Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

Speed limits on roads increase safety.

(a) The braking distance of a car increases as the speed of the car increases.

Give two **other** factors that **increase** the braking distance of a car.

1. _____

2. _____

(2)

(b) Explain why the driver's reaction time affects the thinking distance of a car.

_____

_____

_____

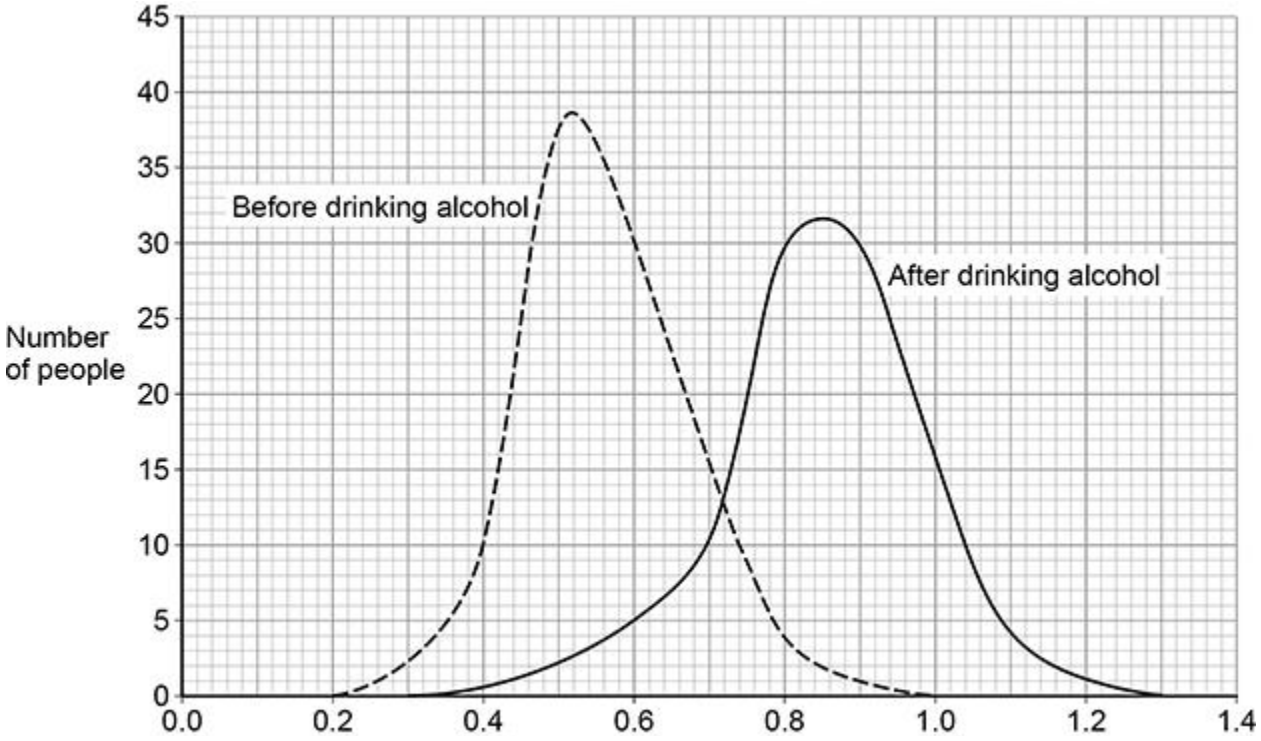
_____

(2)

(c) Scientists have investigated how drinking alcohol affects a person's reaction time.

Figure 1 shows the results of the investigation.

Figure 1



Which of the following conclusions can be made using **Figure 1**?

Tick (✓) **two** boxes.

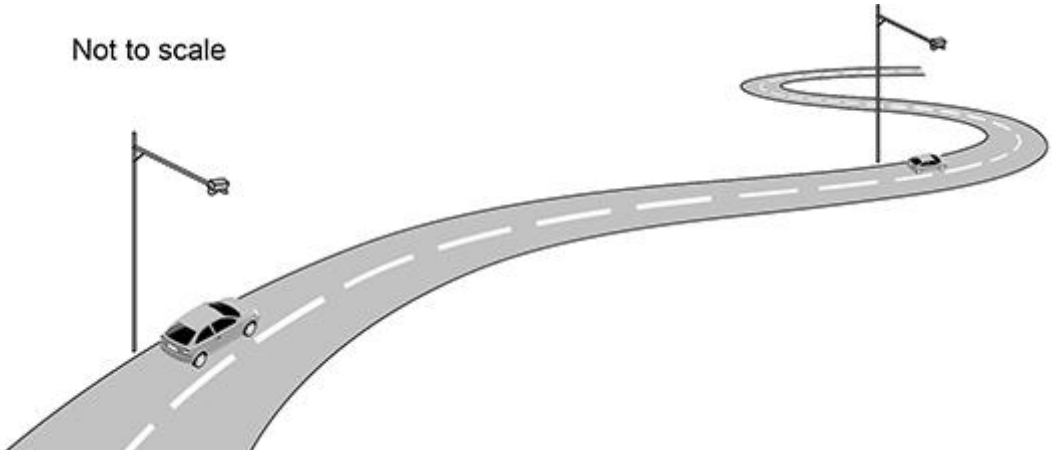
Every person's reaction time increases after drinking alcohol.	☐
Mean reaction time increases after drinking alcohol.	☐
Some people's reaction time is not affected by drinking alcohol.	☐
The change in reaction time is not the same for all people after drinking alcohol.	☐
There is a smaller range of reaction times after drinking alcohol.	☐

(2)

Figure 2 shows some speed cameras on a road.

