Q1.(2019)

a)

The driver of a vehicle sees a hazard on the road.

The driver uses the brakes to stop the vehicle.

Explain the factors that affect the distance needed to stop a vehicle in an emergency.

[6 marks]

b)

Write down the equation which links distance, force and work done.

[1 mark]

_____

c)

The work done by the braking force to stop a vehicle was 900 000 J

The braking force was 60 000 N

Calculate the braking distance of the vehicle.

[3 marks]

_____

_____

_____

_____

Braking distance = _____ m

d)

The greater the braking force, the greater the deceleration of a vehicle.

Explain the possible dangers caused by a vehicle having a large deceleration when it is braking.

[2 marks]

Q2.(2021)

a)

The thinking distance and braking distance for a car vary with the speed of the car.

Explain the effect of **two** other factors on the **braking** distance of a car.

Do **not** refer to speed in your answer.

[4 marks]

b)

Which equation links acceleration (*a*), mass (*m*) and resultant force (*F*).

[1 mark]

Tick (✓) **one** box.

resultant force = mass × acceleration ☐

resultant force = mass × acceleration^2 ☐

resultant force = $\frac{\text{mass}}{\text{acceleration}^2}$ ☐

resultant force = $\frac{\text{mass}}{\text{acceleration}}$ ☐

c)

The mean braking force on a car is 7200 N.

The car has a mass of 1600 kg.

Calculate the deceleration of the car.

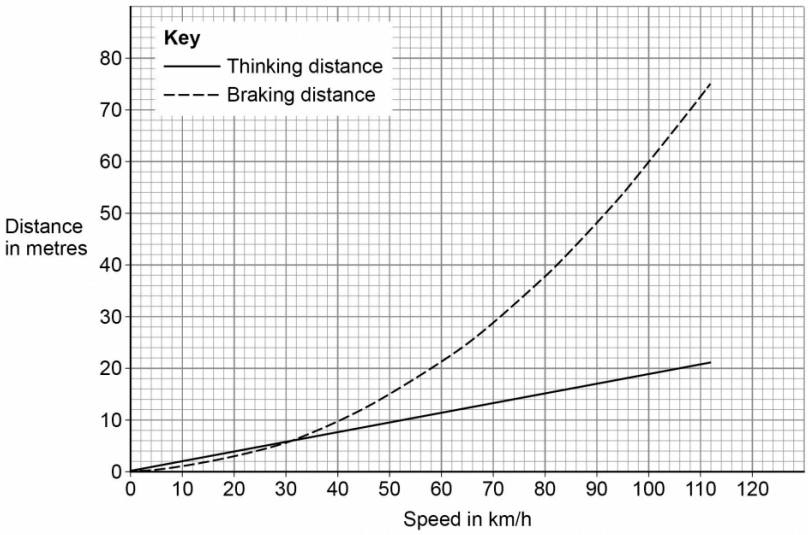
[3 marks]

Deceleration = _____ m/s^2

d)

Figure 1 shows how the thinking distance and braking distance for a car vary with the speed of the car.

Figure 1



Determine the stopping distance when the car is travelling at 80 km/h.

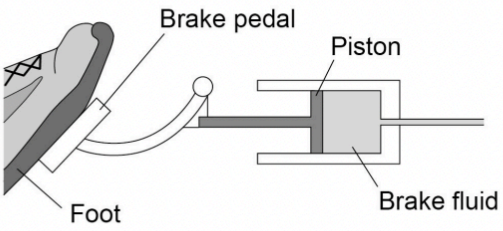
[2 marks]

Stopping distance = _____ m

e)

Figure 2 shows part of the braking system for a car.

Figure 2



Which equation links area of a surface (A), the force normal to that surface (F) and pressure (p).

[1 mark]

Tick (✓) **one** box.

$p = F \times A$ ☐

$p = F \times A^2$ ☐

$p = \frac{F}{A}$ ☐

$p = \frac{A}{F}$ ☐

f)

When the brake pedal is pressed, a force of 60 N is applied to the piston.

The pressure in the brake fluid is 120 000 Pa.

Calculate the surface area of the piston.

Give your answer in standard form.

Give the unit.

[5 marks]

Surface area (in standard form) = _____ Unit _____

Q3.(2022)

a)

Speed limits on roads increase safety.

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.

[2 marks]

b)

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

[2 marks]

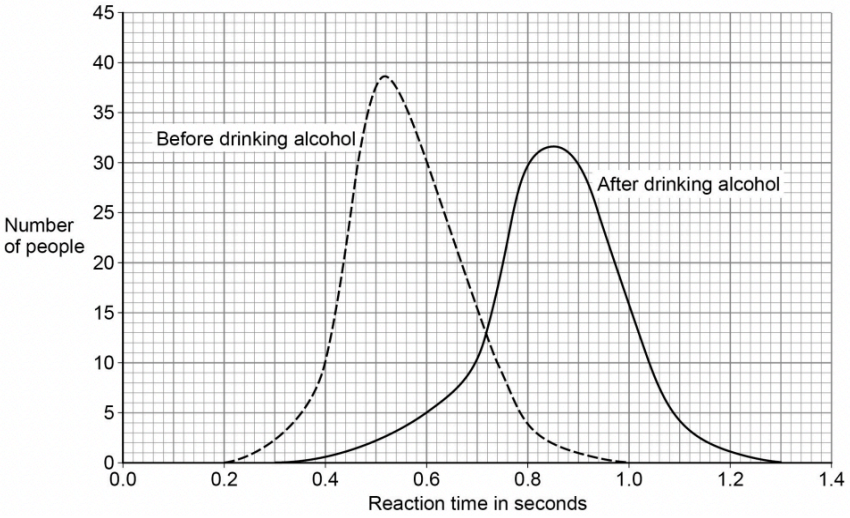
Q4.(2022)

a)

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

Figure 5 shows the results of the investigation.

Figure 5



Which of the following conclusions can be made using **Figure 5**?

[2 marks]

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. ☐