



# Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 1

**Cambridge IGCSE™**  
**Physics 0625**



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- 1 A driving instructor gives a student a sudden order to stop the car in the shortest possible time.

Fig. 1.1 shows the speed-time graph of the motion of the car from the moment the order is given.

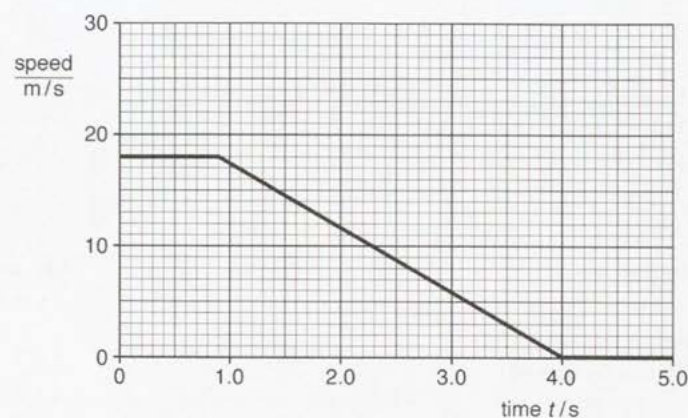


Fig. 1.1

- (a) The order to stop is given at time  $t = 0$  s.

- (i) State the speed of the car at  $t = 0$  s.

speed = 18 m/s [1]

- (ii) Suggest why the car continues to travel at this speed for 0.9 s.

It takes some time before the car decelerates after the brakes are pushed due to the hydraulic system. [1]

- (b) Calculate

- (i) the deceleration of the car between  $t = 0.9$  s and  $t = 4.0$  s,

deceleration = Gradient =  $\frac{18 - 0}{4 - 0.9} = \frac{18}{3.1} = 5.81 \text{ m/s}^2$  [2]

deceleration = 5.81 m/s<sup>2</sup>

- (ii) the total distance travelled by the car from  $t = 0$  s.

$d = A \text{ under graph}$   
 $= \frac{1}{2}(a+b)h$   
 $= \frac{1}{2}(0.9 + 4)18$   
 $= 44.1 \text{ m}$

distance = 44.1 m [3]

Select page

Your Mark

1(a)(i)

1(a)(ii)

1(b)(i)

1(b)(ii)

1(c)

Q1	Mark scheme
(a)(i)	18 m/s
(a)(ii)	(0.90 s is) the driver's time to react
(b)(i)	(a =) $(v - u)/t$ OR $\Delta v/t$ OR either in words OR $(18 - 0)/3.1$ OR $18/3.1$ 5.8 m/s <sup>2</sup> OR Values from any correct points on graph Answer dependent on accuracy of chosen points
(b)(ii)	Evidence of use of: (distance =) area under graph e.g. $\frac{1}{2}bh$ $(18 \times 0.9) + (0.5 \times 3.1 \times 18)$ 44 m
(c)	(Without seat belt, driver:) e.g. keeps moving (forwards)/ does not stop/has inertia/has momentum (Driver) hits steering wheel/windscreen/dashboard

(c) Describe and explain a danger to a driver of not wearing a safety belt during a sudden stop.

The sudden decrease in  
the motion of the car will cause the driver to be  
thrust out of his seat and ~~hit~~ hit the front  
glass of other car if he is not wearing a seat belt.

[2]

[Total: 9]

Your  
Mark

1(a)(i)

1(a)(ii)

1(b)(i)

1(b)(ii)

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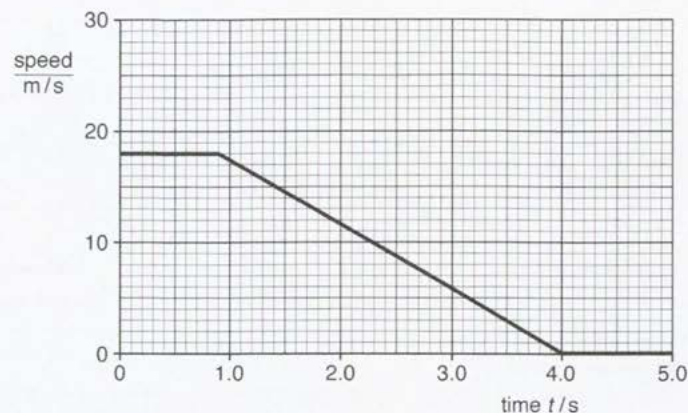


Fig. 1.1

- (a) The order to stop is given at time  $t = 0$  s.

