Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015–2016

Science: Single Award

Unit 3 (Physics)
Foundation Tier

GSS31

[GSS31]

FRIDAY 26 FEBRUARY 2016, 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 nine** questions.

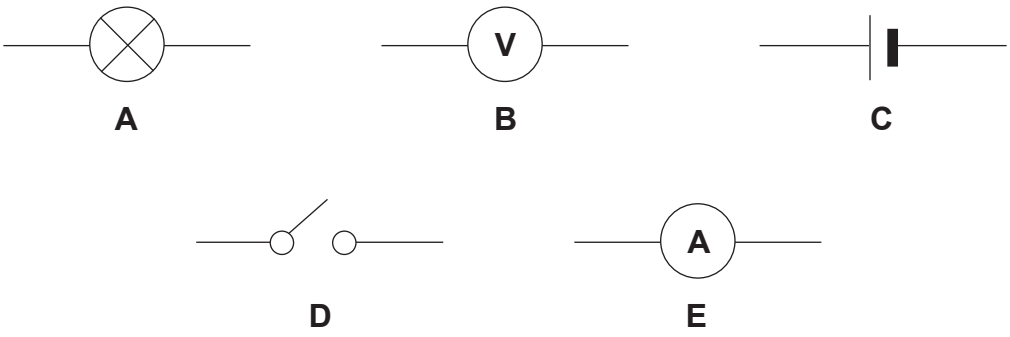
INFORMATION FOR CANDIDATES

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**.

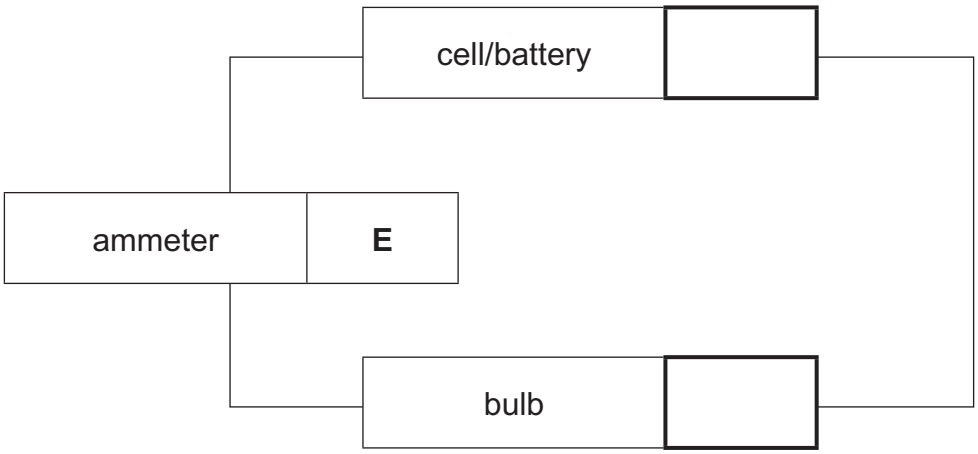
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Below are symbols used in electrical circuit diagrams.

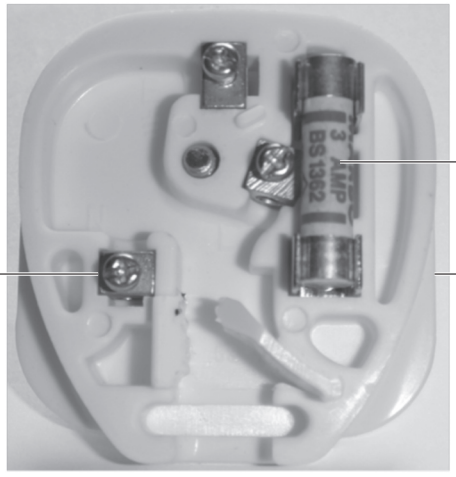


Use the letters (**A**, **B**, **C**, **D** or **E**) to give the symbols which should be used in the following circuit. Write the correct letter in each of the boxes provided.
One has been done for you.



[2]

(b) The photograph below shows the inside of a 3-pin plug.



Source: Principal Examiner

(i) Name the wire which should be attached to terminal **A**.

Choose from:

earth **live** **neutral**

Answer _____ [1]

(ii) Explain fully why the casing of the 3-pin plug is made of plastic.

_____

_____

_____ [2]

(iii) Which of the following statements (**1**, **2** or **3**) about fuses is true?

