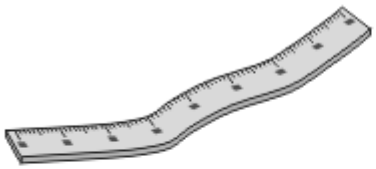
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

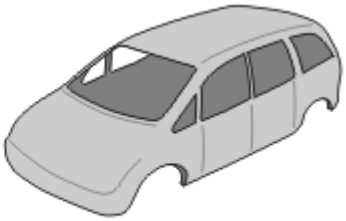
(a) The pictures show four objects. Each object has had its shape changed.



Bent metal ruler
A

Stretched bungee cords
B

Springs on a playground ride
C



Moulded plastic model car body
D

Which of the objects are storing elastic potential energy?

_____

Explain the reason for your choice or choices.

_____

_____

_____

_____

_____

_____

(3)

(b) A student makes a simple spring balance. To make a scale, the student uses a range of weights. Each weight is put onto the spring and the position of the pointer marked

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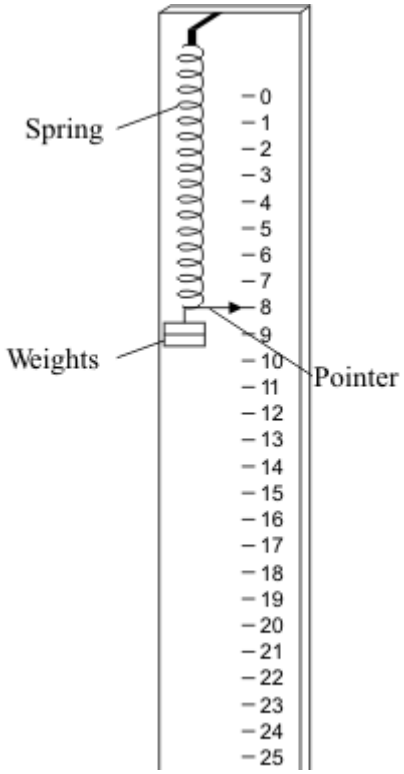
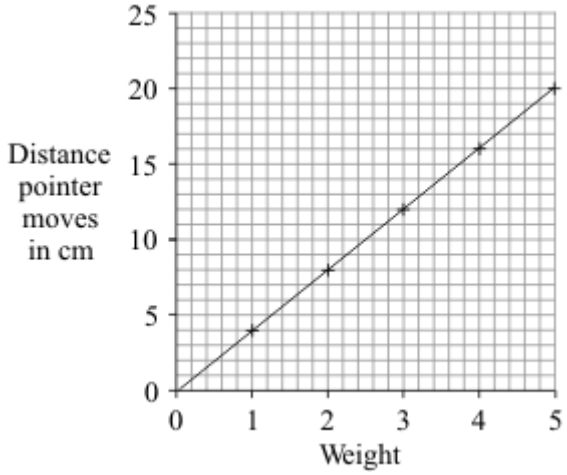


The graph below shows how increasing the weight made the pointer move further.



(i) Which **one** of the following is the unit of weight?.

Draw a ring around your answer.

joule **kilogram** **newton** **watt**

(1)

(ii) What range of weights did the student use?

_____

(1)

(iii) How far does the pointer move when 4 units of weight are on the spring?

_____

(1)

(iv) The student ties a stone to the spring. The spring stretches 10 cm.

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What is the weight of the stone?

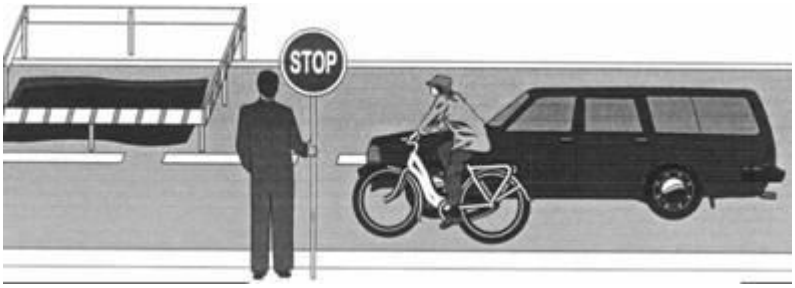
_____

(1)

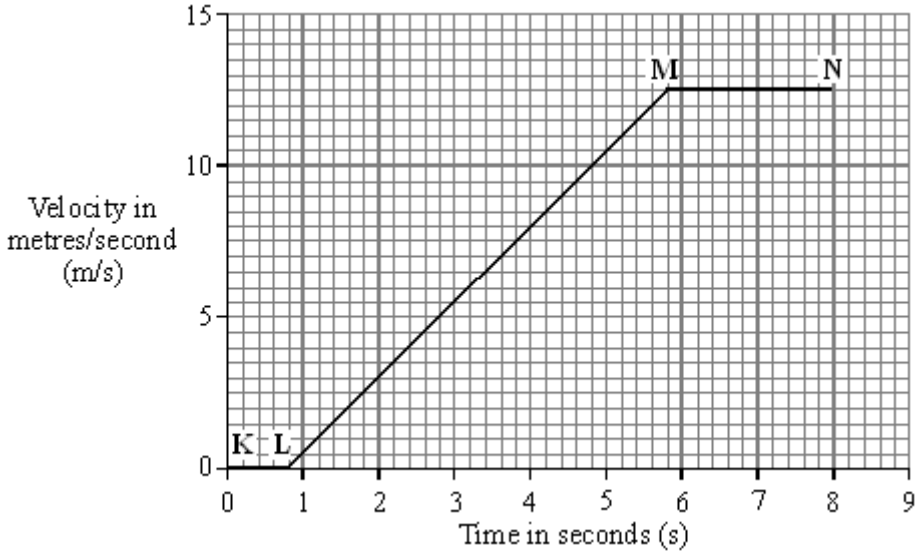
(Total 7 marks)

Q2.