- (i) State the speed of the car at  $t = 0$  s.

speed = 18 m/s [1]

- (ii) Suggest why the car continues to travel at this speed for 0.9 s.

Due to a sudden break, the car travelled for more 0.9 seconds as the driver stopped accelerating [1]

- (b) Calculate

- (i) the deceleration of the car between  $t = 0.9$  s and  $t = 4.0$  s,

gradient = deceleration

$$\frac{y_2 - y_1}{x_2 - x_1} = x$$

$$\frac{0 - 18}{4 - 0.9} = x$$

$$\frac{-18}{3.1} = x$$

$$-5.806 = x$$

$$-5.81 = x$$

deceleration = -5.81 m/s<sup>2</sup> [2]

- (ii) the total distance travelled by the car from  $t = 0$  s.

distance = A under graph.

$$\therefore \frac{1}{2} \times (a+b) \times h = A$$

$$\frac{1}{2} \times (1+4) \times 18 = A$$

$$45 = A$$

distance = 45 m [3]

Select page

Your Mark

1(a)(i)

1(a)(ii)

1(b)(i)

1(b)(ii)

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(c)	(Without seat belt, driver:) e.g. keeps moving (forwards)/ does not stop/has inertia/has momentum (Driver) hits steering wheel/windscreen/dashboard

(c) Describe and explain a danger to a driver of not wearing a safety belt during a sudden stop.

The sudden stop caused the driver's body to lean forward. If no belt is worn, driver can crash his forehead on the steering.

[2]

[Total: 9]

Your  
Mark

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1(b)(ii)

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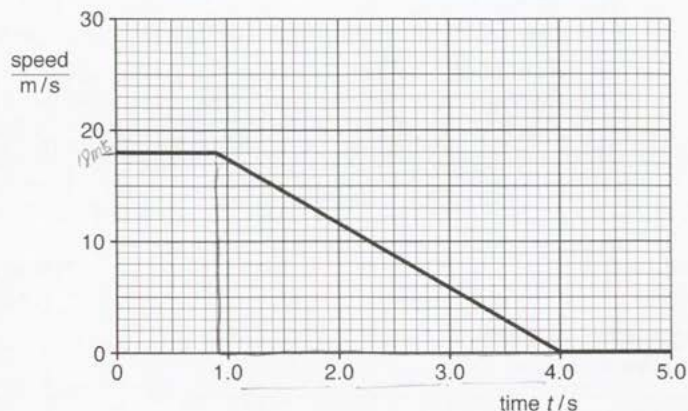


Fig. 1.1

- (a) The order to stop is given at time  $t = 0$  s.

- (i) State the speed of the car at  $t = 0$  s.

speed = 18 m/s.....[1]

- (ii) Suggest why the car continues to travel at this speed for 0.9 s.

The car travels at the constant speed......[1]

- (b) Calculate

- (i) the deceleration of the car between  $t = 0.9$  s and  $t = 4.0$  s,

$$\text{deceleration} = \frac{(v-u)}{t} = \frac{20}{-3.1} = -6.45$$

$$\text{deceleration} = \frac{20-0}{0.9-4.0} = -6.45$$

.....[2]

- (ii) the total distance travelled by the car from  $t = 0$  s.

$$\textcircled{1} 18 \times 0.9 = 16.2$$

$$\textcircled{2} 18 \times 3.1 = 55.8$$

$$16.2 + 55.8 = 72$$

distance = 72 m.....[3]

Select  
page

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(c) Describe and explain a danger to a driver of not wearing a safety belt during a sudden stop.

The driver may injure himself because he is not wearing a safety belt. When the car suddenly stops, the driver may get a jerk or the body may come forward very rapidly and hit the steering. As the break is pressed hardly so the car has to stop immediately. [2] [Total: 9]

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