1 A fuse melts if the current becomes too low
2 A fuse should be connected to the earth wire
3 A fuse melts if the current becomes too high

Answer _____ [1]

(iv) A refrigerator uses 2 A and is connected to a 230 V mains supply.

Use the equation:

power = voltage × current

to calculate the power used by the refrigerator.

(Show your working out.)

Answer _____ W [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** The table below gives information about the four planets nearest the Sun. These planets are **not** in the correct order.

Planet	Average distance from the Sun/million km
A	228
B	108
C	58
D	150

(i) Which planet (**A**, **B**, **C** or **D**) is nearest to the Sun?

Answer _____ [1]

(ii) Name the planet labelled **B**.

Answer _____ [1]

(iii) Which planet (**A**, **B**, **C** or **D**) would you expect to be the coldest?

Answer _____ [1]

(b) Our Solar System consists of many different objects. Put the following objects in order of size, starting with the smallest.

Examiner Only	
Marks	Remark

Earth **asteroid** **Sun** **Moon**

smallest

largest

[2]

(c) Complete the sentence below.

Choose from:

fission **fusion** **hydrogen** **nitrogen** **helium**

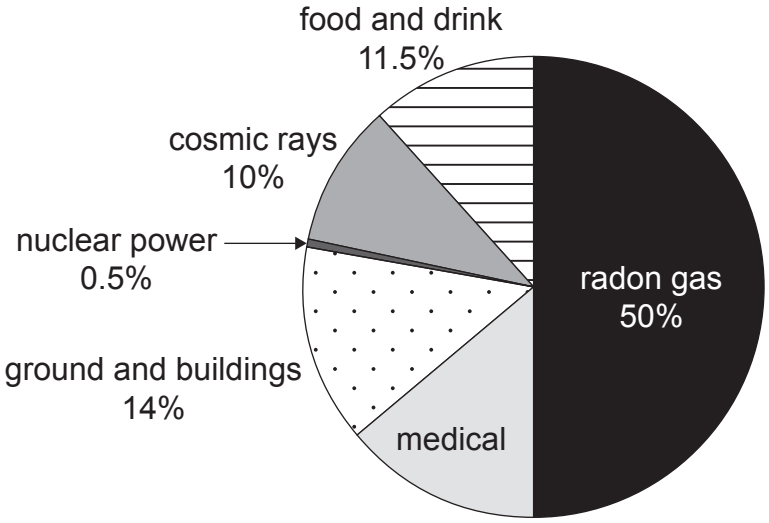
Our Sun is a star which produces energy in a process called

nuclear _____ when the nuclei of

a gas called _____ join together. [2]

3 The pie chart below shows the sources of radiation that are all around us.

Examiner Only	
Marks	Remark



É Principal Examiner

(a) What name is given to radiation that is all around us?

_____ [1]

(b) Name the source of radiation shown in the pie chart which comes from Space.

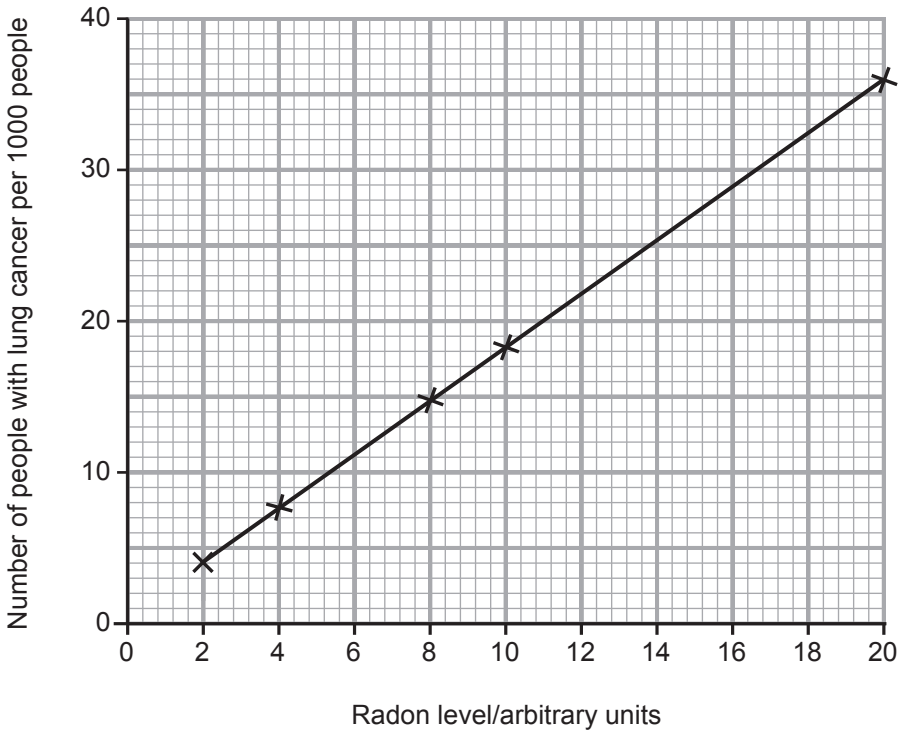
_____ [1]

