



General Certificate of Secondary Education
2017–2018

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit P1
Foundation Tier



[GSD31]

FRIDAY 9 NOVEMBER 2018, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.
Answer **all ten** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **8(a)**.

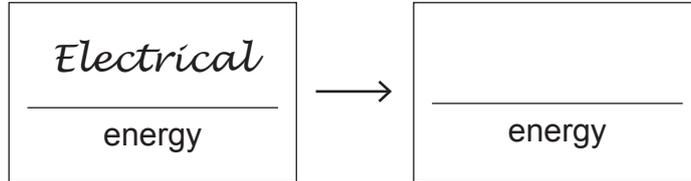
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total Marks	

1 Many devices change energy from one form to another. Complete the boxes below to show the energy change each device is **designed** to bring about.
One box has been completed for you.

(i) Electric bulb



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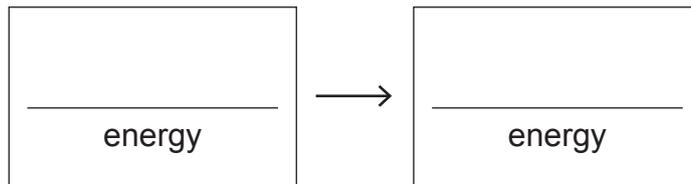


[1]

(ii) Match



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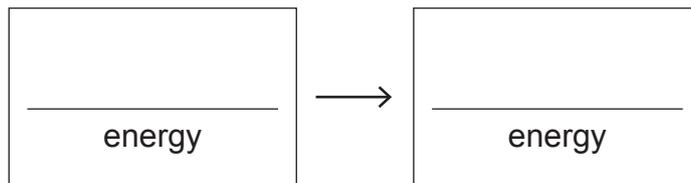


[2]

(iii) Loudspeaker



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[2]

Examiner Only	
Marks	Remark
○	○

2 Energy resources may be described as renewable or non-renewable.

(i) Describe what is meant by a renewable energy resource.

_____ [1]

(ii) In the table below put an R beside the energy resources which are renewable and N beside those which are non-renewable. One entry has been completed for you.

Energy resource	Renewable (R) or Non-renewable (N)
Oil	N
Wind	
Nuclear	
Solar	
Hydroelectric	

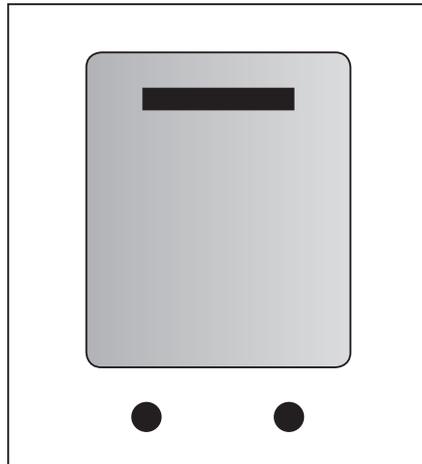
[4]

(iii) Which energy resource from the table would cause the greatest **air** pollution?

Answer _____ [1]

Examiner Only	
Marks	Remark
○	○

- 3 An electric oven produces 2000 J of heat energy every second. However, 200 J of this heat are wasted every second.



Source: Chief Examiner

- (i) Calculate the efficiency of the oven.

You are advised to show your working out.

Efficiency = _____ [4]

- (ii) In what unit, if any, is efficiency measured?

Circle the correct response.

joule

newton

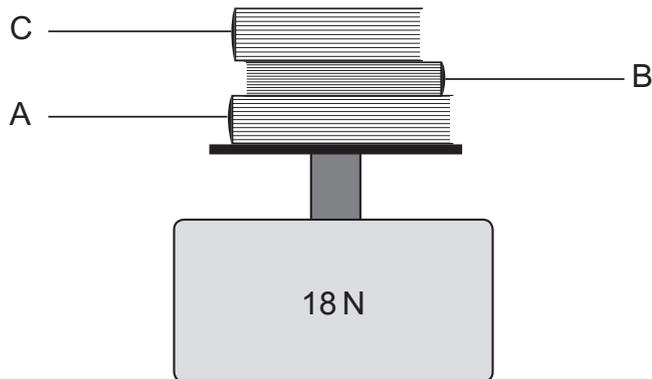
watt

no unit

[1]

Examiner Only	
Marks	Remark
○	○

- 4 A pupil finds the weight of three books, A, B and C, by placing them on a top pan balance. The reading on the balance is 18 N.



