Write your name here

Surname	Other names

13+ Scholarship Examination 2024

Subject: Science
Paper: Combined Science
Time: 1 Hour

You must have:
A ruler
A calculator

Total Marks
60

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions.
- Answer the questions in the spaces provided
  - *there may be more space than you need.*
- Show all the steps in any calculations and state the units.

Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets
  - *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly and in good English (languages please change this).
- Try to answer every question.
- Check your answers if you have time at the end.

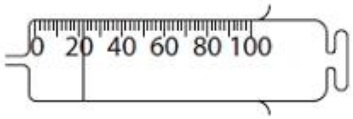
Section A
Answer ALL questions

Q1.

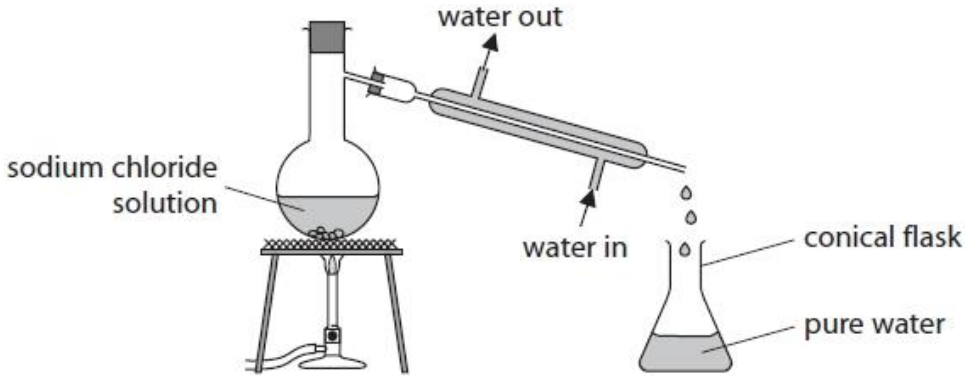
This question is about apparatus used in the laboratory.

(a) Complete the table by giving the name of each piece of apparatus and a unit used for the quantity it measures.

(2)

Apparatus	Name	Unit
		
		

(b) The diagram shows apparatus used to obtain pure water from sodium chloride solution by simple distillation.



(i) Explain why it is necessary for water to flow continuously in and out of the apparatus.

(2)

.....

.....

.....

.....

(iii) Describe a physical test to show that the liquid in the conical flask is pure water.

(2)

.....

.....

.....

.....

(Total for question = 6 marks)

Q2.

(a) The box shows some changes of state.

boiling	condensation	evaporation
freezing	melting	sublimation

The table lists some physical changes.

Complete the table using words from the box to show the change of state for each physical change.

(4)

Physical change	Change of state
water to ice	
steam to water	
solid wax to liquid wax	
iodine crystals to iodine vapour	

(b) A student plans to obtain salt crystals from a mixture of salt and sand.

The student adds pure water to the mixture to dissolve the salt.

(i) State two things the student could do to make the salt dissolve quickly.

(2)

1 .....

2 .....

(ii) State what the student should do next to separate the sand from the salt solution.

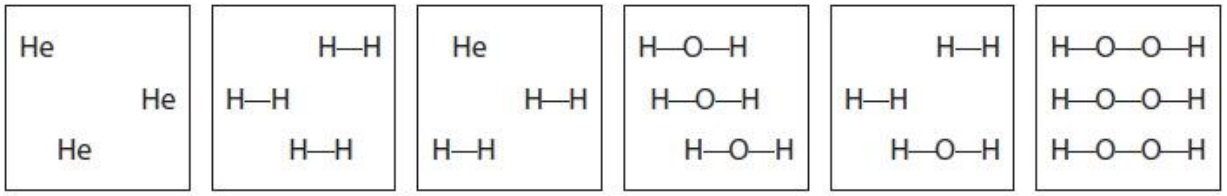
(1)

(Total for question = 7 marks)

Q3.

Substances can be classified as elements, compounds or mixtures.

(a) Each of the boxes in the diagram represents either an element, a compound or a mixture.



box 1 box 2 box 3 box 4 box 5 box 6

(i) Explain which **two** boxes represent an element.