(c) Calculate the percentage of radiation which comes from medical sources.

(Show your working out.)

Answer _____ % [2]

(d) The graph below shows the number of people who developed lung cancer after inhaling different levels of radon gas.



State the conclusion which can be made from these results.

_____

_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** The table below shows the thinking and braking distances of a vehicle at different speeds.

Speed/ mph	Thinking distance/ m	Braking distance/ m
20	6	6
30		14
40	12	24
50	15	38

(i) Complete the table by adding the thinking distance for 30 mph. [1]

(ii) Complete the following sentence to give a trend shown by this data.

As speed _____

_____ [1]

(b) The table below gives some factors which might affect thinking and braking distance.

Complete the table.

Choose from:

increased : no effect : decreased

Factor	Thinking distance	Braking distance
driving on a wet road		
worn tyres	no effect	increased
using a mobile phone		
drinking alcohol		

[3]

(c) The table below shows how the chance of a pedestrian surviving a collision depends on the speed of the vehicle.

Speed/ mph	Chance of surviving collision/ %
20	96
25	90
30	80
35	50
40	10

Using the information above, explain why many people think that the speed limit outside schools should be reduced from 30 mph to 20 mph.

_____

_____ [1]

Examiner Only

Marks	Remark

5 **(a)** The table below shows the electromagnetic spectrum.
Complete the table using the words given below.

infrared **microwaves** **ultraviolet**

Gamma rays	X-rays		Visible light			Radio waves

[2]

(b) State **one** feature these waves have in common.

_____ [1]

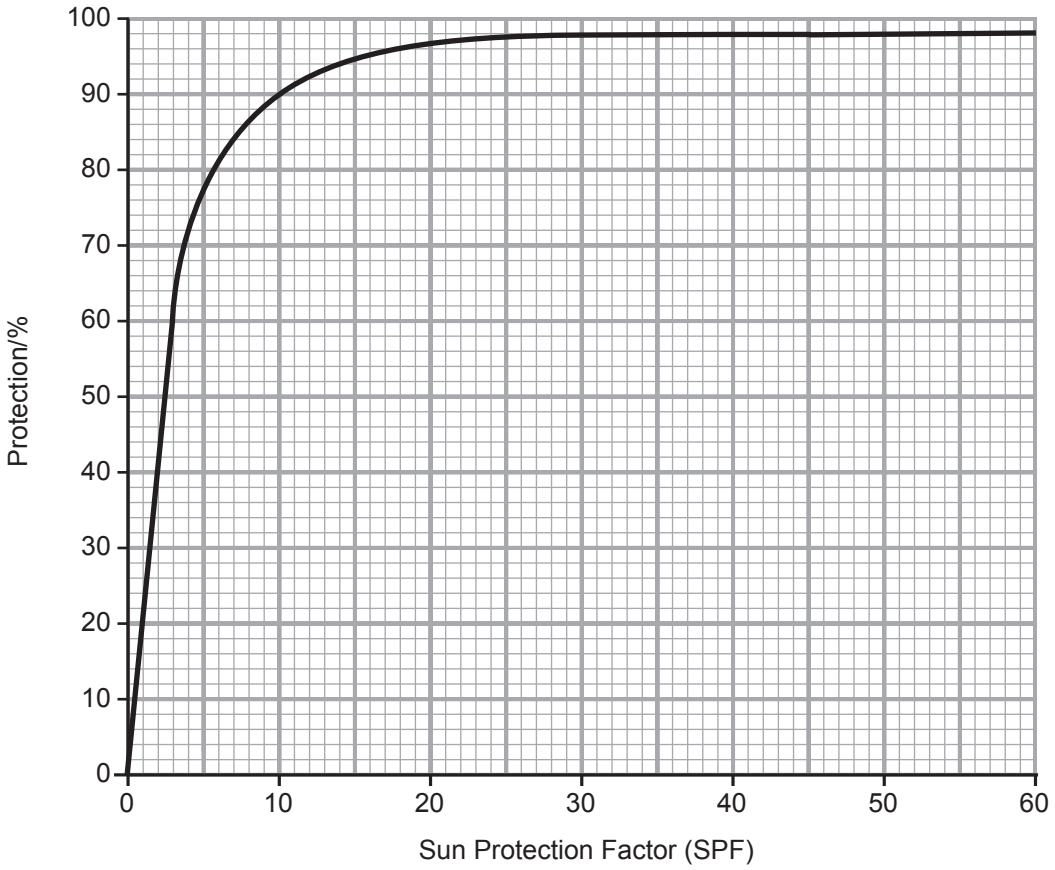
(c) Electromagnetic waves can be used while watching television.
Using lines, match each wave with its correct use.