The speed cameras determine the average speed of cars on the road.

Figure 2



(d) The speed limit on the road in **Figure 2** is 20 m/s.

The cameras in **Figure 2** are 1.5 km apart.

Calculate the minimum time it takes to travel 1.5 km without breaking the speed limit.

Use the Physics Equations Sheet.

Minimum time = _____ s

(4)

(e) The average speed of a car between the cameras and the average velocity of the car between the cameras are different.

Explain why.

(3)

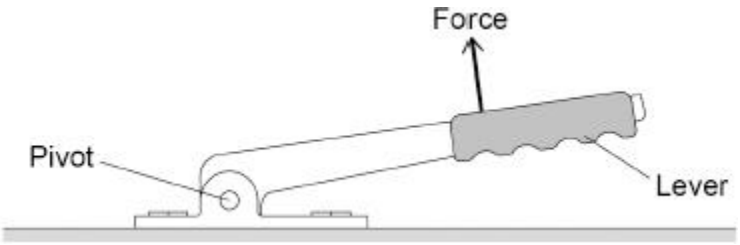
(Total 13 marks)

Q2.

Some cars have a lever that is used to apply the handbrake.

Figure 1 shows the handbrake lever in a car.

Figure 1



(a) The driver applies the force shown in **Figure 1**. The force produces a moment about the pivot.

How could the driver increase the moment about the pivot without increasing the size of the force?

_____

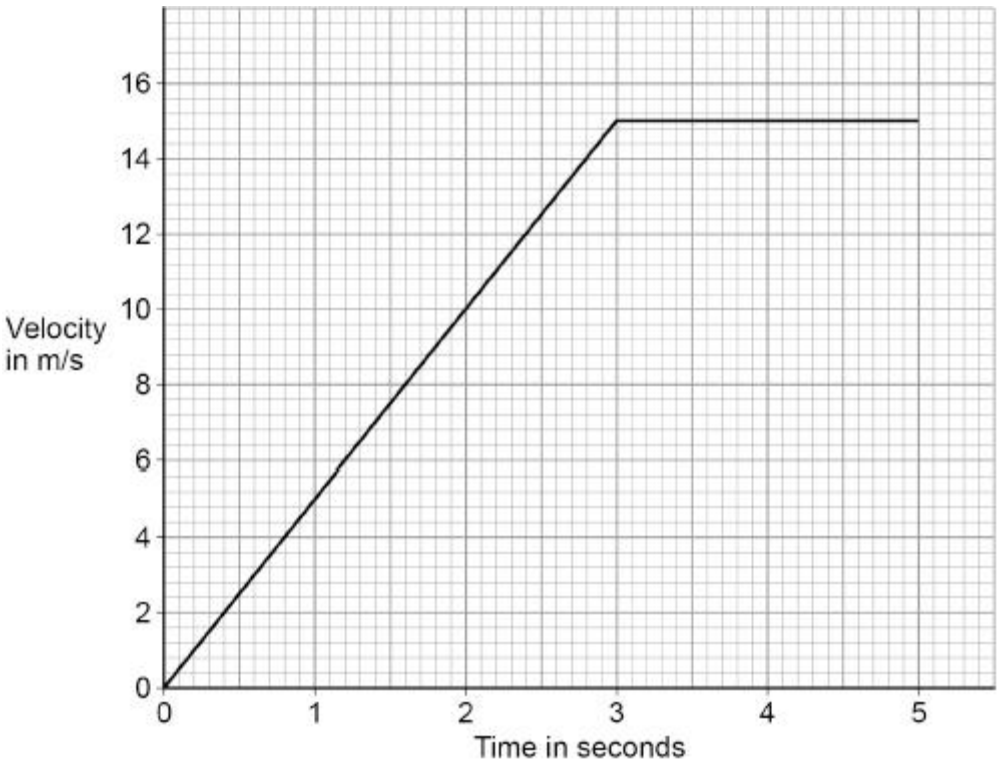
_____

(1)

The driver releases the handbrake.

Figure 2 shows how the velocity of the car changes during the first 5 seconds of a journey.

Figure 2



(b) After 3 seconds, the momentum of the car is 24 000 kg m/s.

Calculate the mass of the car.

Use the Physics Equations Sheet.

_____

_____

_____

Mass = _____ kg

(4)

(c) Determine the distance travelled by the car during the first 5 seconds of the journey.

Use **Figure 2**.

Distance travelled by the car = _____ m

(3)

(d) In an emergency the driver needs to apply the brakes suddenly to stop the car quickly.

The driver of the car is distracted.

Explain why the distraction will increase the stopping distance.

(3)

(e) Explain why the temperature of the brakes increases as they are used.

(2)

(Total 13 marks)