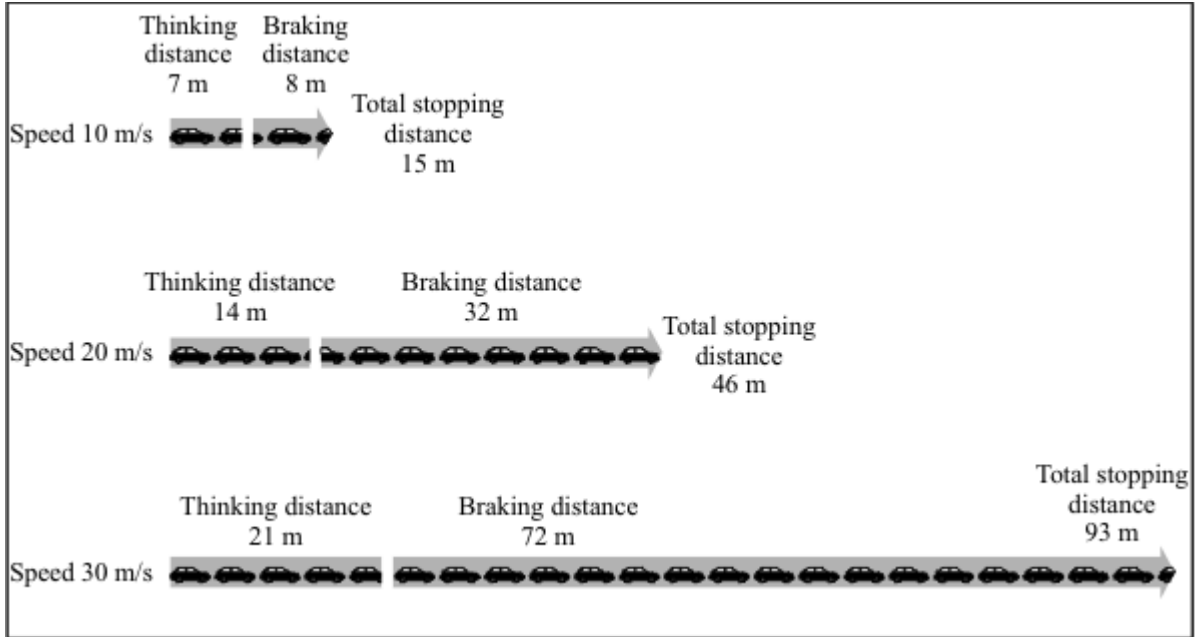


**Q1.**

The diagram below shows the thinking distances, braking distances and total stopping distances at different speeds.



(a) Look at the total stopping distances at each speed.

Complete the sentence by choosing the correct words from the box.

<b>distance</b>	<b>force</b>	<b>mass</b>	<b>time</b>
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The total stopping distance depends on the distance the car travels during the driver's reaction \_\_\_\_\_ and under the braking \_\_\_\_\_ .

(2)

(b) Give **three** other factors that could cause the total stopping distance of a car to be greater. Do **not** give the factors in **Figure 1**.

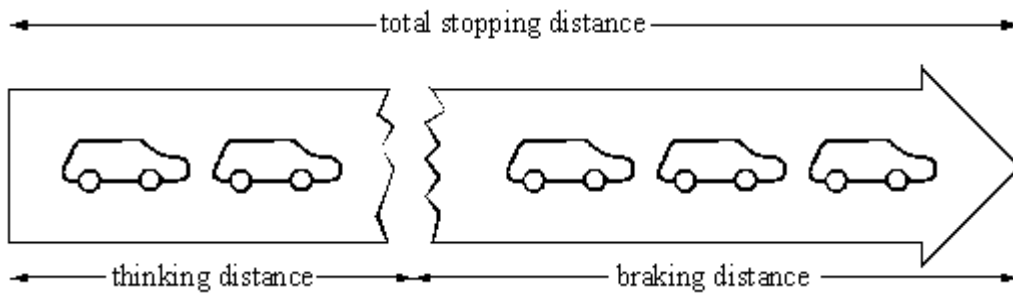
1. \_\_\_\_\_
- \_\_\_\_\_
2. \_\_\_\_\_
- \_\_\_\_\_
3. \_\_\_\_\_
- \_\_\_\_\_

(3)

(Total 5 marks)

**Q2.**

The Highway Code gives tables of the shortest stopping distances for cars travelling at various speeds. An extract from the Highway Code is given below.



$$\text{thinking distance} + \text{braking distance} = \text{total stopping distance}$$

(a) A driver's reaction time is 0.7 s.