(2)

.....

.....

.....

.....

(ii) Explain which **two** boxes represent a mixture.

(2)

.....

.....

.....

.....

(b) Which method of separating mixtures is suitable for separating water from sodium chloride solution?

The list gives the names of some methods used in the separation of mixtures:

- chromatography
- crystallisation
- distillation
- filtration

Use names from the list to choose a suitable method for each separation.
Each name may be used once, more than once or not at all.

(i) Separating water from sodium chloride solution.

(1)

.....

(ii) Separating the blue dye from a mixture of blue and red dyes.

(1)

.....

(iii) Separating potassium nitrate from potassium nitrate solution.

(1)

.....

(Total for question = 7 marks)

Section B
Answer ALL questions

1. All living organisms release energy from nutrient molecules within their cells.

What is the name of this characteristic?

A growth

B nutrition

C respiration

D sensitivity

2. A student found four different worms in a sample of soil and drew diagrams of them. The diagrams were drawn with different magnifications.

Which worm was the longest?

	length of diagram / mm	magnification
A	60	×3
B	70	×1
C	100	×2
D	120	×5

3. Which chemical is a product of photosynthesis that moves out of a green leaf through its stomata?

A carbon dioxide

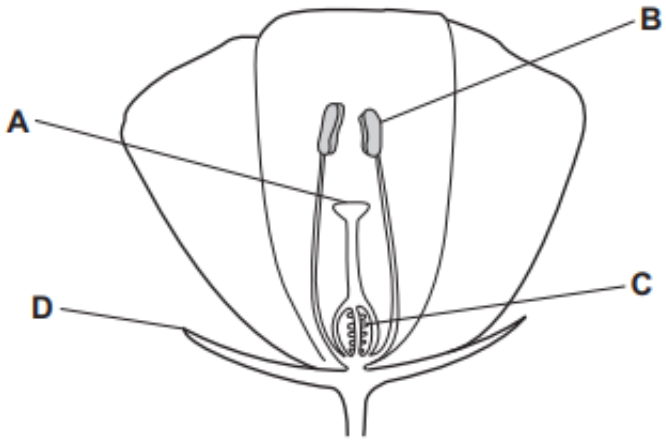
B glucose

C oxygen

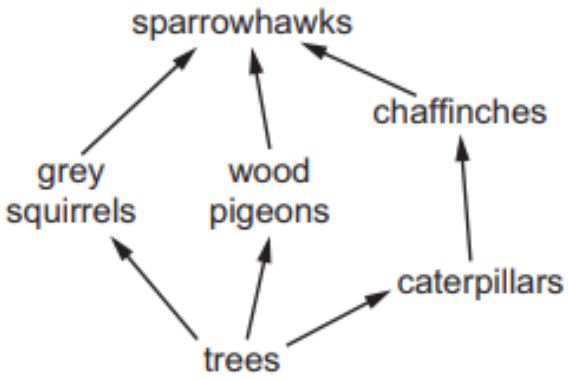
D water

4. The diagram shows a cross-section of an insect-pollinated flower.

Which label is the stigma?



5. The food web shows the feeding relationships in a woodland.



If all the chaffinches in the food web die, which effect would this have?

A The amount of damage to trees will increase.

B The food supply for grey squirrels will increase.

C The number of wood pigeons will increase.

D The population of caterpillars will decrease.

6. **(a)** Fig. 7.1 is a diagram showing some of the organs in the human body.

