having large pupils is useful to the owl monkey.

[2 marks]

Do not write outside the box

Owl monkeys can only see far objects clearly.

0 2 . 3 What name is given to this defect of vision in humans?

[1 mark]

0 2 . 4 Suggest why owl monkeys are unable to see objects that are close clearly.

Tick (✓) **one** box.

[1 mark]

The lens is too close to the retina. ☐

The lens is too powerful. ☐

The retina is too small. ☐

The pupils are very large. ☐

0 2 . 5 The eyes of an owl monkey can detect ultraviolet radiation, visible light and infrared radiation.

How is this different from human eyes?

[1 mark]

Question 2 continues on the next page

Do not write outside the box

0 2 . 6 Cameras detect visible light to produce an image.

Compare the structure of the eye of the owl monkey with the structure of a camera.

[4 marks]

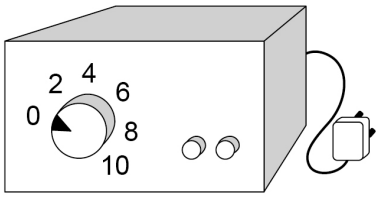
11

Do not write outside the box

0 3 A student investigated how changing the number of turns of wire on an electromagnet affected the strength of the electromagnet.

0 3 . 1 **Figure 3** shows some of the equipment the student used.

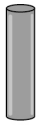
Figure 3



Power supply

Leads with crocodile clips

Insulated wire



Iron bar

Large paper clips

Describe how the student could carry out the investigation.

[6 marks]

Question 3 continues on the next page

Do not write outside the box

Table 2 shows the results of a similar investigation.

Table 2

Number of turns on the electromagnet	Maximum number of large paper clips picked up			
	Test 1	Test 2	Test 3	Mean
10	1	2	2	2
40	5	4	4	4
70	5	6	4	**X**
100	7	5	3	6

0 3 . 2 Calculate value **X** in **Table 2**.

[1 mark]

X = _____

0 3 . 3 Why would using small paper clips instead of large paper clips improve the investigation?

Tick (✓) **one** box.

[1 mark]

The investigation would be more repeatable. ☐

A smaller change in the strength of the electromagnet could be detected. ☐

The results of the investigation would be more difficult to predict. ☐

Do not write outside the box

0 3 . 4 Write a conclusion for the investigation.

Use **Table 2**.

[1 mark]

0 3 . 5 The greater the current in the wire, the stronger the electromagnet.

How could the student increase the current in the wire?

[1 mark]

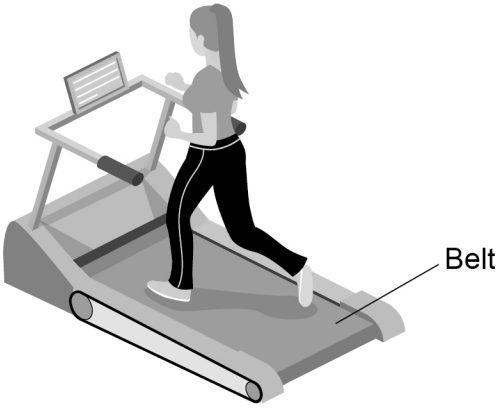
10

Turn over for the next question

Do not write outside the box

0 4 **Figure 4** shows a woman using a running machine.

Figure 4



The running machine records the distance she would have travelled if she was running on a road.

She runs at an average speed of 2.6 m/s for 10 minutes.

0 4 . 1 Calculate the distance recorded by the running machine.

Use the Physics Equations Sheet.

[4 marks]

Distance recorded by the running machine = _____ m

Do not write outside the box

0 4 . 2 The running machine has a belt that moves around in a loop.

The woman runs on the surface of the belt as the belt moves around.

The belt is 3.0 m long.

Determine the number of complete loops of the belt for the 10 minutes that the woman runs.

Use your answer from Question **04.1**.

[2 marks]

Number of complete loops = _____

0 4 . 3 The woman adjusts the running machine so that the speed she is running at increases from 2.6 m/s to 3.0 m/s.

Her acceleration was 0.10 m/s^2.

Calculate the time taken to accelerate from 2.6 m/s to 3.0 m/s.

Use the Physics Equations Sheet.