Source: CCEA

- (a) (i) What force do the books exert downwards on the top pan balance?

Downward force = _____ N [1]

- (ii) What force does the top pan balance exert on the books?

Force = _____ N [1]

Book A has a mass of 0.7 kg.

Book B a mass of 0.5 kg.

Book C mass is unknown.

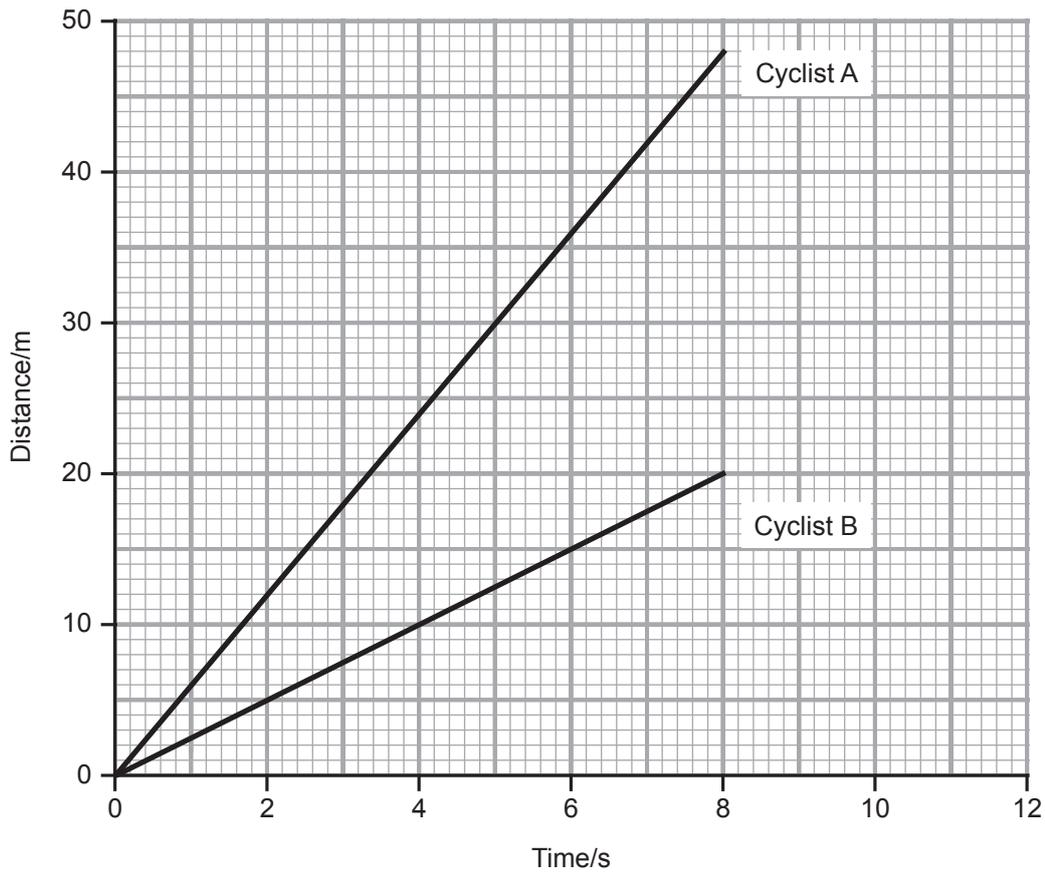
- (b) Calculate the mass of book C.

You are advised to show clearly your working out.

Mass of book C = _____ kg [4]

Examiner Only	
Marks	Remark
○	○

5 Shown below is the distance–time graph for cyclist A and cyclist B.



(i) How far has cyclist A travelled in 8 seconds?

Distance = _____ m [1]

(ii) How far apart are cyclist A and cyclist B after 8 seconds?

You are advised to show clearly your working out.

