Forces and motion – GCSE Physics Paper 2

1. No.2(2.6_2.9)

0 2 . 6 What is the change in velocity of the cyclist in the first 20 seconds of the journey?

[1 mark]

Tick (✓) **one** box.

5.2 m/s ☐

5.4 m/s ☐

5.6 m/s ☐

5.8 m/s ☐

0 2 . 7 Determine the acceleration of the cyclist during the first 20 seconds of the journey.

Use your answer from Question **02.6**

Use the equation:

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$$

[2 marks]

Acceleration of the cyclist = _____ m/s^2

0 2 . 9 The cyclist travels from home to school.

Figure 7 shows the route the cyclist followed.

Figure 7

Draw an arrow on **Figure 7** to show the displacement of the cyclist.

[1 mark]

2. No.7(7.6_7.7)

0 7 . 6 Write down the equation which links distance travelled (s), speed (v) and time (t).

[1 mark]

_____

0 7 . 7 The conveyor belt moves a can at a speed of 1.7 m/s.

Calculate the time taken to move the can 3.3 m at this speed.

Give your answer to 2 significant figures.

[4 marks]

_____

_____

_____

_____

_____

Time taken (2 significant figures) = _____ s

3. No.8(8.1_8.4)

0 8 The thinking distance and braking distance for a car vary with the speed of the car.

0 8 . 1 Explain the effect of **two** other factors on the **braking** distance of a car.

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

[4 marks]

0 8 . 2 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 = $\frac{\text{mass}}{\text{acceleration}}$ ☐

0 8 . 3 The mean braking force on a car is 7200 N.

The car has a mass of 1600 kg.

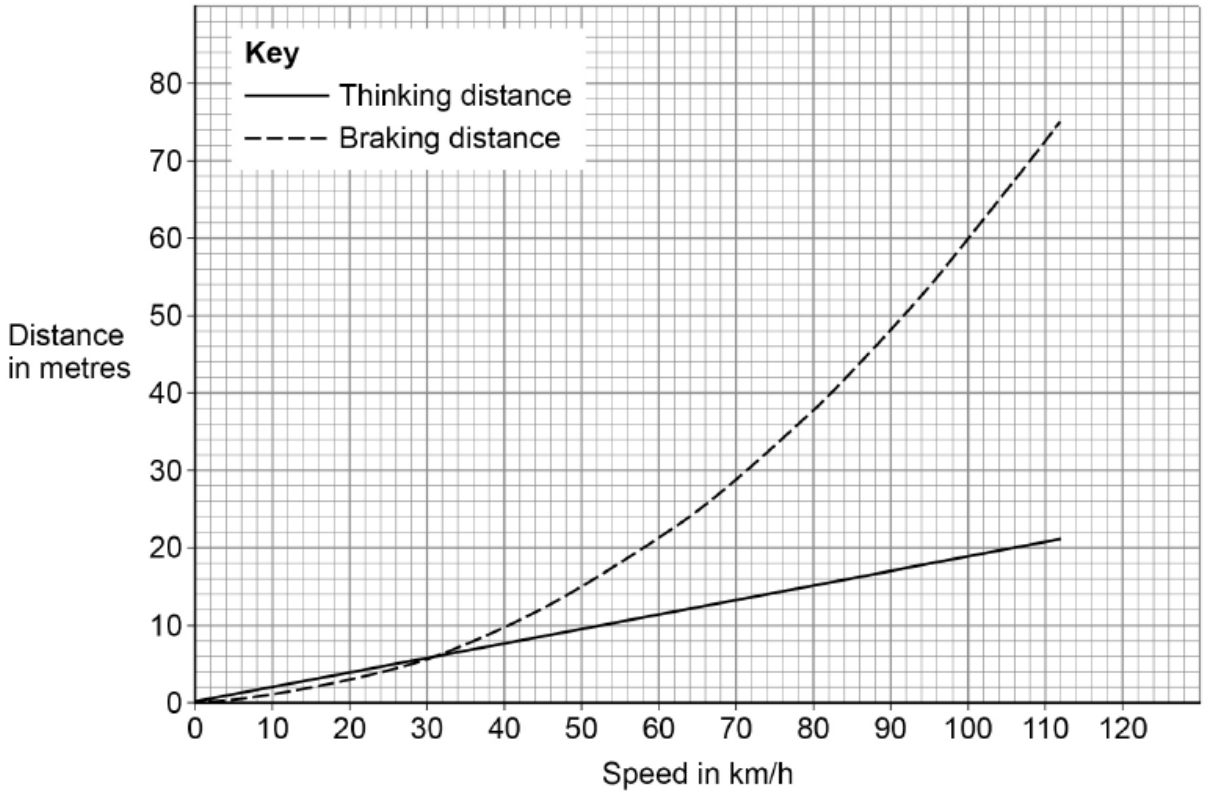
Calculate the deceleration of the car.