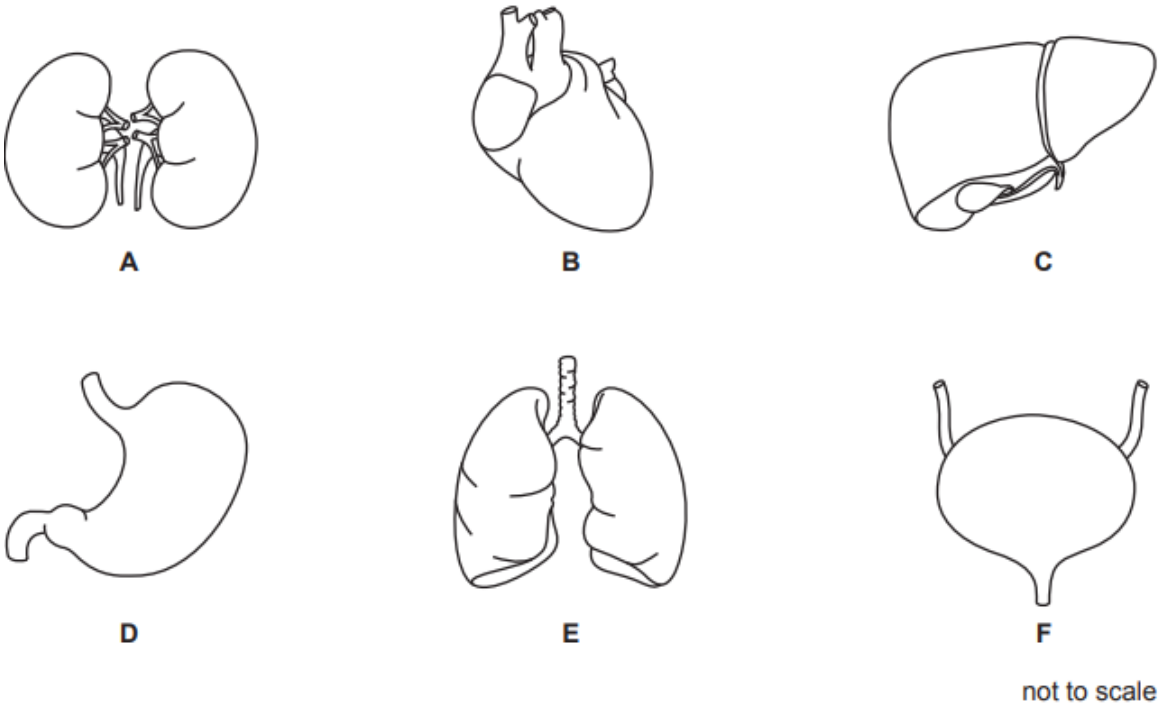


Fig. 7.1

Table 7.1 shows the names of some of the organs in Fig. 7.1, the identifying letters of some of these organs and their functions.

Complete Table 7.1.

Table 7.1

name	letter in Fig. 7.1	function
		excretes carbon dioxide from the body
heart	**B**	
	F	stores urine
		excretes urea, excess water and ions

[6]

(b) State the names of **two** organs from the human female reproductive system.

1 .....

2 .....

[2]

(c) Excretion and reproduction are two characteristics of all living organisms.

Place ticks (✓) in **two** boxes to show other characteristics of all living organisms.

breathing	
eating	
growing	
moving	
sleeping	
talking	

[2]

7. **(a)** Fig. 2.1 is a diagram showing some of the structures found in a plant cell.

