



Rewarding Learning

General Certificate of Secondary Education
2012–2013

Centre Number

71

Candidate Number

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

WEDNESDAY 29 FEBRUARY, 2012

9.30 am–10.30 am



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 eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

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)**.

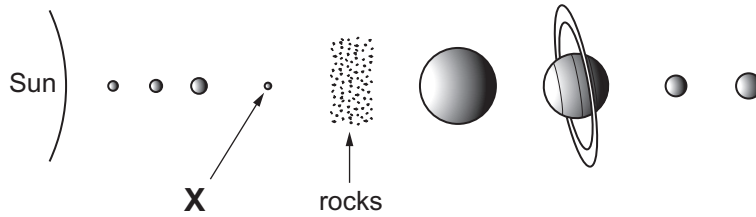
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use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

**Total
Marks**



1 The diagram below shows some of the objects in our Solar System.



(a) (i) Name the planet labelled X.

Answer _____ [1]

(ii) What name is given to the rocks shown in the diagram?

Choose from:

stars asteroids moons comets

Answer _____ [1]

(b) Our Solar System has been described and named in two models, one of which we now know is wrong. Use lines to match each name with its correct description.

Name

Description

Heliocentric

The Sun is at the centre

Geocentric

The Moon is at the centre

The Earth is at the centre

[2]

Examiner Only	
Marks	Remark

(c) The table below gives information on some planets in our Solar System.

Planet	Distance from Sun/ million km	Time to orbit the Sun/years
Mercury	60	0.2
Venus	110	0.6
Earth	150	1
Jupiter	780	12
Uranus	2900	84

(i) Complete the following sentence to describe the trend shown in the table.

As the distance from the Sun increases, the time to orbit the

Sun _____ [1]

(ii) Use the information in the table to suggest which planet will be the coldest. Explain your answer.

_____ [2]

Examiner Only

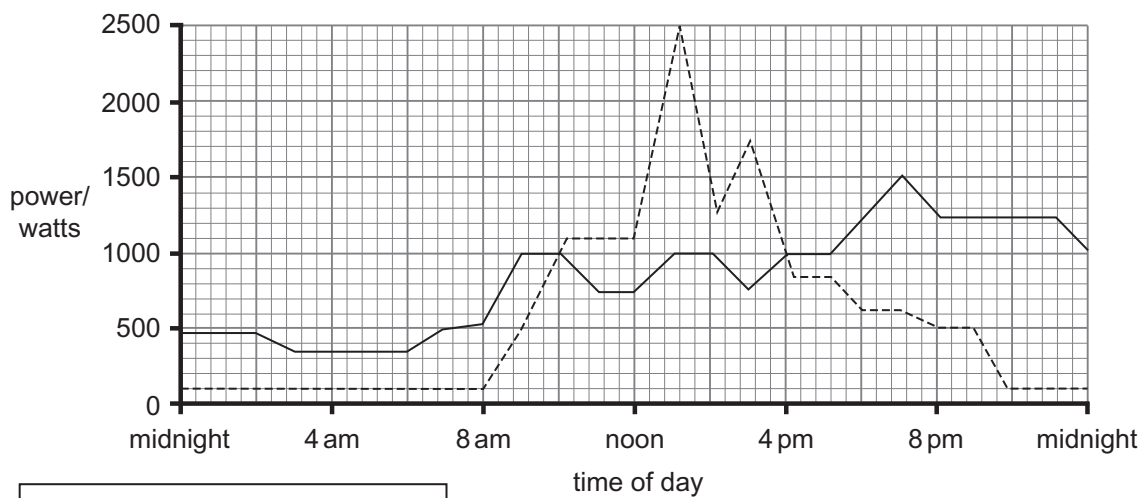
Marks Remark

(c) The picture below shows a house that uses a wind turbine to generate some of its electricity.



© iStockphoto / Thinkstock

The graph below shows the power output from the wind turbine and the household demand for electricity over a 24 hour period.



Key	
—	Output from wind turbine
- - - -	Household demand

(i) During which period of the day is the household demand greater than the wind turbine output?

Choose from:

4 am to 10 am : 10 am to 4 pm : 4 pm to 10 pm

Answer _____ [1]

(ii) What is the maximum power output from the **turbine**?

Answer _____ watts [1]

Examiner Only	
Marks	Remark

(iii) Suggest **one** reason for the household demand being low from 10pm to 8am.

[1]

Examiner Only	
Marks	Remark

3 The table below gives information for two different types of light bulb.

	Low-energy bulb	Ordinary bulb
Electrical power input	15 W	60 W
Light power output	3 W	3 W
Cost to buy	£3.50	£0.50
Expected lifetime	8 years	1 year
Annual running cost	£1.00	£4.00

(a) (i) Give two reasons for choosing a low-energy light bulb.

1. _____
2. _____ [2]

(ii) Give **one** reason for choosing the ordinary light bulb.