Distance apart = _____ m [1]

Examiner Only	
Marks	Remark
○	○

- (iii) Use the graph to find cyclist B's speed.
Include the unit with your answer.

You are advised to show clearly your working out.

Speed = _____ [4]

- (iv) Cyclist B stops after eight seconds. Complete the distance–time graph
for cyclist B up to twelve seconds. [1]

Examiner Only	
Marks	Remark

6 The diagram shows a satellite at a distance from the earth.



Source: CCEA

A force, called the centripetal force, acts on the satellite.

(i) What supplies the centripetal force in this case?

_____ [1]

(ii) **Starting on the satellite**, draw an arrow to show the direction of the centripetal force. [1]

(iii) The centripetal force causes the satellite to move in a particular way. Tick (✓) the box which describes the motion of the satellite.

The satellite moves further away from the earth.

The satellite moves in a circular orbit.

The satellite moves in a straight line.

[1]

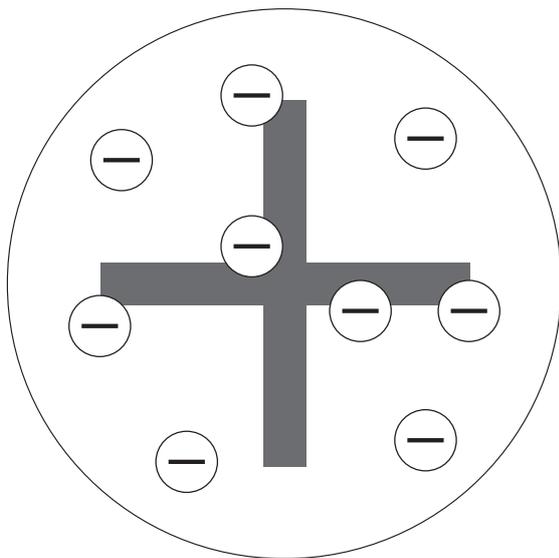
(iv) Describe the motion of the satellite if the centripetal force ceased to exist.

_____ [1]

Examiner Only	
Marks	Remark
○	○

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(Questions continue overleaf)

- 7 In 1904 a scientist called JJ Thomson put forward a theory about the structure of the atom. This model imagined that electrons are fixed in a sphere of positive charge.



Source: CCEA

- (a) (i) What is the name of this model of the atom?

_____ [1]

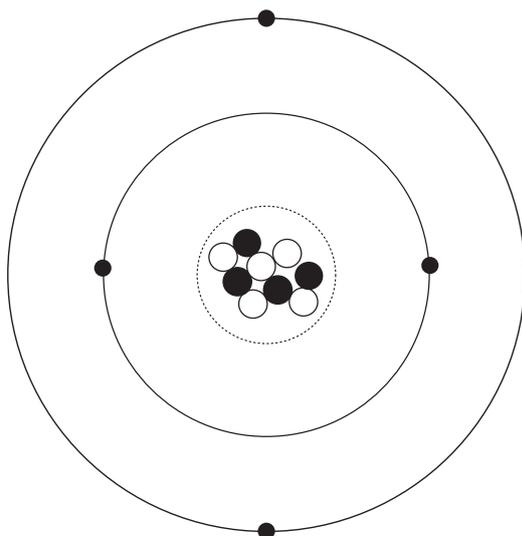
Later this model was replaced by a new model.

- (ii) Name the two scientists who proposed the new model.

_____ and _____ [2]

Examiner Only	
Marks	Remark
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The diagram represents a neutral atom.



Source: CCEA

(b) (i) State its atomic number.

Atomic number = _____ [1]

(ii) State the number of neutral particles.

Number = _____ [1]

(iii) State the mass number.

Mass number = _____ [1]

The atom loses an electron in a collision with another atom.