[3 marks]

Deceleration = _____ m/s^2

0 8 . 4 **Figure 18** shows how the thinking distance and braking distance for a car vary with the speed of the car.

Figure 18



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

[2 marks]

Stopping distance = _____ m

4. No.1(1.1_1.4)

0 1 The thinking distance and braking distance for a car vary with the speed of the car.

0 1 . 1 Explain the effect of **two** other factors on the **braking** distance of a car.

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

[4 marks]

0 1 . 2 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 = $\frac{\text{mass}}{\text{acceleration}}$ ☐

0 1 . 3 The mean braking force on a car is 7200 N.

The car has a mass of 1600 kg.

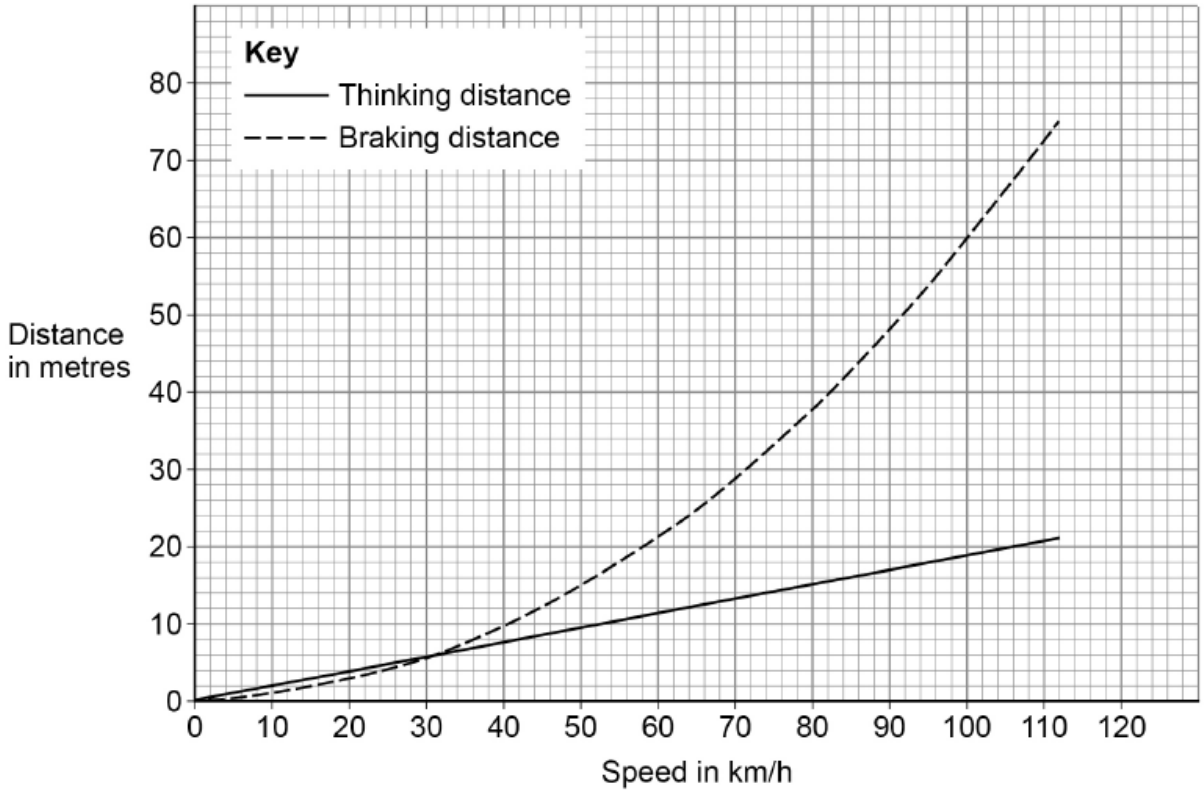
Calculate the deceleration of the car.

