

New
Specification



Centre Number

71	
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Candidate Number

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General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 3 (Physics)

Higher Tier

[GSS32]

WEDNESDAY 29 FEBRUARY, 2012

9.30 am–10.45 am



TIME

1 hour 15 minutes.

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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75.

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 questions **3(a)** and **9(a)(i)**.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total
Marks

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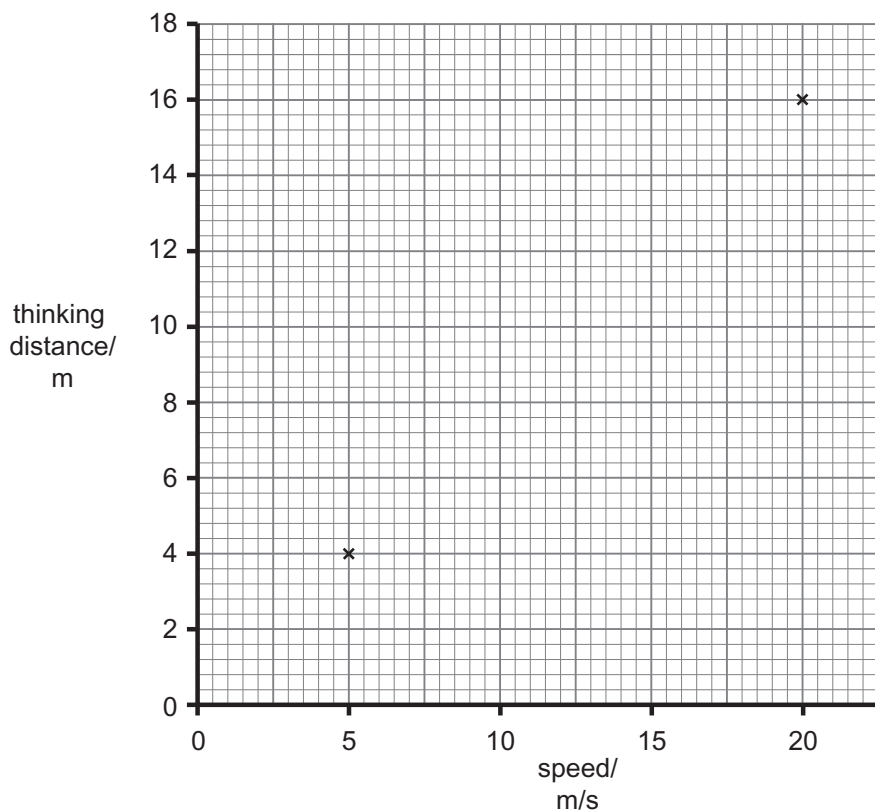
2 (a) Complete the following equation about the stopping distance of a car.

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.



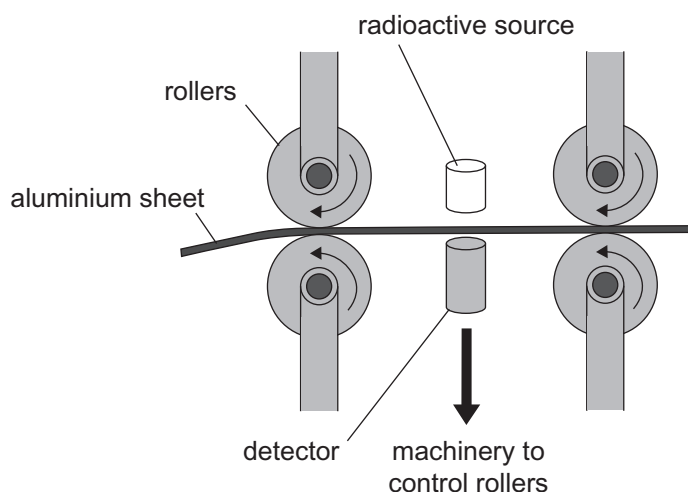
[2]

(ii) State the trend shown in this information.

_____ [1]

Examiner Only	
Marks	Remark

- 3 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.

