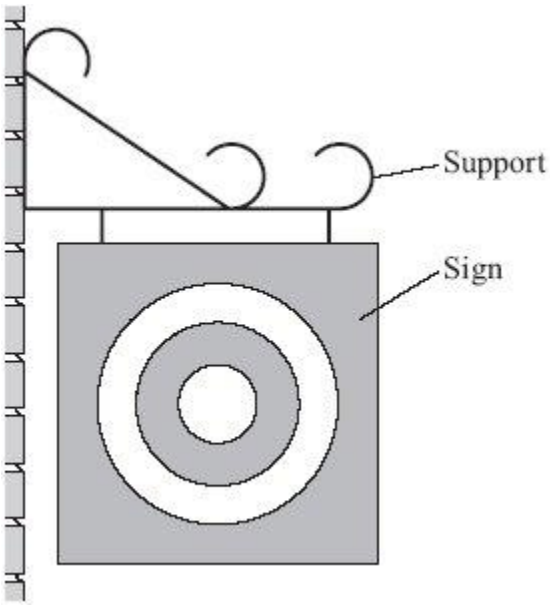
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The drawing shows a sign which hangs outside a shop.



(a) Draw an **X** on the sign so that the centre of your **X** is at the centre of mass of the sign.

(1)

(b) Use a ruler to draw **one** axis of symmetry on the sign.

(1)

(c) One force which acts on the sign is its weight.

Complete the following sentence by drawing a ring around the correct line in the box.

The moment of the weight produces

an accelerating
a balancing
a turning

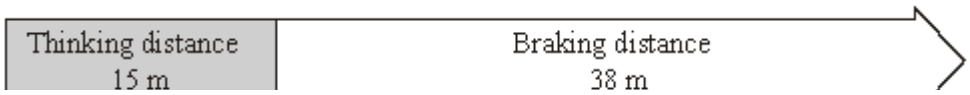
effect.

(1)
(Total 3 marks)

Q2.

(a) A car driver makes an emergency stop.

The chart shows the 'thinking distance' and the 'braking distance' needed to stop the car.



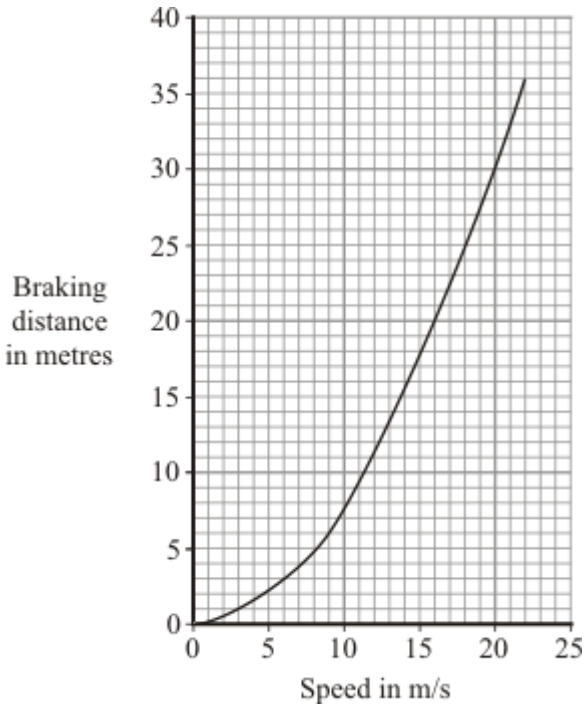
Calculate the total stopping distance of the car.

_____

Stopping distance = _____ m

(1)

(b) The graph shows how the braking distance of a car driven on a dry road changes with the car's speed.



The braking distance of the car on an icy road is longer than the braking distance of the car on a dry road.

(i) Draw a new line on the graph to show how the braking distance of the car on an icy road changes with speed.

(2)

(ii) Which **two** of the following would also increase the braking distance of the car?