A car and a bicycle are travelling along a straight road. They have stopped at road works.



The graph shows how the velocity of the car changes after the sign is changed to GO.



(a) Between which two points on the graph is the car moving at constant velocity?

_____

(1)

(b) Between which two points on the graph is the car accelerating?

_____

(1)

(c) Between the sign changing to GO and the car starting to move, there is a time delay. This is called the reaction time.

(i) What is the reaction time of the car driver?

Reaction time = _____ seconds

(1)

(ii) Which **one** of the following could increase the reaction time of a car driver? Tick the box next to your choice.

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Drinking alcohol ☐

Wet roads ☐

Worn car brakes ☐

(1)

(d) The cyclist starts to move at the same time as the car. For the first 2 seconds the cyclist's acceleration is constant and is greater than that of the car.

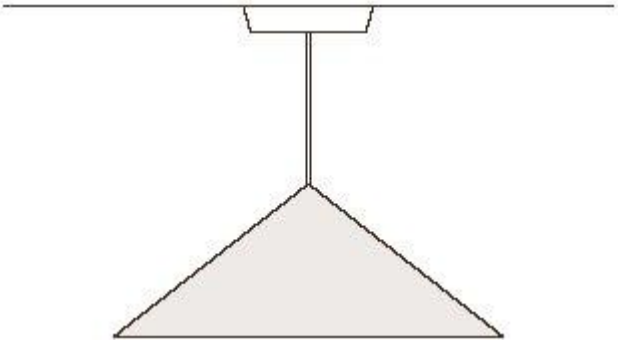
Draw a line on the graph to show how the velocity of the cyclist might change during the first 2 seconds of its motion.

(2)

(Total 6 marks)

Q3.

(a) The diagram shows a lampshade hanging from the ceiling. Draw an **X** on the diagram so that the centre of the **X** marks the centre of the mass of the lampshade.



(1)

(b) Complete the sentence using the correct word or phrase from the box.

above	**below**	**to the left of**	**to the right of**

A suspended object will come to rest with its centre of mass directly

_____ the point of suspension.

(1)

(c) The diagrams show equipment that a student uses to find the centre of mass of a thin sheet of card.

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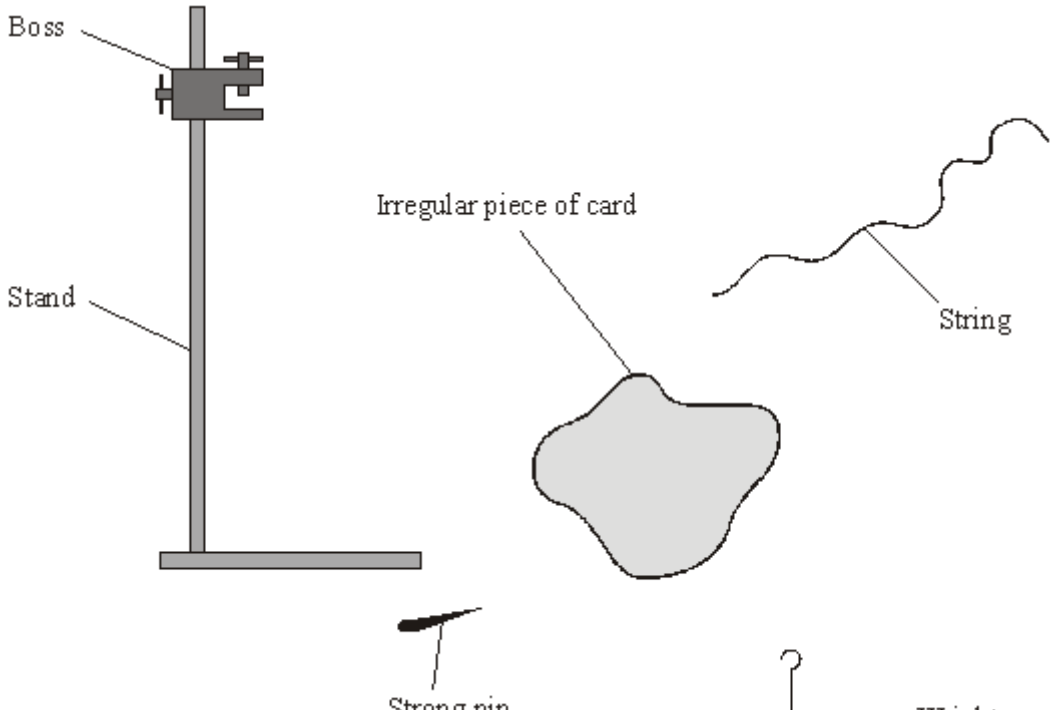

Arrange these sentences in the correct order to describe how the student can find the centre of mass of the card.

The sequence starts with sentence **D** and finishes with sentence **E**.

A A line is drawn on the card marking the position of the string.

B The pin is put through one of the holes in the card and held in the boss.

C This is repeated using the other hole.

D Two holes are made in the card with each hole near to the edge of the card.

E The centre of mass is where the lines cross on the card.

F The weight is tied to the string and then the string is hung from the pin.

D					**E**

(3)

(Total 5 marks)

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