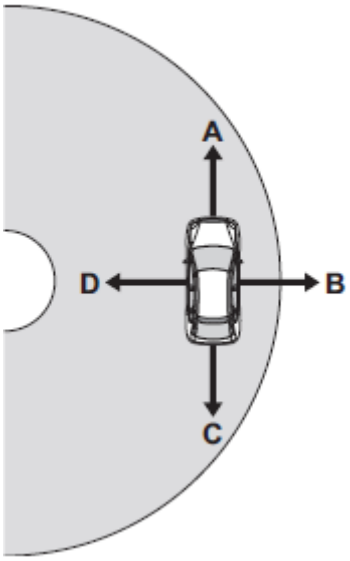
Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

(a) **Figure 1** shows a car travelling around a bend in the road. The car is travelling at a constant speed.

Figure 1



There is a resultant force acting on the car. This resultant force is called the centripetal force.

(i) In which direction, **A**, **B**, **C** or **D**, does the centripetal force act on the car?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(ii) State the name of the force that provides the centripetal force.

_____

(1)

(iii) State **two** factors that affect the size of the centripetal force acting on the car.

1. _____

2. _____

(2)

(b) **Figure 2** shows a racing car.

Figure 2

The racing car should not roll over when racing.

State **two** features of the car that make it difficult for the car to roll over.

1. _____

_____

2. _____

_____

(2)

(Total 6 marks)

Q2.

An investigation was carried out to show how thinking distance, braking distance and stopping distance are affected by the speed of a car.

The results are shown in the table.

Speed in metres per second	Thinking distance in metres	Braking distance in metres	Stopping distance in metres
10	6	6	12
15	9	14	43
20	12	24	36
25	15	38	53
30	18	55	73

(a) Draw a ring around the correct answer to complete each sentence.

As speed increases, thinking distance

decreases.
increases.

stays the same.

As speed increases, braking distance

decreases.
increases.
stays the same.

(2)

(b) One of the values of stopping distance is incorrect.

Draw a ring around the incorrect value in the table.

Calculate the correct value of this stopping distance.