[3 marks]

Time taken = _____ s

9

Turn over for the next question

Do not write outside the box

0 5 Light from distant galaxies shows a red shift.

Red shift provides evidence for the Big Bang theory.

0 5 . 1 Describe what is meant by red shift.

[2 marks]

0 5 . 2 In 2016 the Hubble Space Telescope detected light from a galaxy with the largest red shift ever measured.

Explain what this tells us about the galaxy.

[2 marks]

Do not write outside the box

0 5 . 3 Cosmic Microwave Background Radiation (CMBR) is another piece of evidence for the Big Bang theory.

Explain how CMBR provides evidence for the Big Bang theory.

[4 marks]

0 5 . 4 Explain why the Big Bang theory may be replaced by another theory in the future.

[2 marks]

10

Turn over for the next question

Do not write outside the box

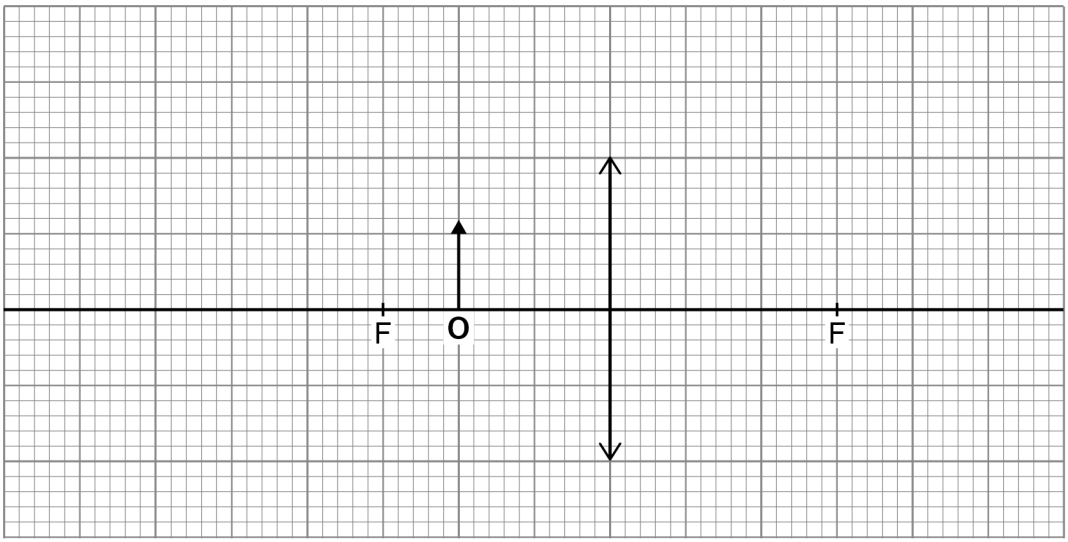
0 6 A convex lens can be used to make a small object seem larger.

0 6 . 1 Object **O** is very close to a convex lens as shown in **Figure 5**.

Complete **Figure 5** to show how the rays of light from object **O** form an image.

[3 marks]

Figure 5



0 6 . 2 Determine the magnification of the image you drew on **Figure 5**.

Use the Physics Equations Sheet.

[2 marks]

Magnification = _____

Do not write outside the box

0 6 . 3 The object in **Figure 5** is moved closer to the lens.

Describe the effect this has on the image produced.

[2 marks]

7

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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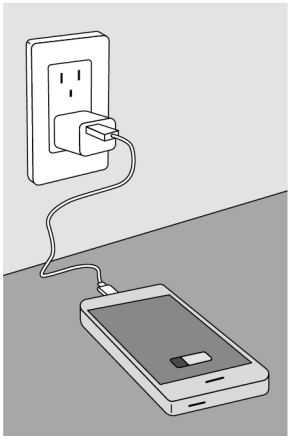
0 7 **Figure 6** shows a mobile phone with a charger.

The charger contains a step-down transformer.

Figure 6



0 7 . 1 Give **two** reasons why a step-down transformer is used in the mobile phone charger.

[2 marks]

1 _____

_____

2 _____

_____

0 7 . 2 The mobile phone charger uses a switch mode transformer rather than a basic transformer.

Give **two** advantages of using a switch mode transformer.