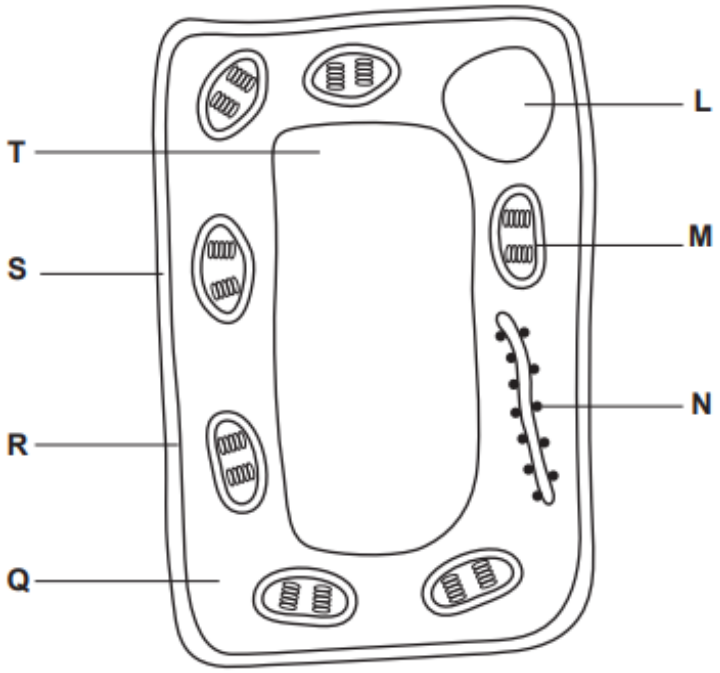


Fig. 2.1

Table 2.1 shows the names of some plant cell structures, their functions and the letters that identify them in Fig. 2.1.

Complete Table 2.1 by writing the missing name, letters and functions in the spaces provided.

Table 2.1

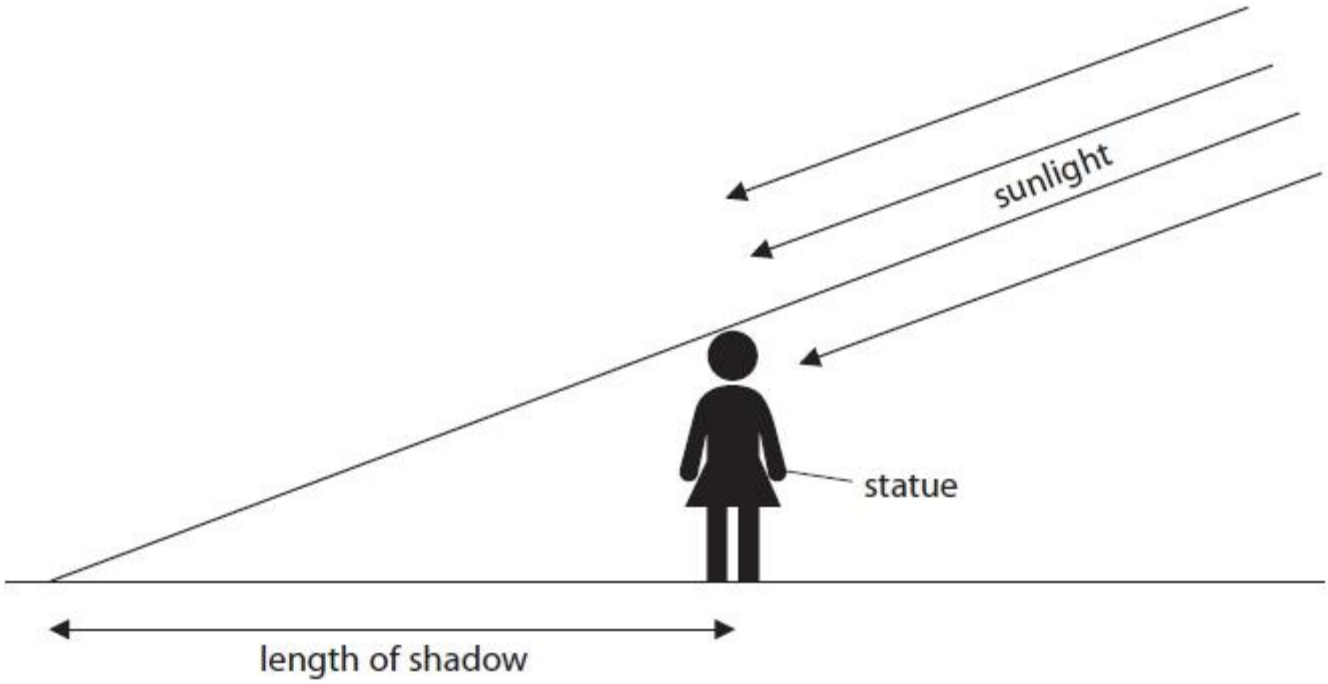
name of structure	letter from Fig. 2.1	**one** function
chloroplast		site of photosynthesis
ribosome	**N**	
cell wall		prevents the cell bursting
	L	

[5]

Section C
Answer ALL questions

Q1.

A student measures the length of the shadow made by a statue at three different times of the day.