Electromagnetic wave	Use
infrared	carries signals to the television aerial
radio wave	carries picture signals from the television to the person
visible light	carries signals from the remote control to the television

[2]

Examiner Only	
Marks	Remark

(d) The graph below shows the percentage protection against Sun damage provided by different factors of sun cream.



State fully the conclusion which can be made from this graph.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** Describe fully how fossil fuels were formed.

_____

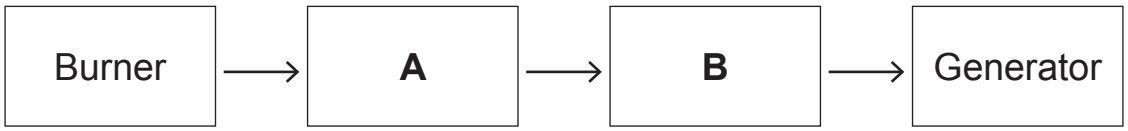
_____

_____

_____

_____ [3]

(b) Shown below are some parts of a fossil fuel power station.



(i) Name the parts **A** and **B** shown in the diagram above.

A _____

B _____ [2]

(ii) Explain fully how a generator produces electricity.

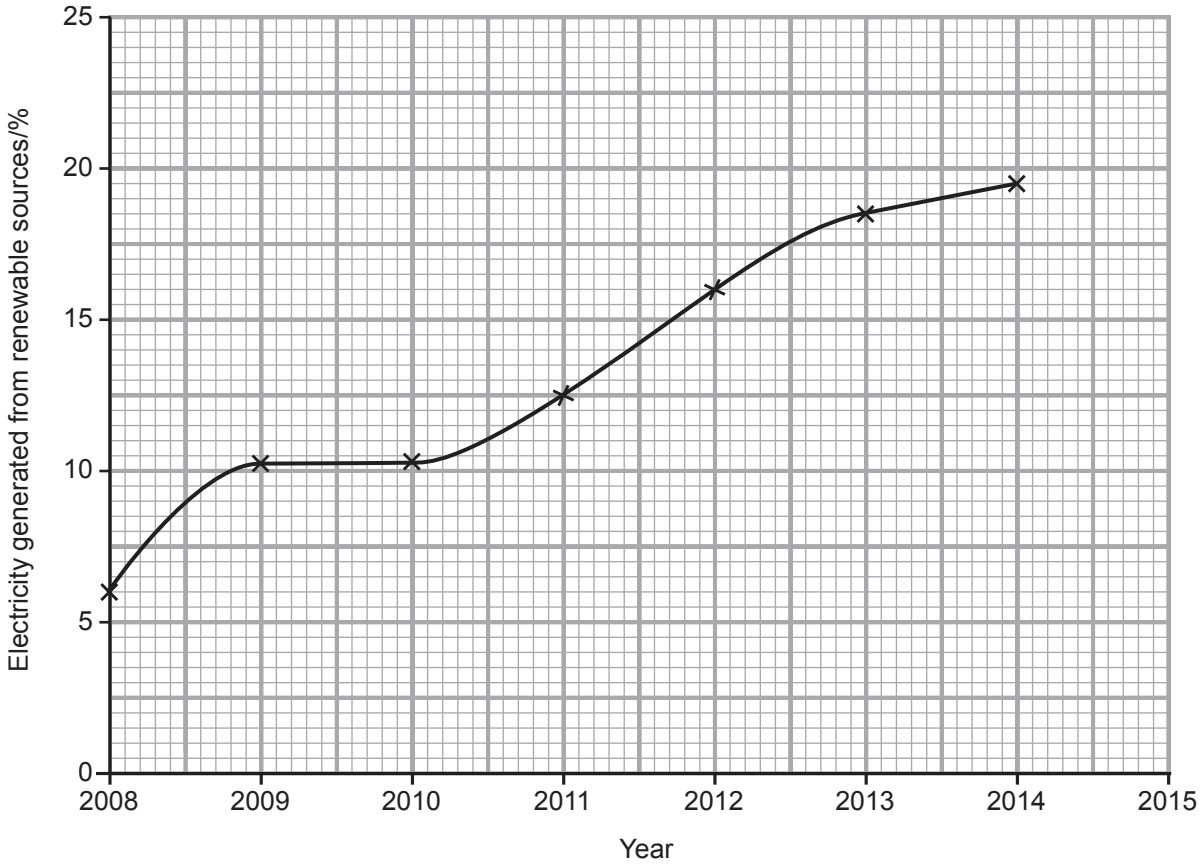
_____

_____

_____ [2]

Examiner Only	
Marks	Remark