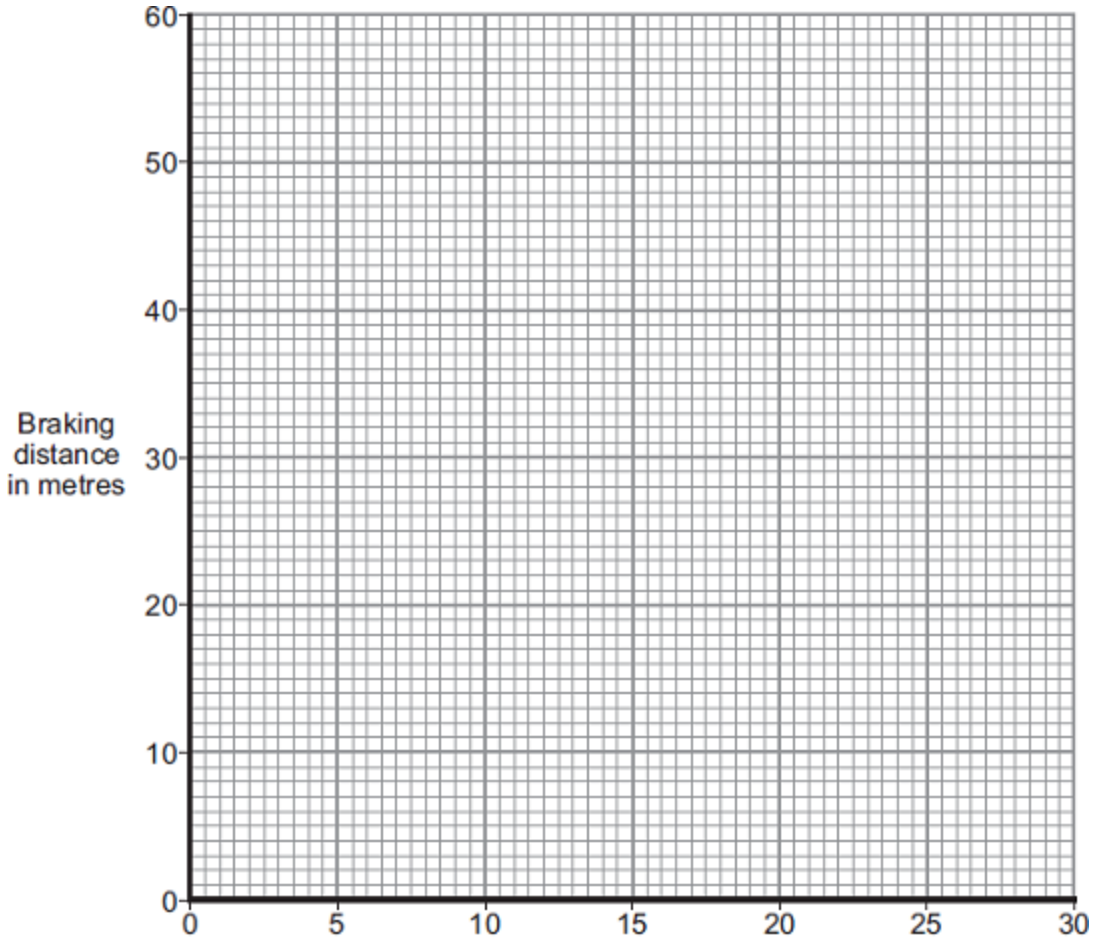
_____

Stopping distance = _____ m

(2)

(c) (i) Using the results from the table, plot a graph of braking distance against speed.

Draw a line of best fit through your points.



(3)

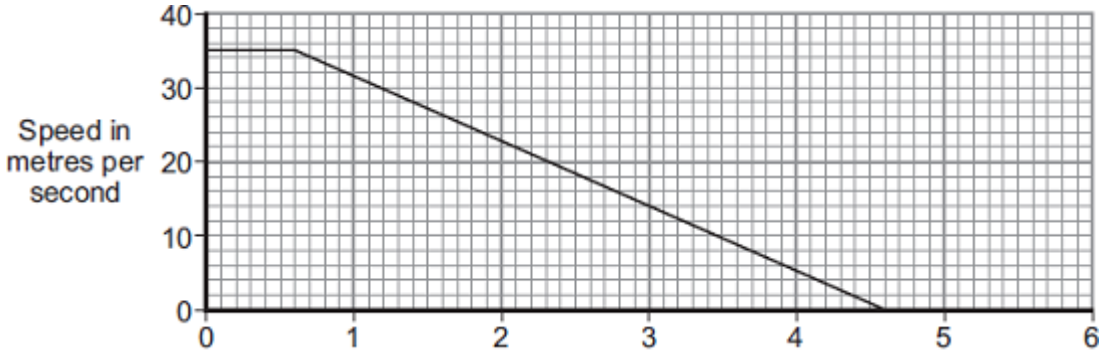
(ii) Use your graph to determine the braking distance, in metres, at a speed of 22 m / s.

Braking distance = _____ m

(1)

(d) The speed–time graph for a car is shown below.

While travelling at a speed of 35 m / s, the driver sees an obstacle in the road at time $t = 0$. The driver reacts and brakes to a stop.



(i) Determine the braking distance.

_____

_____

_____

_____

Braking distance = _____ m

(3)

(ii) If the driver was driving at 35 m / s on an icy road, the speed–time graph would be different.

Add another line to the speed–time graph above to show the effect of travelling at 35 m / s on an icy road and reacting to an obstacle in the road at time $t = 0$.

(3)

(e) A car of mass 1200 kg is travelling with a velocity of 35 m / s.

(i) Calculate the momentum of the car.

Give the unit.

_____

_____

_____

Momentum = _____

(3)

(ii) The car stops in 4 seconds.

Calculate the average braking force acting on the car during the 4 seconds.

_____

Force = _____ N

(2)

(Total 19 marks)