1. **Thinking and stopping distance GCSE questions**

(a) A driver may have to make an emergency stop.

Stopping distance = thinking distance + braking distance.

Give **three** different factors which affect the thinking distance or the braking distance. In your answer you should explain what effect **each** factor has on the stopping distance.

(6)

(b) Complete the following sentences by writing in the **two** missing words.

Acceleration is the rate of change of ....

The acceleration of a car depends on the force applied by the engine and the

.... of the car.

(2)

(c) A car moves because of the force applied by the engine.

Name **two** other forces which act on the car when it is moving. Give the direction in which **each** of these factors acts.

1. Name of force ....

   Direction of this force ....

2. Name of force ....

   Direction of this force ....

(4)
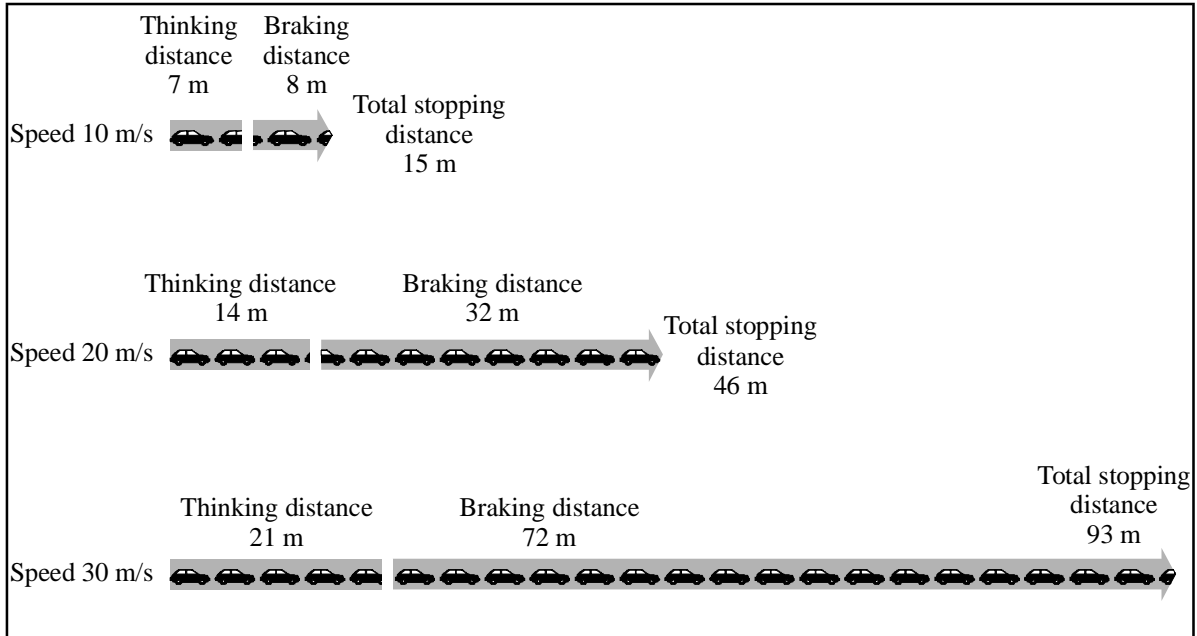
(d)   Complete the following sentence by writing in the missing word.

The velocity of a car is its speed in a particular ....

(1)
(Total 13 marks)

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

Thinking   Braking
distance   distance
7 m   8 m
                              Total stopping
Speed 10 m/s   distance
                              15 m

Thinking distance   Braking distance
14 m   32 m
                                            Total stopping
Speed 20 m/s   distance
                                            46 m

                                                                              Total stopping
Thinking distance   Braking distance   distance
21 m   72 m   93 m
Speed 30 m/s

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

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

distance	force	mass	time

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.**

(3)
(Total 5 marks)

3. 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.

total stopping distance

thinking distance   braking distance

thinking distance + braking distance = total stopping distance
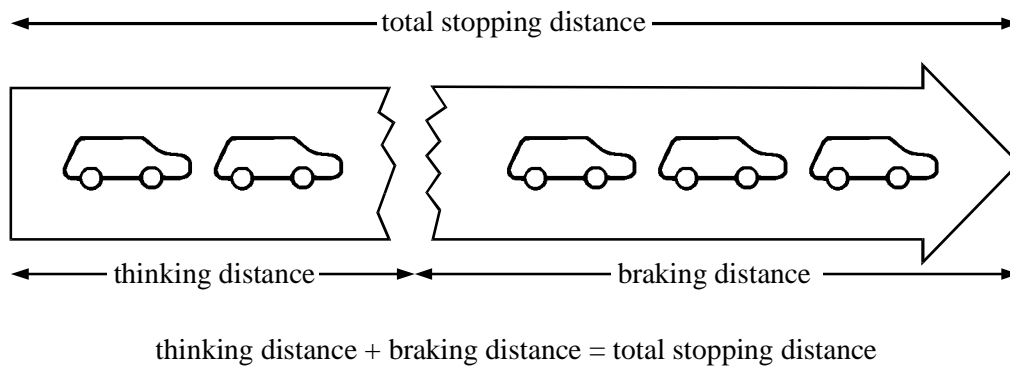
(a) A driver's reaction time is 0.7 s.

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

(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.

....

....

....

....
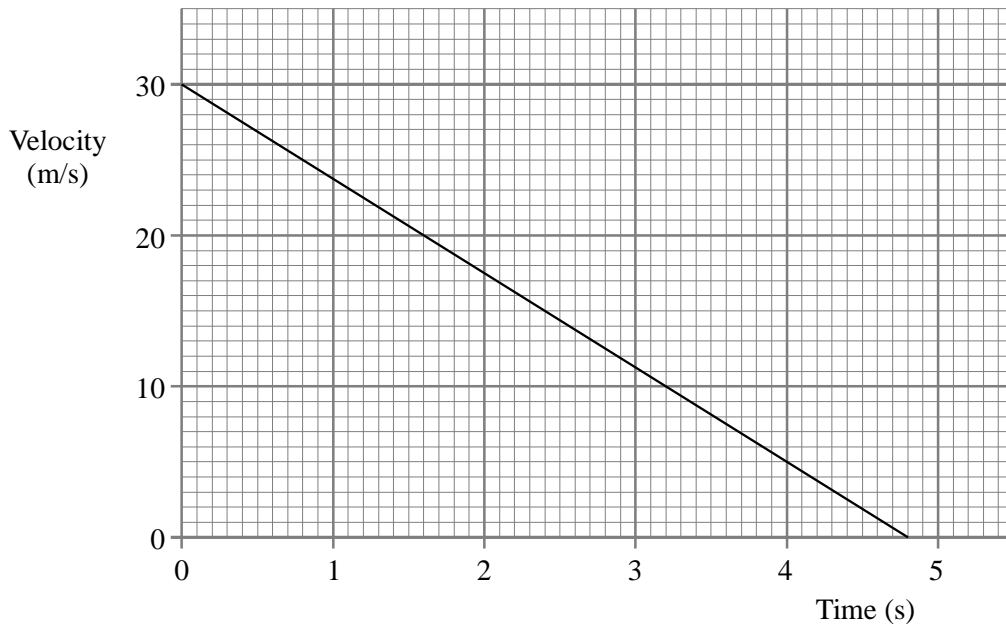
(2)

(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);

....

....

Rate .... m/s²

(2)

(ii) the braking force, if the mass of the car is 900 kg;

....

....

Braking force .... N

(2)

(iii) the braking distance.

....

....

Braking distance .... m

(2)
(Total 13 marks)

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