[3 marks]

Deceleration = _____ m/s^2

0 1 . 4 **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]

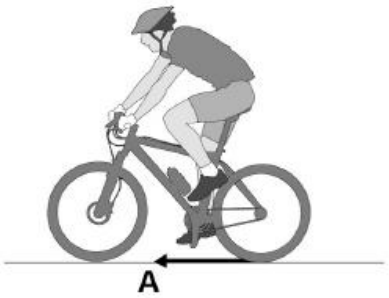
Stopping distance = _____ m

5. No.7

0 7 **Figure 11** shows a cyclist riding a bicycle.

Force **A** causes the bicycle to accelerate forwards.

Figure 11

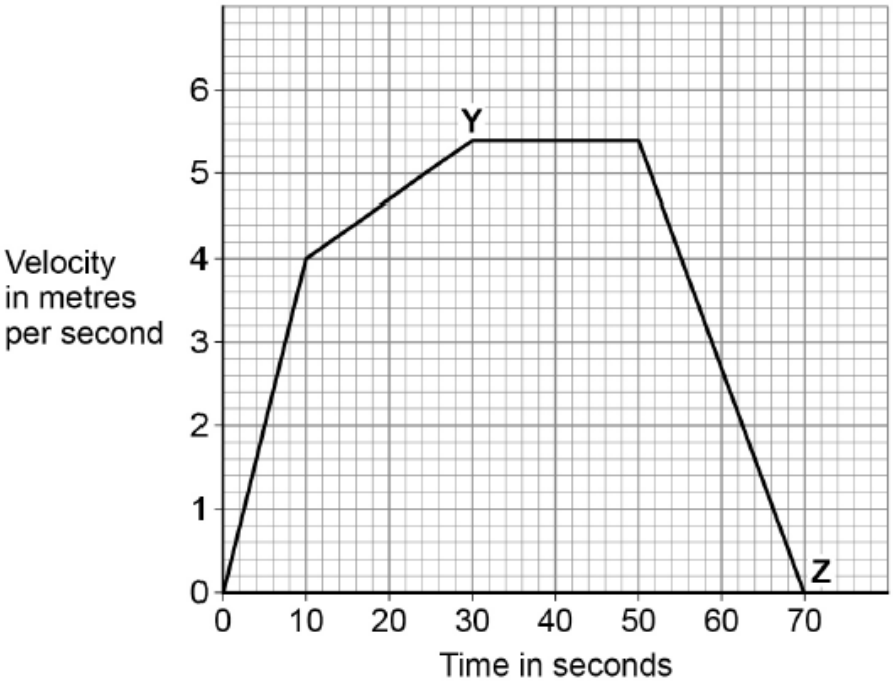


0 7 . 1 What name is given to force **A**?

[1 mark]

Figure 12 shows how the velocity of the cyclist changes during a short journey.