_____ [1]

(b) Calculate the efficiency of the **low-energy** bulb using the equation:

$$\text{efficiency} = \frac{\text{light power output}}{\text{electrical power input}}$$

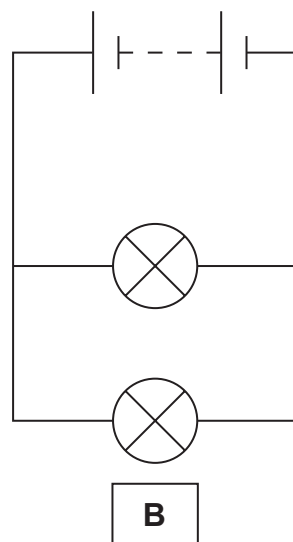
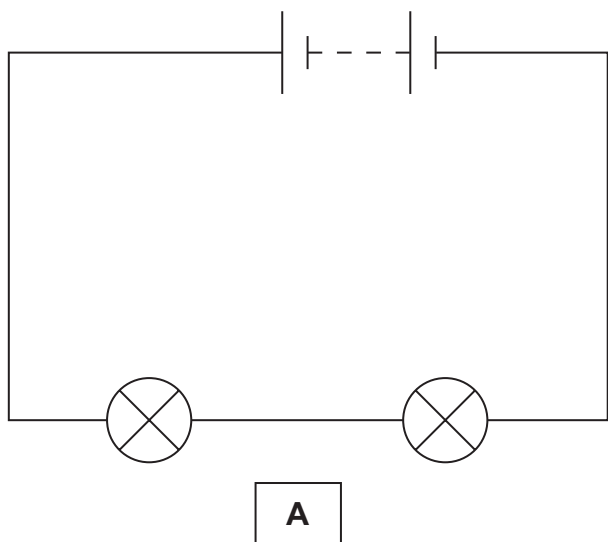
(Show your working out.)

Answer _____ [2]

Examiner Only

Marks Remark

4 Shown below are two simple electrical circuits.



(a) Complete the following sentences.

(i) The bulbs in circuit **A** are connected in _____ [1]

(ii) The bulbs in circuit **B** are connected in _____ [1]

(b) State what will happen in each circuit if one bulb is broken.

(i) Circuit **A**

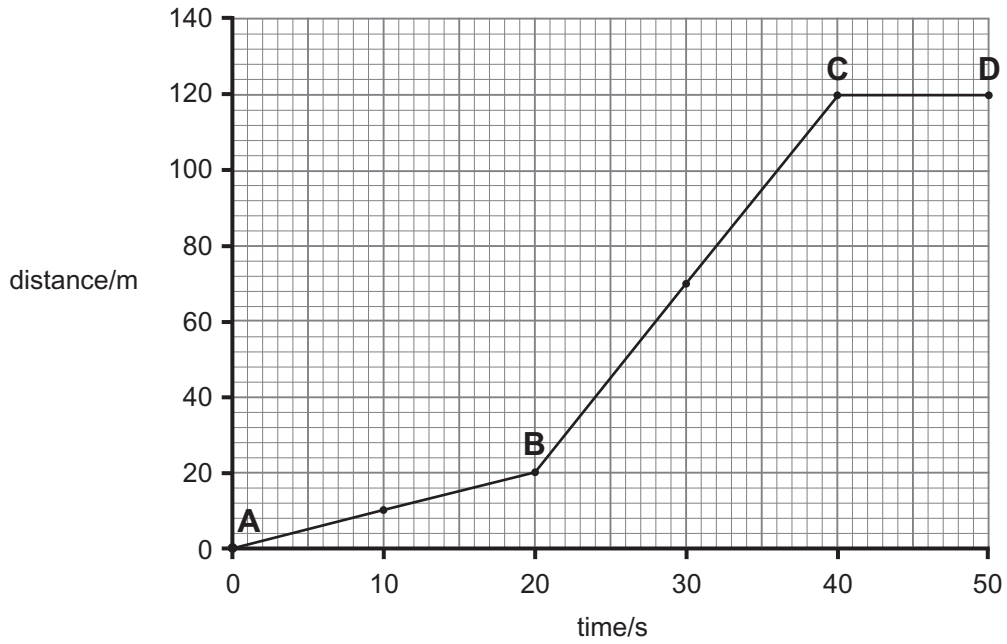
 _____ [1]

(ii) Circuit **B**

 _____ [1]

Examiner Only	
Marks	Remark

5 The distance–time graph for a car journey is shown below.



(a) Describe the motion of the car from:

1. **A to B** _____ [1]

2. **C to D** _____ [1]

(b) What happens to the motion of the car at point **B**?