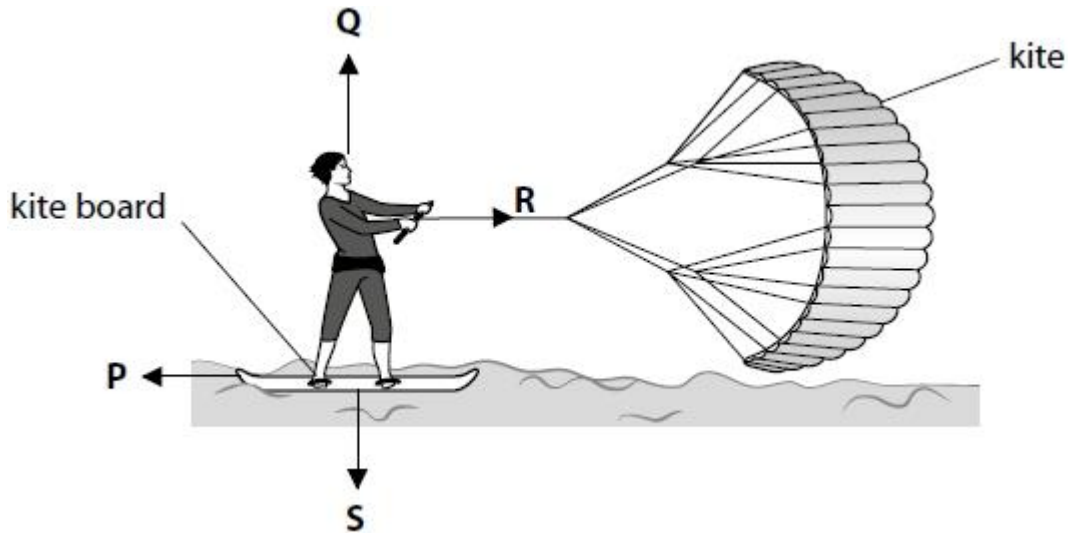
Draw **one** straight line from each time of day to the most likely length of the shadow at that time.

(2)

time of day	length of shadow
11.00 am	125 cm
midday	222 cm
7.00 pm	85 cm

(Total for question = 2 marks)

Q2. The diagram shows the direction of four forces as a kitesurfer moves across water.



Draw **one** straight line from each force to the letter that shows the direction of the force.

Force	Direction of the force
	P
the force pulling the kitesurfer along	Q
the friction between the kite board and the water	R
	S

(Total for question = 2 marks)

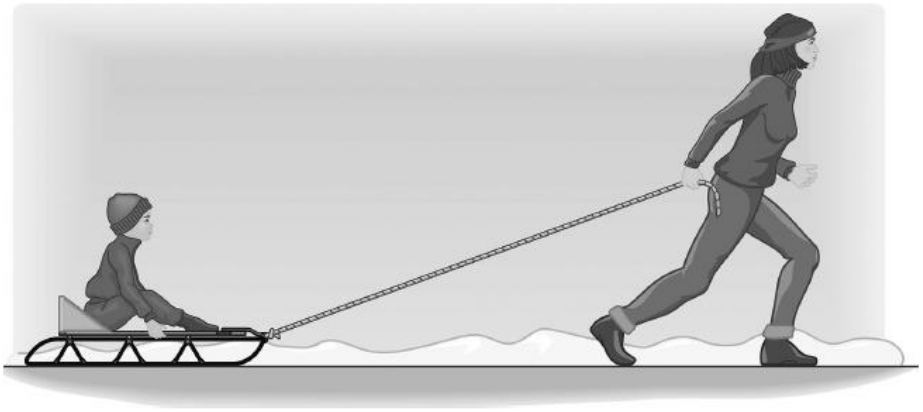
Q3. Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Why is there night and day on the Earth?

- ☐ **A** because the Earth is in orbit around the Sun
- ☐ **B** because the Sun is in orbit around the Earth
- ☐ **C** because the Earth is spinning on its axis
- ☐ **D** because the Sun is spinning on its axis

(Total for question = 1 mark)

Q4. When a sledge is being pulled, friction can be both useful and not useful.