Figure 12



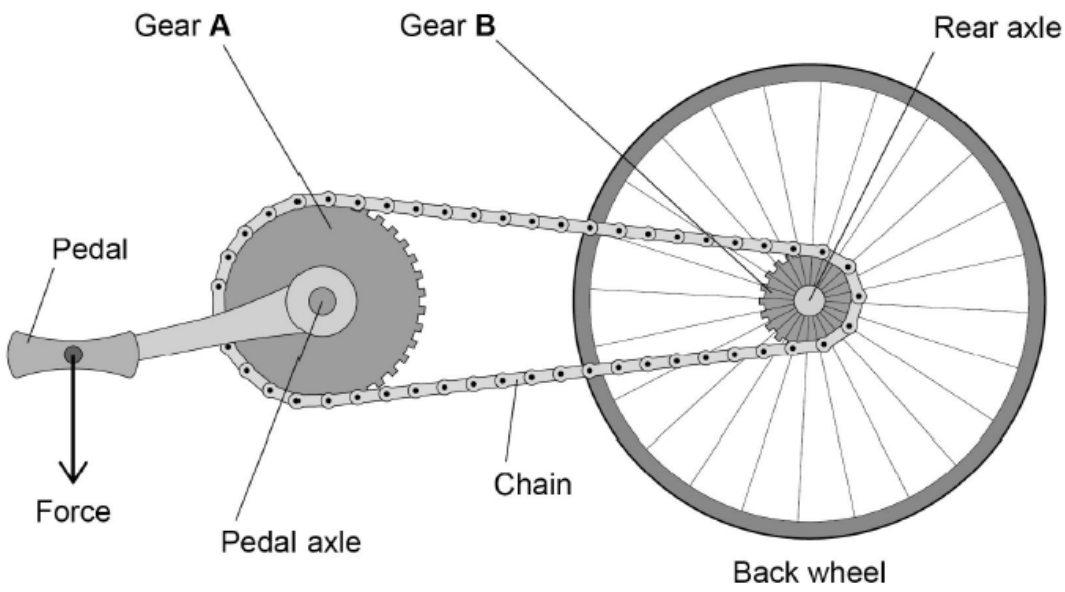
0 7 . 2 Determine the distance travelled by the cyclist between **Y** and **Z**.

[3 marks]

Distance travelled by the cyclist between **Y** and **Z** = _____ m

0 7 . 3 **Figure 13** shows the gears on the bicycle.

Figure 13

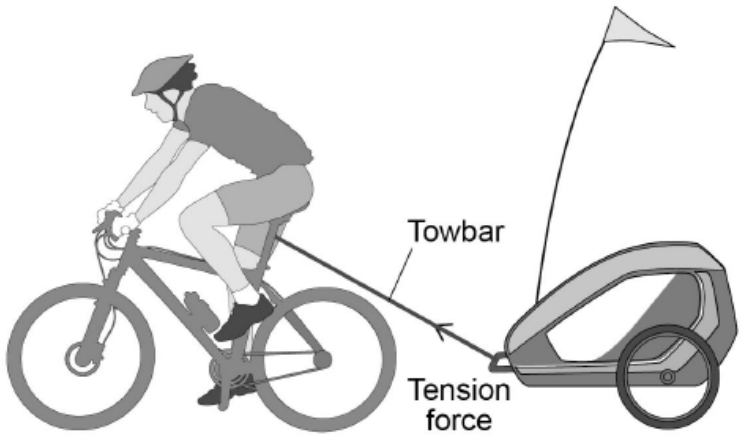


Describe how the force on the pedal causes a moment about the rear axle.

[2 marks]

Figure 14 shows a different cyclist towing a trailer.

Figure 14



0 7 . 4 The speed of the cyclist and trailer increased uniformly from 0 m/s to 2.4 m/s.

The cyclist travelled 0.018 km while accelerating.

Calculate the initial acceleration of the cyclist.