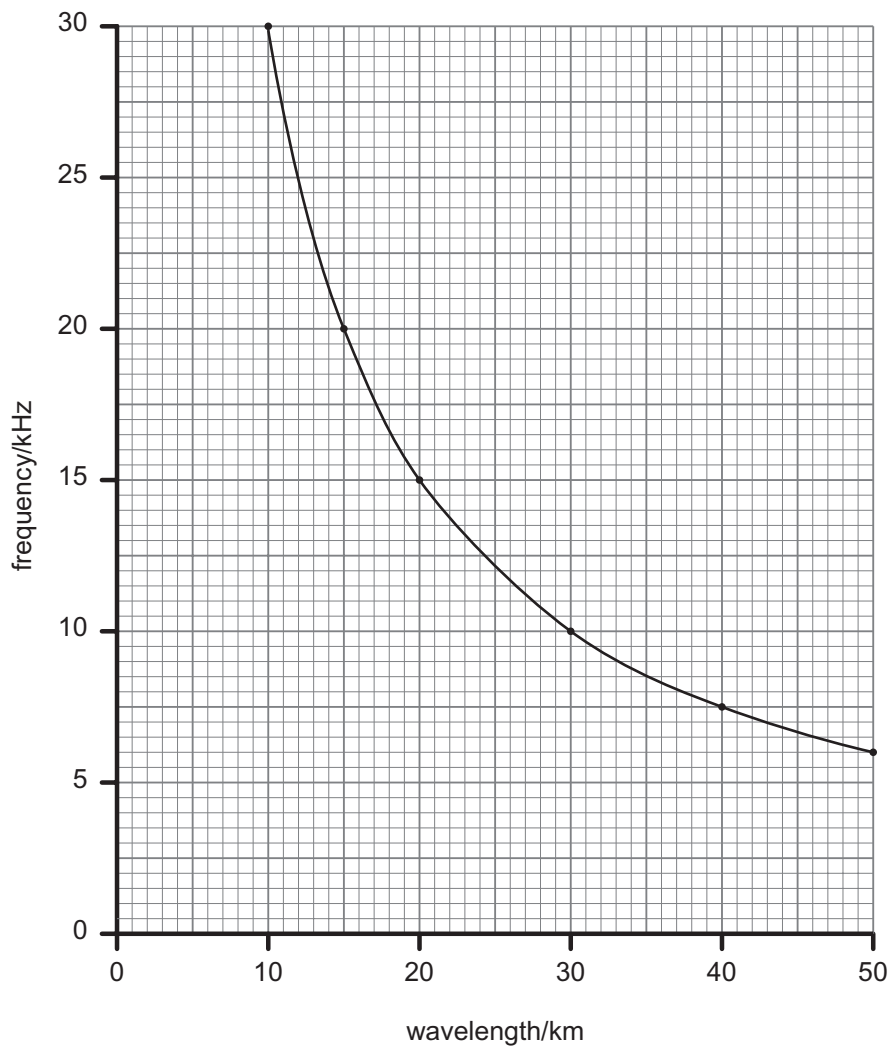
In this question you will be assessed on your written communication skills including the use of specialist science terms.

[6]

Examiner Only

Marks Remark

- 4 The graph below shows how the frequency of electromagnetic waves changes with wavelength.

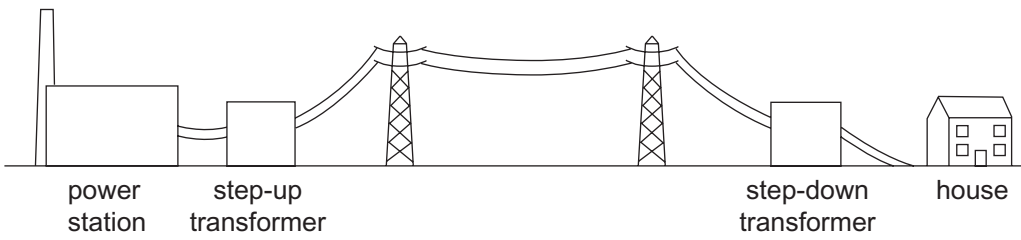


- (a) State the conclusion that can be drawn from this graph.

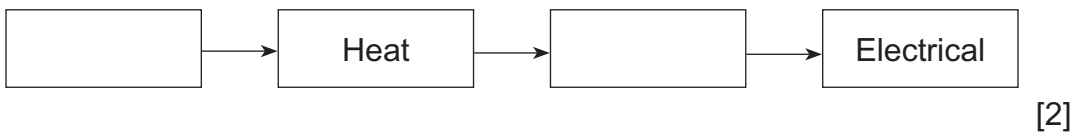
_____ [1]

Examiner Only	
Marks	Remark

5 The diagram below shows how electricity gets from power stations to consumers.



(a) (i) Complete the following energy change diagram for a fossil fuel power station.



(ii) Why is electrical the most useful type of energy?
 _____ [1]

(b) Electricity from the power station is passed through a step-up transformer.

(i) What change, if any, does the step-up transformer make to the:

1. current?
 _____ [1]

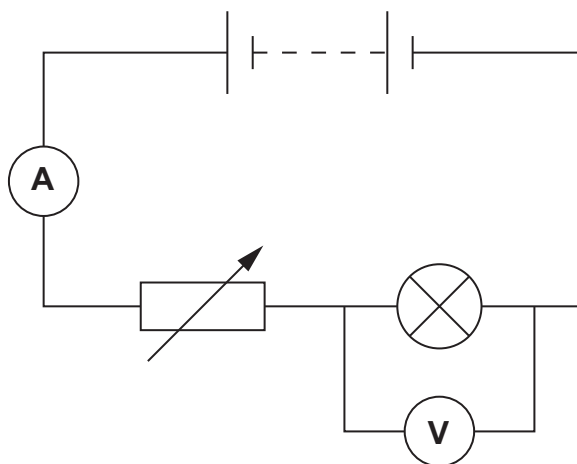
2. voltage?
 _____ [1]

(ii) Suggest **one** advantage of passing electricity through the step-up transformer.