(i) Write down **two** factors which could increase a driver's reaction time.

1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

(ii) What effect does an increase in reaction time have on:

A thinking distance; \_\_\_\_\_

B braking distance; \_\_\_\_\_

C total stopping distance? \_\_\_\_\_

(3)

(b) Explain why the braking distance would change on a wet road.

\_\_\_\_\_

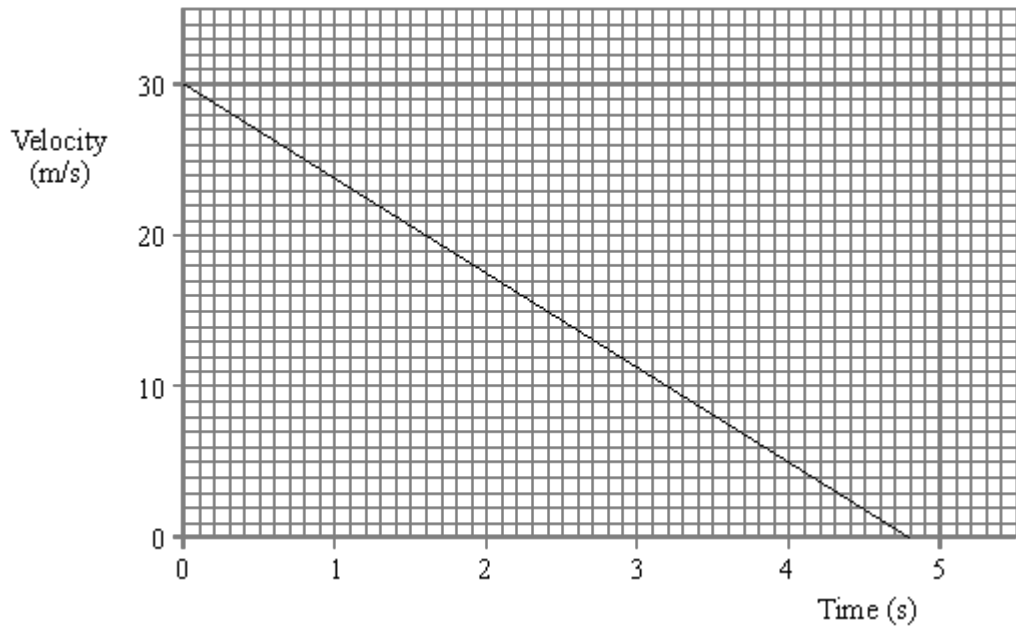
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2)

- (c) A car was travelling at 30 m/s. The driver braked. The graph below is a velocity-time graph showing the velocity of the car during braking.



Calculate:

- (i) the rate at which the velocity decreases (deceleration);

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Rate \_\_\_\_\_ m/s<sup>2</sup>

(2)

- (iii) the braking distance.

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

(2)

(Total 11 marks)

## Mark schemes

### Q1.

- (a) time 1
- force 1
- (b) any **three** from
- driver's reactions are slow(er)  
*accept driver could have taken drugs  
or alcohol or due to tiredness or  
distractions*
  - poor weather conditions  
*accept raining or snowing or fog /  
mist (poor visibility)*
  - greater mass or weight
  - poor road conditions  
*oil / gravel / mud / leaves / wet / icy  
going downhill*
  - poorly maintained brakes  
*do not accept driver's weak foot force*
  - worn tyres 3

[5]

### Q2.

- (a) (i) tiredness / boredom  
drugs  
alcohol  
distraction  
*any two for 1 mark each* 2
- (ii) A greater / longer  
B no effect  
C greater / longer  
*each for 1 mark* 3
- (b) on a wet road: there is less friction / grip  
*for 1 mark*
- braking distance is greater / takes longer to stop  
or car skids / slides forward  
*for 1 mark* 2

(c) (i) deceleration = gradient or  $30 / 4.8$   
*each for 1 mark*

2

(iii) distance = area under graph or  $0.5 \times 4.8 \times 30$  **or** average  
speed  $\times$  time **or**  $15 \times 4.8$   
Accept answer in terms of change in k.e. = work done  
*if incorrect unit given (eg 72km) then no mark*  
*each for 1 mark*

2

[11]