[3 marks]

Acceleration = _____ m/s^2

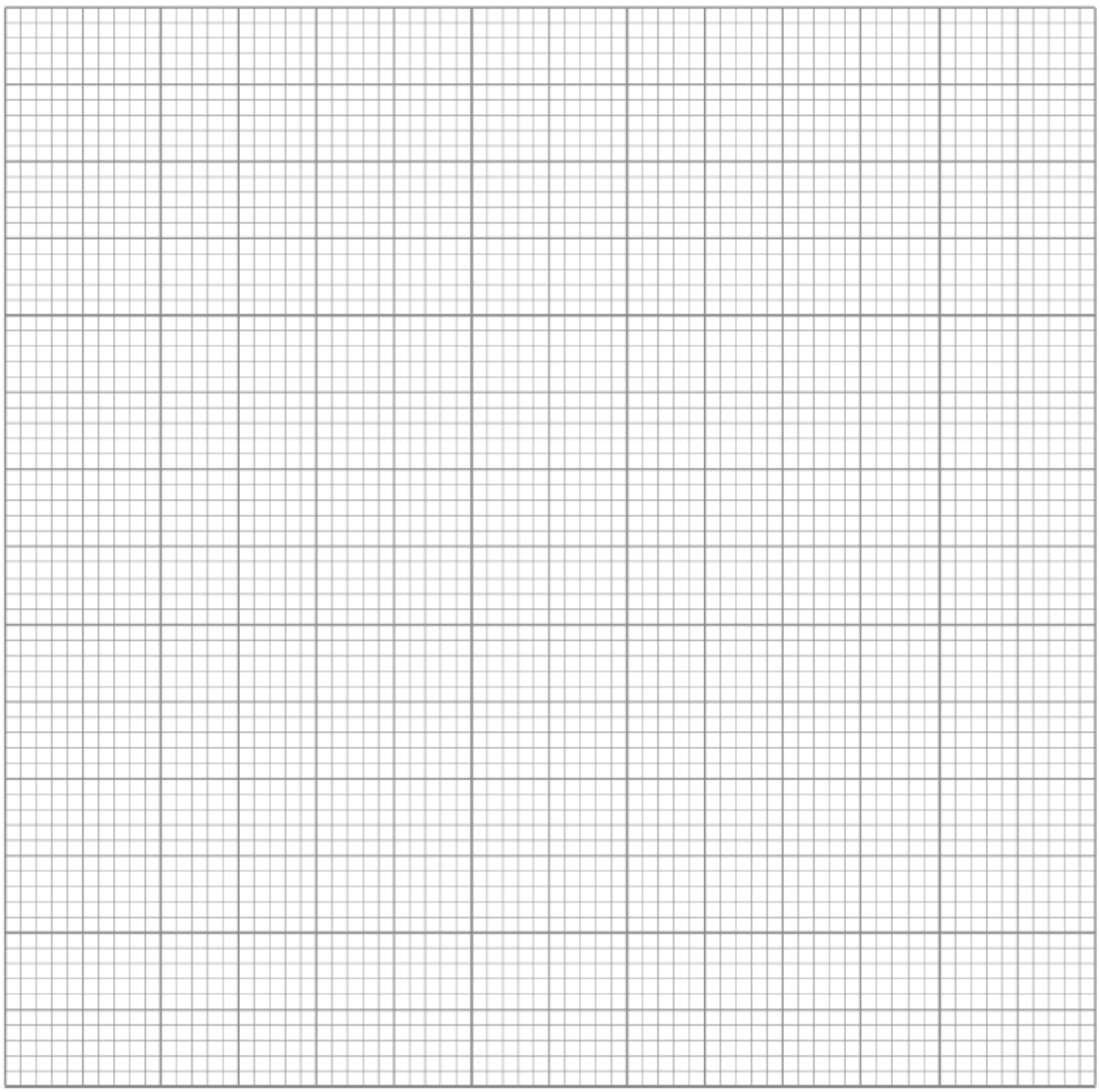
0 7 . 5 The resultant force of the towbar on the trailer has a horizontal component and a vertical component.

horizontal force = 200 N

vertical force = 75 N

Determine the magnitude and direction of the resultant force of the towbar on the trailer by drawing a vector diagram.

[4 marks]



Magnitude of force = _____ N

Direction of force = _____ degrees