 _____ [1]

Examiner Only	
Marks	Remark

(c) Below is shown a simple circuit which includes a variable resistor.



- (i) Draw an arrow on the diagram to show the direction of conventional current flow. [1]
- (ii) The table below shows the results obtained from the circuit when the variable resistor is adjusted.

Voltage/V	Current/A
2	0.10
3	0.15
5	0.25
7	0.30

State the trend shown by these results.

_____ [1]

- (iii) Suggest a suitable application of a variable resistor in the home. [1]
- _____

Examiner Only	
Marks	Remark

- 6 (a) The diagrams below show a filament lamp, a halogen lamp and a compact fluorescent lamp (CFL).



filament lamp
(wire inside)

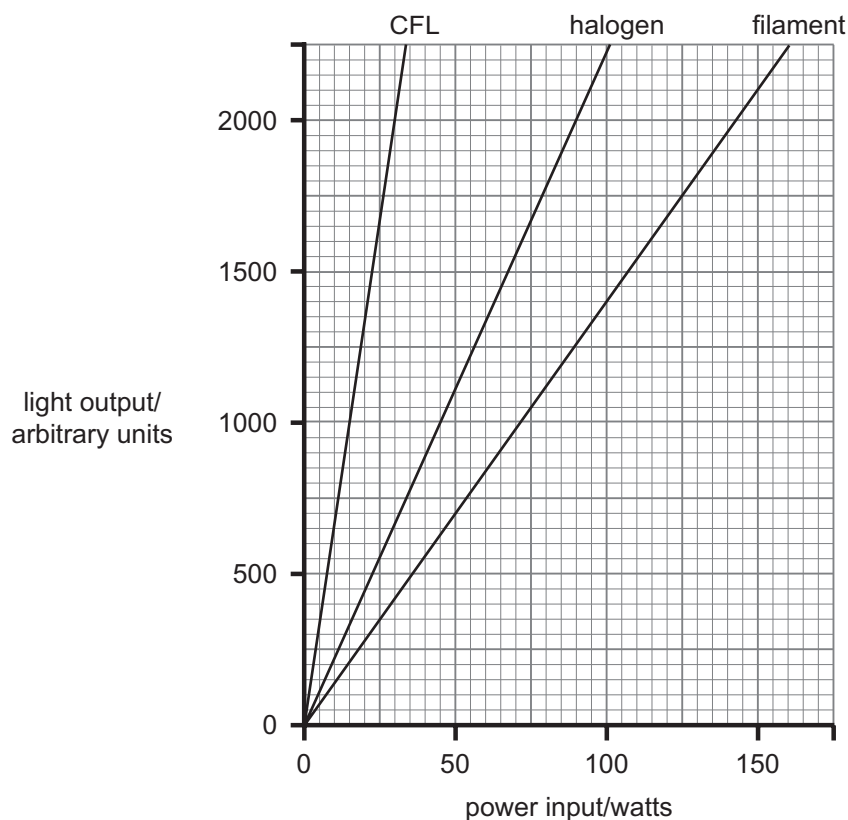


halogen lamp
(filled with argon)



CFL

The graph below shows how the light output for each type changes with power input.

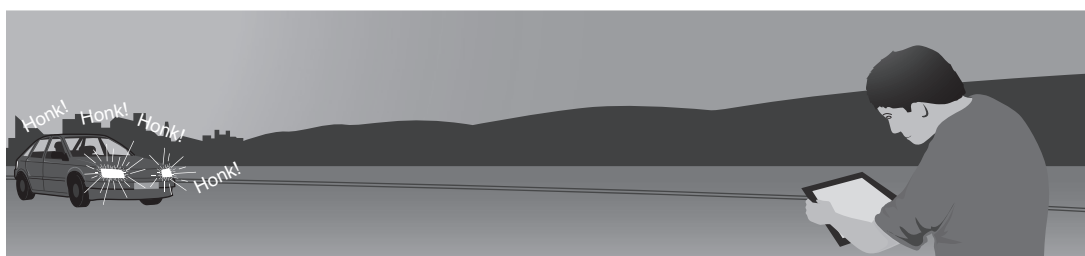


- (i) At 25 watts calculate how much more light a halogen lamp produces compared with a filament lamp.

_____ arbitrary units [1]

Examiner Only	
Marks	Remark

- 7 (a) The picture below shows two pupils using the flash-bang method to find the speed of sound in air.



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- (i) Describe a method the pupils could use to find the speed of sound.

[3]

- (ii) When the experiment was repeated in the opposite direction, the results were found to be different.

Suggest a reason for the difference.

[1]

- (b) The speed of sound can also be found using the echo method.

- (i) What is an echo?

[1]

- (ii) In concert halls echoes can distort the sound.

Explain fully how this problem can be overcome.

[2]

Examiner Only

Marks Remark

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