[2 marks]

1 _____

_____

2 _____

_____

Question 7 continues on the next page

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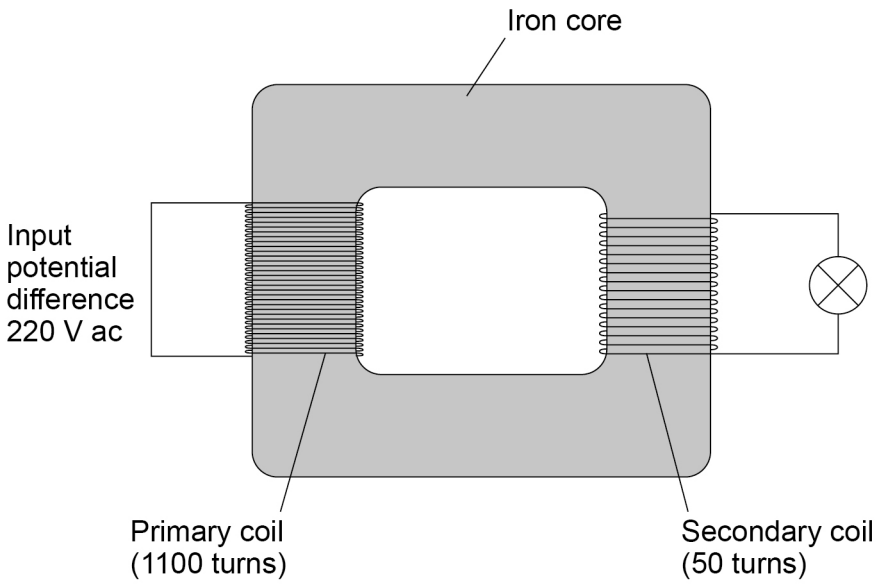
Figure 7 shows a basic step-down transformer.

Figure 7



0 7 . 3 Explain how the transformer works to light the lamp.

[5 marks]

Do not write outside the box

0 7 . 4 The transformer is 100% efficient.

Determine the potential difference across the secondary coil.

Use the Physics Equations Sheet.

[3 marks]

Potential difference across secondary coil = _____ V

0 7 . 5 The current in the primary coil is 50 mA.

The transformer is 100% efficient.

Determine the current in the secondary coil.

Use the Physics Equations Sheet.

[4 marks]

Current in secondary coil = _____ A

16

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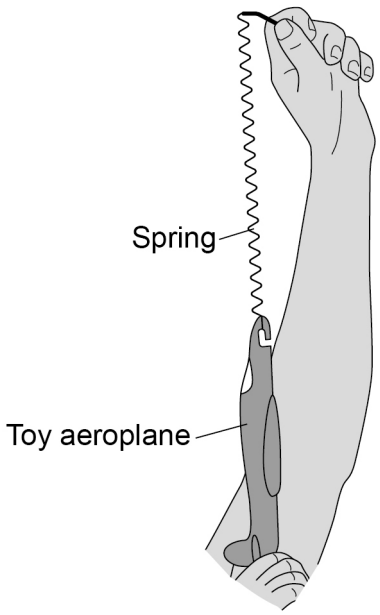
0 8 **Figure 8** shows a toy aeroplane with a spring attached.

The aeroplane is pulled down so that the spring is stretched.

Figure 8



0 8 . 1 Describe how the extension of the spring could be accurately measured.

[3 marks]

Do not write outside the box

The aeroplane is released and moves vertically upwards. The aeroplane becomes detached from the spring as it moves upwards.

0 8 . 2 When the spring is stretched it stores elastic potential energy.

Describe the energy transfers that take place from when the aeroplane is released to when it reaches its maximum height.

[4 marks]

Question 8 continues on the next page

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0 8 . 3 When the aeroplane is pulled down the spring extends by 0.30 m. The mass of the aeroplane is 20 g.

gravitational field strength = 9.8 N/kg

spring constant of spring = 40 N/m

Calculate the maximum change in height of the aeroplane.

Use the Physics Equations Sheet.

[5 marks]

Maximum change in height = _____ m

0 8 . 4 The spring is now stretched so that the extension doubles.

Explain the effect on the elastic potential energy now stored in the spring.

[2 marks]

14

END OF QUESTIONS

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Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

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