Put a tick (✓) next to each of your answers.

rain on the road ☐

the driver having drunk alcohol ☐

car brakes in bad condition ☐

the driver having taken drugs ☐

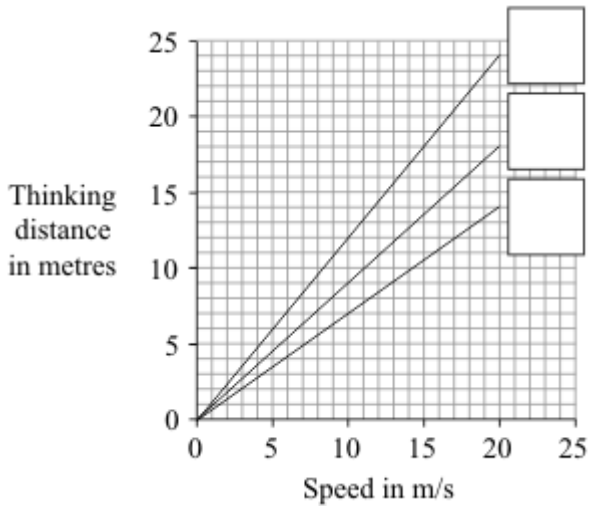
(2)

(c) The thinking distance depends on the driver's reaction time.

The table shows the reaction times of three people driving under different conditions.

Car driver	Condition	Reaction time in seconds
A	Wide awake with no distractions	0.7
B	Using a hands-free mobile phone	0.9
C	Very tired and listening to music	1.2

The graph lines show how the thinking distance for the three drivers, **A**, **B** and **C**, depends on how fast they are driving the car.



(i) Match each graph line to the correct driver by writing **A**, **B** or **C** in the box next to the correct line.

(2)

(ii) The information in the table cannot be used to tell if driver **C**'s reaction time is increased by being tired or by listening to music.

Explain why.

_____

_____

_____

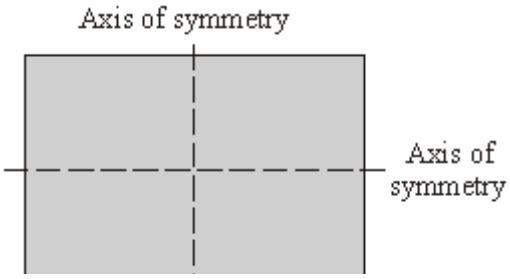
_____

(2)

(Total 9 marks)

Q3.

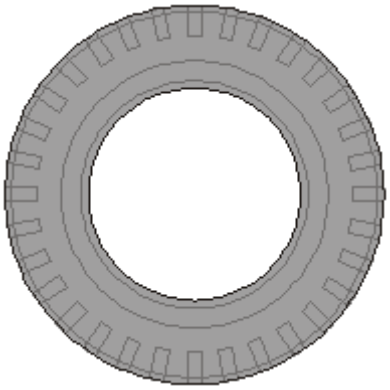
(a) The diagram shows a rectangle made out of a sheet of cardboard.



Draw an **X** on the diagram so that the centre of the **X** is at the centre of mass of the rectangle.

(1)

(b) The drawing shows a car tyre.



(i) Where is the centre of mass of the tyre?

_____

(1)

(ii) Explain your answer to (b)(i).

_____

_____

(1)

(Total 3 marks)

Q4.

The diagram shows the horizontal forces acting on a car travelling along a straight road.

(a) Complete the following sentences by drawing a ring around the correct word in each box.

(i) When the driving force equals the drag force, the speed ofthe car is

decreasing
constant

increasing

(1)

(ii) Putting the brakes on transforms the car's kinetic energy mainly into

heat
light
sound

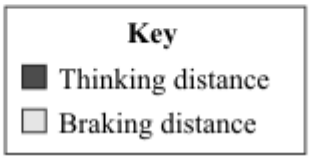
(1)

(b) The charts, **A**, **B** and **C** give the thinking distance and the braking distance for a car driven under different conditions.

(i) Draw straight lines to match each chart to the correct conditions.

Draw only **three** lines.

Conditions	Charts
Speed = 22 m/s driver wide awake	
Speed = 13 m/s driver wide awake	
Speed = 13 m/s driver very tired	



(2)

(ii) The three charts above all apply to dry road conditions.

How would the braking distances be different if the road were wet?

_____

_____

(1)

(Total 5 marks)