(c) The graph below shows the percentage of electricity generated in Northern Ireland using renewable sources in recent years.



(i) Use the graph to predict the percentage of electricity generated from renewable sources in 2015.

Answer _____ % [1]

(ii) Suggest why the Northern Ireland Assembly wants more electricity produced from renewable sources.

_____

_____ [1]

(d) The table below shows fuels which could be used to generate heat in a house.

Fuel	Fuel cost	Energy output/ kWh	Cost per kWh/p
wood pellets	£238 per tonne	4800/tonne	4.96
heating oil	49p per litre	10/litre	4.90
bottled gas	45p per litre	7.1/litre	6.30

Which fuel would be the best value for the householder to use? Explain your answer.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

7 The half-life of carbon-14 can be used to estimate the age of an object made from wood.

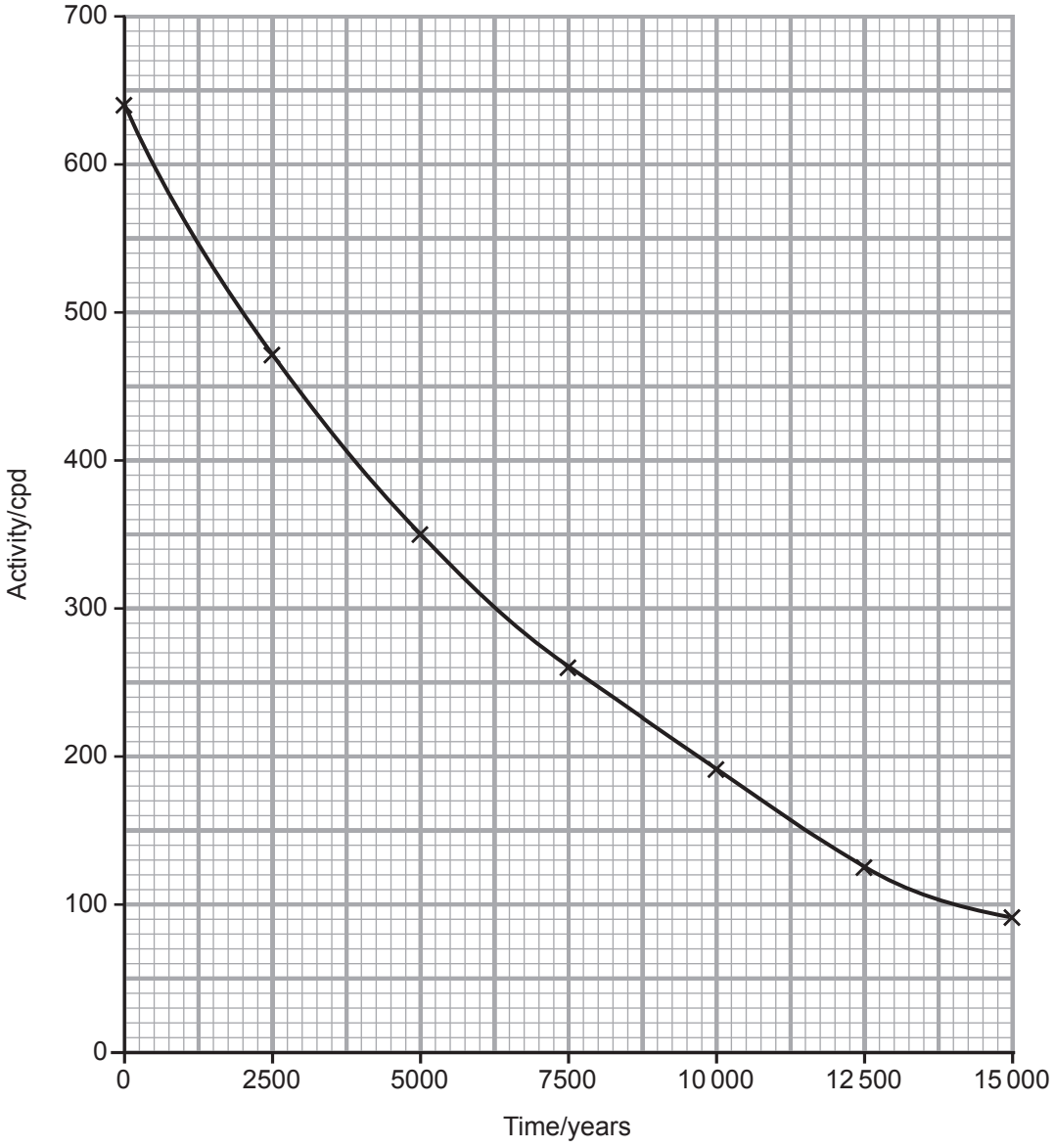
(a) What is meant by the term ‘half-life’?