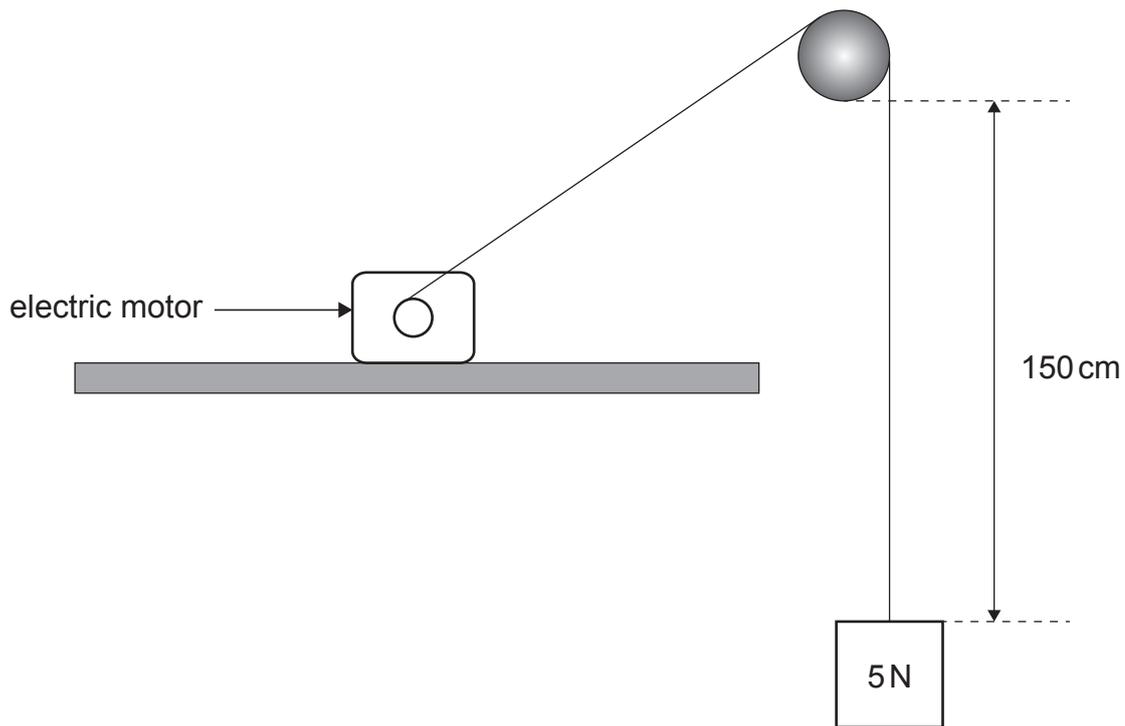
(iv) What name is given to the particle when it loses the electron?

Name of particle _____ [1]

Examiner Only

Marks Remark

An electric motor raises a load of 5 N through a vertical distance of 150 cm in a time of 3 seconds.



Source: CCEA

(b) Calculate the power of the electric motor.

You are advised to show your working out.

Power = _____ W [4]

Examiner Only	
Marks	Remark

9 Three types of radiation, alpha, beta and gamma, may be emitted from radioactive sources.

(a) Complete the table below by writing alpha, beta or gamma in the second column.

Is easily absorbed by a piece of cardboard	
Consists of four particles	
Is a wave rather than a particle	
Comes from the nucleus and has a negative charge	

[4]

(b) (i) When a radioactive substance is delivered to a laboratory its activity is 6000 counts per minute. Complete the table below.

Activity/counts per minute	Time/half-lives
6000 (arrives)	0
	1
1500	
	4

[3]

Examiner Only	
Marks	Remark
○	○

It takes 45 minutes for the count rate to fall from 6000 counts per minute to 750 counts per minute.

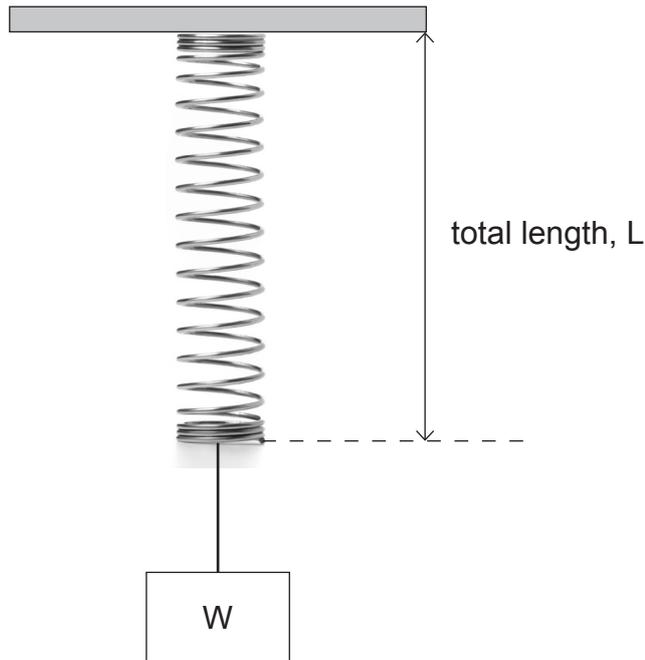
(ii) Calculate the half-life of the radioactive substance.