Choose from:

slows down : **turns a corner** : **gets faster**

Answer _____ [1]

Examiner Only	
Marks	Remark

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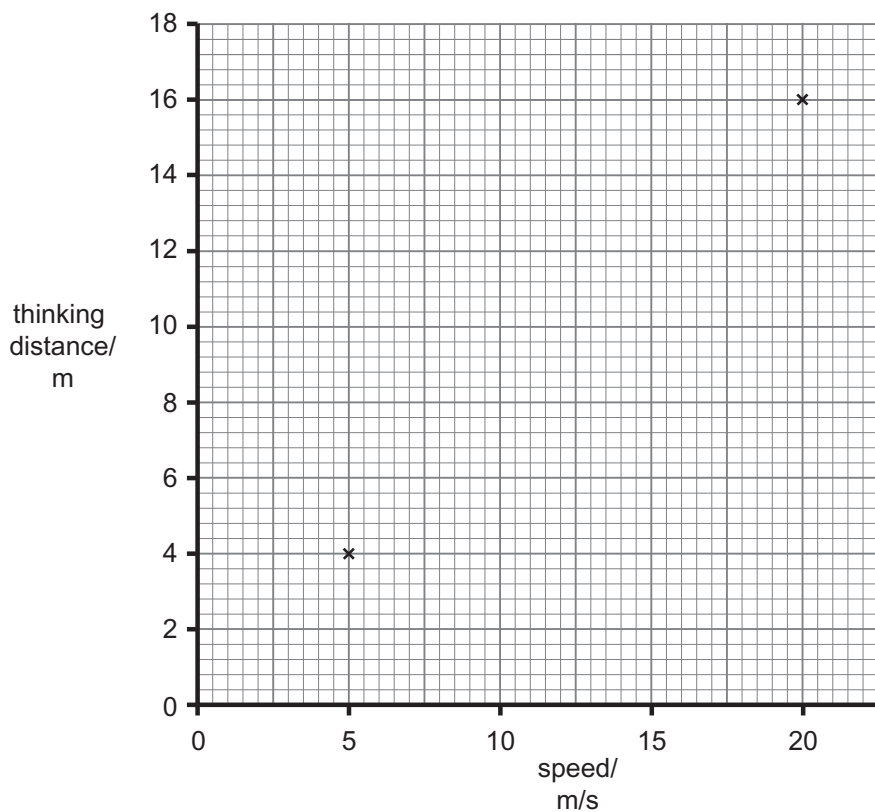
7 (a) Complete the following equation about the stopping distance of a car.

Stopping distance = thinking distance + _____ distance
[1]

(b) The table below gives the thinking distance at different speeds on a dry day.

Speed/ m/s	Thinking distance/ m
5	4
8	6.4
12	9.6
15	12
20	16

(i) Complete the plots for these values and draw a line graph on the grid below.



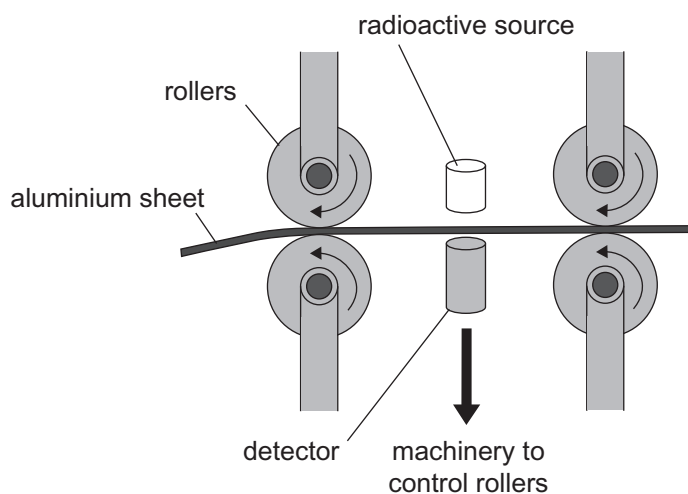
[2]

(ii) State the trend shown in this information.

_____ [1]

Examiner Only	
Marks	Remark

- 8 The diagram below shows how a radioactive source is used to monitor the thickness of an aluminium sheet during manufacture. If the thickness of the aluminium sheet changes, the force applied to the rollers will adjust to maintain the correct thickness.



- (a) Beta is the best type of radiation to use as a source. With reference to the penetration properties of all types (alpha, beta and gamma) explain fully why beta is the best.

In this question you will be assessed on your written communication skills including the use of specialist science terms.

[6]

Examiner Only	
Marks	Remark

- (b) Radiation is used to kill bacteria and fungi found in fresh food to stop decay. The radiation is applied after packaging.

The table below gives details of some isotopes.

Isotope	Type of radiation emitted	Half-life
Radon-220	Alpha	54.5 seconds
Polonium-210	Alpha	138 days
Bismuth-83	Beta	61 minutes
Hydrogen-3	Beta	12 years
Technetium-99	Gamma	6 hours
Cobalt-60	Gamma	5 years

Which isotope would be best for a food producer to use with a packet of fresh strawberries? Explain your answer.

Isotope _____ [1]

Explanation _____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

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Marks

Remark

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