

## P10 Exam Practice 2

### Q1.

The image below shows a lorry.



- (a) The brakes of the lorry are in a poor condition.

What effect will the condition of the brakes have on thinking distance and the braking distance of the lorry?

Thinking distance \_\_\_\_\_

\_\_\_\_\_

Braking distance \_\_\_\_\_

\_\_\_\_\_

(2)

- (b) Using a hand-held mobile phone while driving is illegal in the United Kingdom.

The table below shows the effect of using a mobile phone on thinking distance.

	Thinking distance
Not using a mobile phone	19 m
Using a mobile phone with hands-free kit	23 m
Using a hand-held mobile phone	27 m

Explain why driving while using a hand-held mobile phone is more dangerous than using a mobile phone with a hands-free kit.

Use data from the table above.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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(4)  
(Total 6 marks)

**Q2.**

The stopping distance of a car is the sum of the thinking distance and the braking distance.

(a) The thinking distance is affected by the reaction time of the driver.

Which **two** of the following can affect the reaction time of the driver?

Tick (✓) **two** boxes.

Damaged brakes

Taking drugs

Tiredness

Wet roads

Worn tyres

(2)

Scientists measured the reaction time for drivers of different ages.

The graph below shows the results.



(b) At what age did the drivers have the lowest mean reaction time?

Age = \_\_\_\_\_ years

(1)

(c) What was the lowest mean reaction time?

Time = \_\_\_\_\_ seconds

(1)

The braking distance of a car is the distance travelled between the driver applying the brakes and the car stopping.

(d) Complete the sentences.

Choose answers from the box.

Each answer may be used once, more than once or not at all.

<b>decreases</b>	<b>stays the same</b>	<b>increases</b>
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When the brakes are applied, the kinetic energy of the car \_\_\_\_\_.

The temperature of the brakes \_\_\_\_\_.

(2)

(e) A car is travelling at a speed of 12 m/s.

The driver applies the brakes and the car decelerates at a constant 3.0 m/s<sup>2</sup>.

Calculate the braking distance of the car.

Use the equation:

$$\text{braking distance} = \frac{(\text{speed})^2}{2 \times \text{deceleration}}$$

Choose the unit from the box.

m	kg	s
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Braking distance = \_\_\_\_\_ Unit \_\_\_\_\_

(3)

- (f) To pass the UK driving test, people must know the typical stopping distance of a car at certain speeds.

Suggest **one** reason why.

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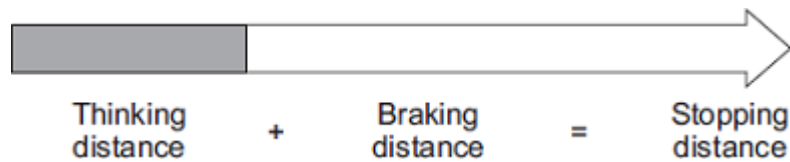
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(1)

(Total 10 marks)

**Q3.**

The diagram shows how the thinking distance and braking distance of a car add together to give the stopping distance of the car.



- (a) Use words from the box to complete the sentence.

distance	energy	force	time
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The stopping distance is found by adding the distance the car travels during the driver's reaction \_\_\_\_\_ and the distance the car travels under the braking \_\_\_\_\_ .

(2)

- (b) Which **one** of the following would **not** increase the thinking distance?

Tick (✓) **one** box.

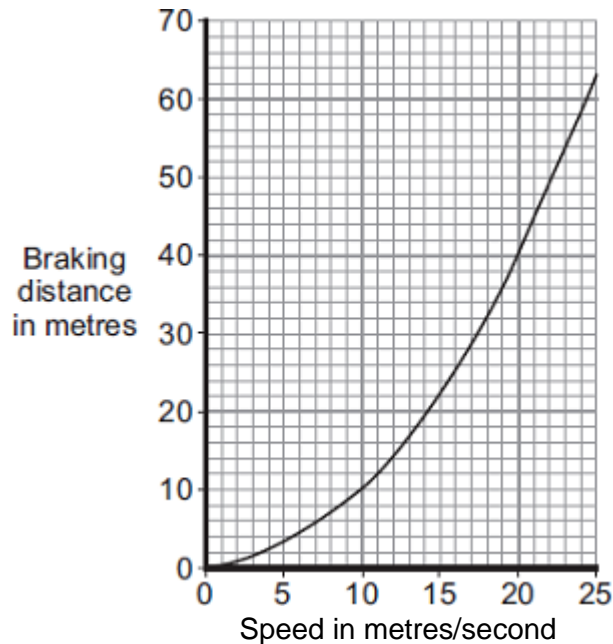
The car driver being tired.

The car tyres being badly worn.

The car being driven faster.

(1)

- (c) The graph shows how the braking distance of a car changes with the speed of the car.  
The force applied to the car brakes does not change.



- (i) What conclusion about braking distance can be made from the graph?

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(2)

- (ii) The graph is for a car driven on a dry road.

Draw a line on the graph to show what is likely to happen to the braking distance at different speeds if the same car was driven on an icy road.

(1)

- (d) A local council has reduced the speed limit from 30 miles per hour to 20 miles per hour on a few roads. The reason for reducing the speed limit was to reduce the number of accidents.

- (i) A local newspaper reported that a councillor said:

“It will be much safer because drivers can react much faster when driving at 20

miles per hour than when driving at 30 miles per hour.”

This statement is wrong. Why?

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**(1)**

- (ii) The local council must decide whether to introduce the lower speed limit on a lot more roads.

What evidence should the local council collect to help make this decision?

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**(2)**

**(Total 9 marks)**

## Mark schemes

### Q1.

- (a) thinking distance stays the same 1
- braking distance increases 1
- (b) reaction time is increased by using a mobile phone 1
- hand-held mobile phones increase the thinking distance more than hands-free phone
- allow thinking distance is increased by using a mobile phone* 1
- by 4 m more than the hands-free phone 1
- allow 2 marks for a hand-held mobile phone doubles the increase of the thinking distance*
- so overall stopping distance increases 1

[6]

### Q2.

- (a) taking drugs 1
- tiredness 1
- (b) 24 (years) 1
- (c) 0.55 (s)
- allow answer in range 0.54 to 0.56* 1
- (d) decreases
- this order only* 1
- increases 1
- (e) braking distance =  $\frac{(12)^2}{(2 \times 3)}$  1
- braking distance = 24 1

unit = m

1

(f) so they know how far behind another car they should drive

**or**

so they can stop safely if the car in front stops

1

[10]

**Q3.**

(a) time

*correct order only*

1

force

1

(b) The car tyres being badly worn

1

(c) (i) braking distance increases with speed

*accept positive correlation*

*do **not** accept stopping distance for braking distance*

1

relevant further details, eg

- but not in direct proportion
- and increases more rapidly after 15 m/s  
*accept any speed between 10 and 20*  
*accept numerical example*
- double the speed, braking distance increases  $\times 4$

1

(ii) line drawn above existing line starting at the origin

*as speed increases braking distance must increase*  
*each speed must have a single braking distance*

1

(d) (i) reaction time / reaction (of driver) does not depend on speed (of car)

1

(ii) (on the reduced speed limit roads) over the same period of time

*accept a specific time, eg 1 year*

1

monitor number of accidents before and after (speed limit reduced)

*allow 1 mark only for record number of vehicles / cars using*  
*the (20 mph) roads **or** collect data on accidents on the (20*  
*mph) roads*

*to score both marks the answer must refer to the roads with*  
*the reduced speed limit*