You are advised to show your working out.

Half-life = _____ minutes [2]

Examiner Only	
Marks	Remark

10 Weights are placed on the end of a spring causing it to increase in length.



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A student thinks that the total length L of the spring is proportional to the weight W added.

To test the relationship a number of readings of weight and length were obtained experimentally and these are recorded below.

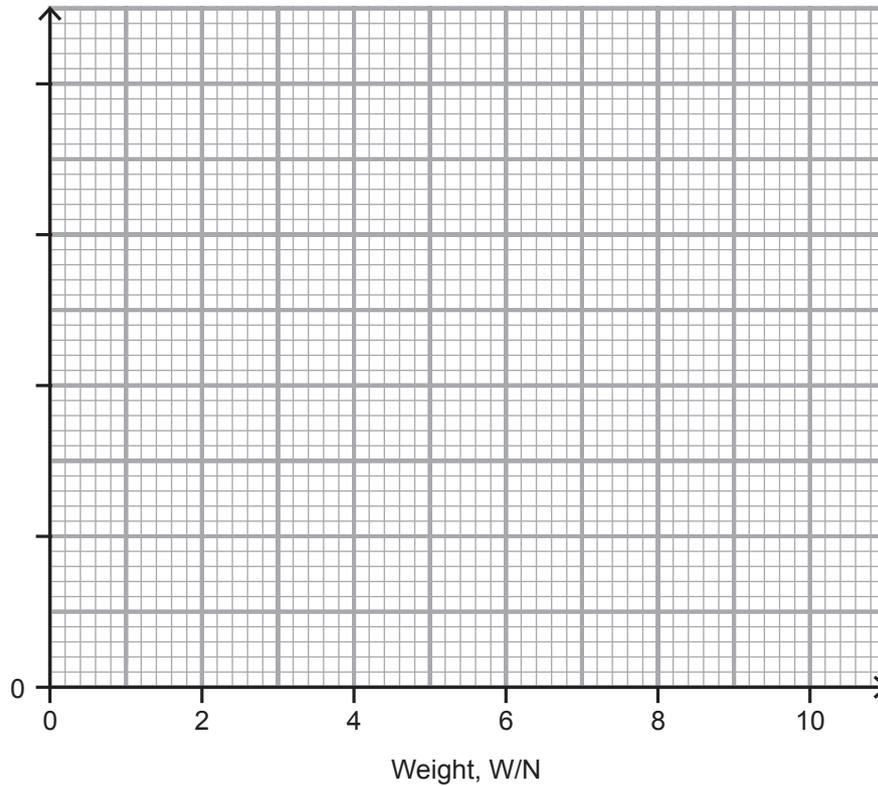
Weight, W/N	2	4	6	8	10
Total length, L/cm	8	11	14	17	20

You are asked to plot a graph of total length, L against weight, W .

- (i) Choose a suitable vertical scale and label it. [2]
- (ii) Plot a graph of total length against weight. [2]
- (iii) Draw the best fit line and extend the line until it cuts the vertical axis. [1]
- (iv) Give the total length of the spring before any weight has been added.

Total length = _____ cm [1]

Examiner Only	
Marks	Remark
○	○



Examiner Only	
Marks	Remark

(v) Is it true to say that the two quantities are proportional?

Circle the correct response. Yes / No

Give a reason for your answer.

_____ [1]

(vi) Calculate the gradient of your graph and give its unit.

You are advised to show clearly your working out.

Gradient = _____ Unit = _____ [4]

THIS IS THE END OF THE QUESTION PAPER

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