(Source: © Emre Terim/Shutterstock)

Give **one** place where friction is useful and **one** place where friction is not useful when a sledge is being pulled.

(2)

Useful .....

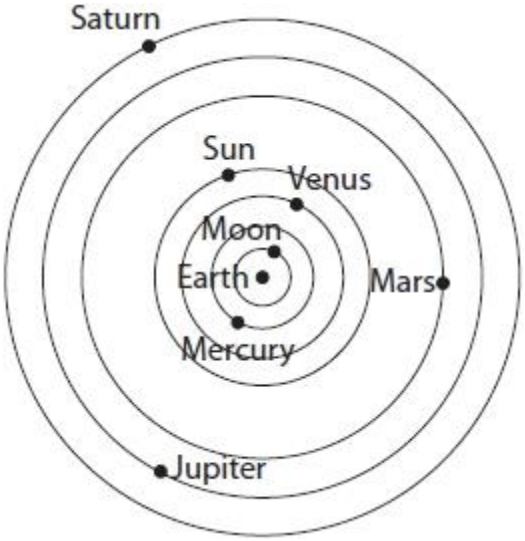
.....

Not useful .....

.....

(Total for question = 2 marks)

Q5. The diagram shows the Ptolemy geocentric model of our Solar System.



(a) The Ptolemy model does not include the planets Uranus and Neptune.

Give **two** other ways in which the Ptolemy model is different to the present model of the Solar System.

(2)

1 .....

.....

2 .....

.....

(b) Give **one** reason why the Ptolemy model does not include Uranus and Neptune.

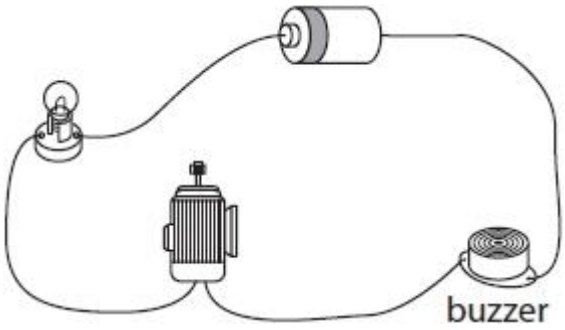
(1)

.....

.....

(Total for question = 3 marks)

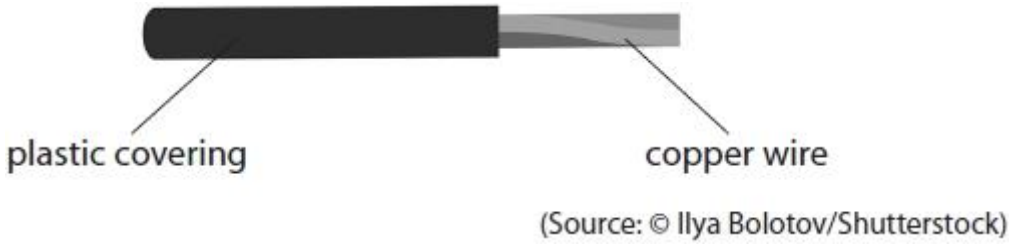
Q6. The drawing shows an electrical circuit.



(a) Complete the circuit diagram for this circuit. Use the correct scientific symbols for each component.

(2)

(b) Explain why electrical cables are made from a copper wire inside a plastic covering.



(Source: © Ilya Bolotov/Shutterstock)

(2)

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.....

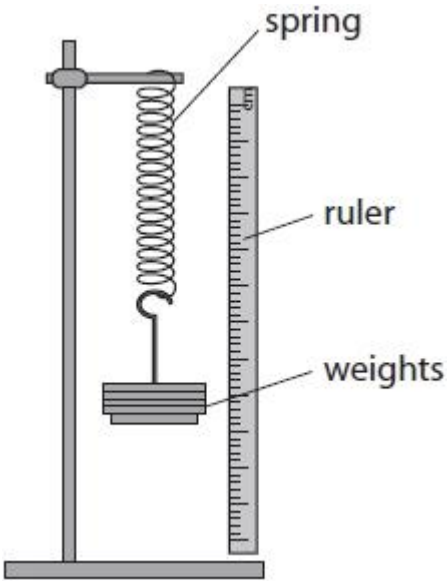
(Total for question = 4 marks)