_____

_____

_____ [2]

The graph below shows how the activity of carbon-14 changes with time.



(b) Use the graph to give the count rate of the carbon-14 after 7500 years.

Answer _____ cpd [1]

(c) **(i)** Brazil nuts contain radium-226 which has a half-life of 1600 years. What fraction of the radium-226 will be left after 3200 years?

Answer _____ [1]

(ii) The table below shows three isotopes of radium and the type(s) of radiation they emit.

Isotope	Radiation emitted
radium-224	alpha
radium-226	alpha, gamma
radium-228	beta

Describe the penetrating powers of these isotopes and how their radiation can be stopped.

_____

_____

_____

_____

_____ [3]

Examiner Only

Marks	Remark

8 Describe an investigation that will show how electrical resistance depends on the length of a piece of wire.

Your answer should include:
- the electrical circuit used;
- how to make the investigation valid (a fair test);
- what measurements would be taken, how they are used, and the conclusion you would expect.

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

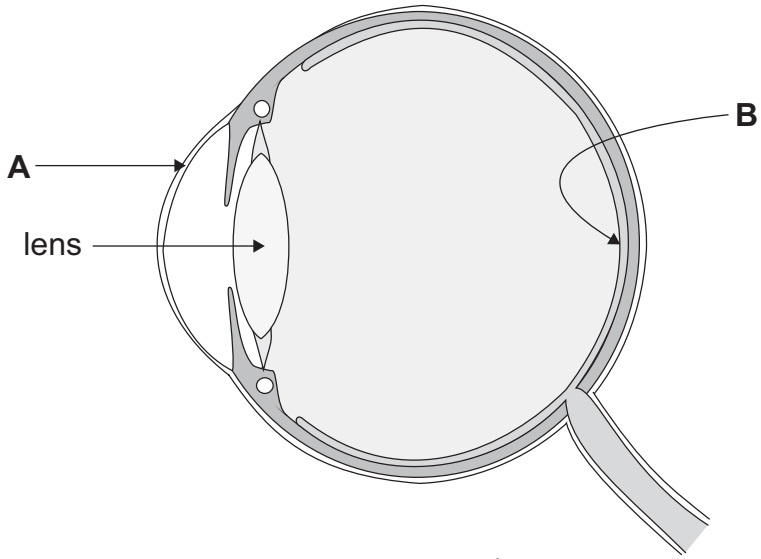
[6]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

9 The diagram below shows the eye.

(a) Name the parts labelled **A** and **B**.



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A _____

B _____ [2]

Long and short sight are eye defects that cause people difficulty in seeing objects clearly as shown in the table.

Person	Near object	Far object
A	blurry	clear
B	blurry	blurry
C	clear	blurry
D	clear	clear

(b) From the table above, which person **A**, **B**, **C** or **D** suffers from short sight?

Answer _____ [1]

THIS IS THE END OF THE QUESTION PAPER

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