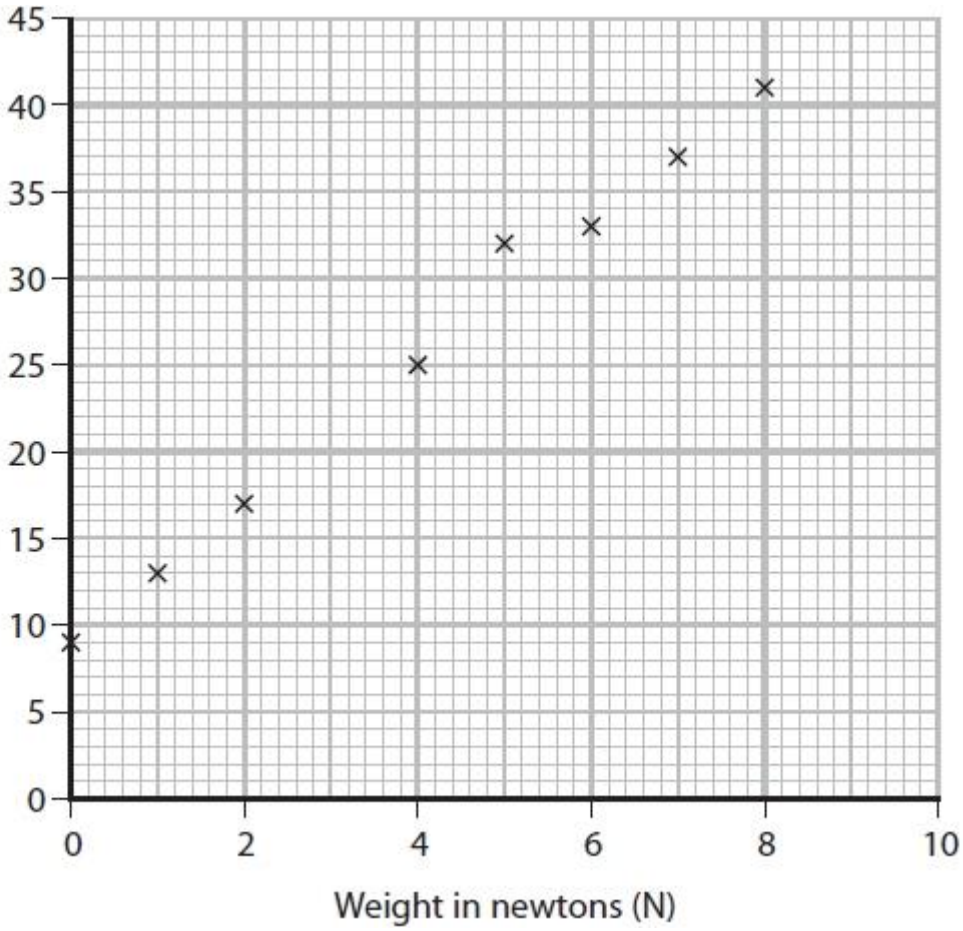
Q7. Some students investigate what happens to the length of a spring when different weights are hung from it.

The students start by measuring the length of the spring with no weights on it.

They then add weights, one at a time, and measure the length of the spring each time.

Their results are shown on the graph.





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The students forgot to label one of the axes on their graph.

(a) Add the missing label to the axis on the graph.

(1)

(b) (i) Circle the result that looks odd compared to the other results.

(1)

(ii) Complete the graph by drawing a straight line through the points.
You should ignore the result that looks odd.

(1)

(c) (i) What conclusion can the students make about the effect of adding weights to the length of the spring?

(2)

.....

.....

.....

.....

(ii) Predict, using the graph, what the length of the spring will be when a weight of 3 N is hung from it.

(1)

length = ... cm

(Total for question = 6 marks)

TOTAL FOR PAPER = 60 MARKS

END OF PAPER