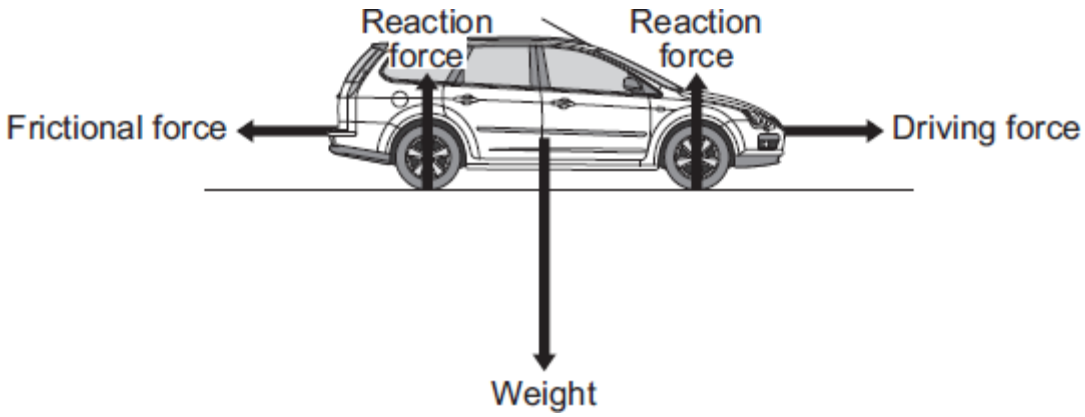
Practice Question Set For GCSE
Subject : Physics
Paper-2 Topic: Forces (Standard Demand Questions)

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Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

The diagram shows the forces acting on a car. The car is being driven along a straight, level road at a constant speed of 12 m/s.



(a) The driver then accelerates the car to 23 m/s in 4 seconds.

Use the equation in the box to calculate the acceleration of the car.

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

Show clearly how you work out your answer and give the unit.

_____

_____

Acceleration = _____

(3)

(b) Describe how the horizontal forces acting on the car change during the first **two** seconds of the acceleration.

_____

_____

_____

_____

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_____

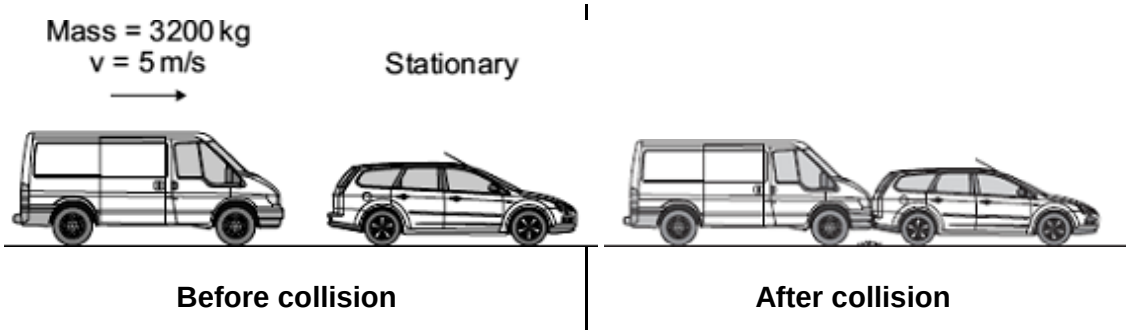
_____

(3)

(Total 6 marks)

Q2.

(a) A van has a mass of 3200 kg. The diagram shows the van just before and just after it collides with the back of a car.



Just before the collision, the van was moving at 5 m/s and the car was stationary.

(i) Calculate the momentum of the van just before the collision.

Show clearly how you work out your answer.

_____

_____

Momentum = _____ kg m/s

(2)

(ii) The collision makes the van and car join together.

What is the total momentum of the van and the car just after the collision?

Momentum = _____ kg m/s

(1)

(iii) Complete the following sentence by drawing a ring around the correct line in the box.

The momentum of the car before the collision is

more than
the same as
less than

the

momentum of the car after the collision.

(1)

(b) A seat belt is one of the safety features of a car.

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In a collision, wearing a seat belt reduces the risk of injury.

Use words or phrases from the box to complete the following sentences.

decreases	stays the same	increases

In a collision, the seat belt stretches. The time it takes for the person held by the seat belt to lose momentum compared to a person not wearing a seat belt,

_____ .

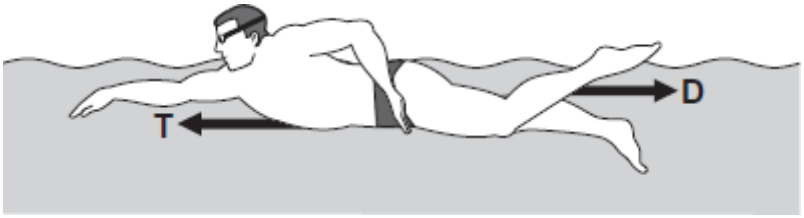
The force on the person's body _____ and so reduces the risk of injury.

(2)

(Total 6 marks)

Q3.

(a) The diagram shows the horizontal forces acting on a swimmer.



(i) The swimmer is moving at constant speed.
Force **T** is 120 N.

What is the size of force **D**?

_____ N

(1)

(ii) By increasing force **T** to 140 N, the swimmer accelerates to a higher speed.

Calculate the size of the initial resultant force acting on the swimmer.

_____

_____

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Initial resultant force = _____ N

(1)

(iii) Even though the swimmer keeps the force **T** constant at 140 N, the resultant force on the swimmer decreases to zero.

Explain why.

_____

_____

_____

_____

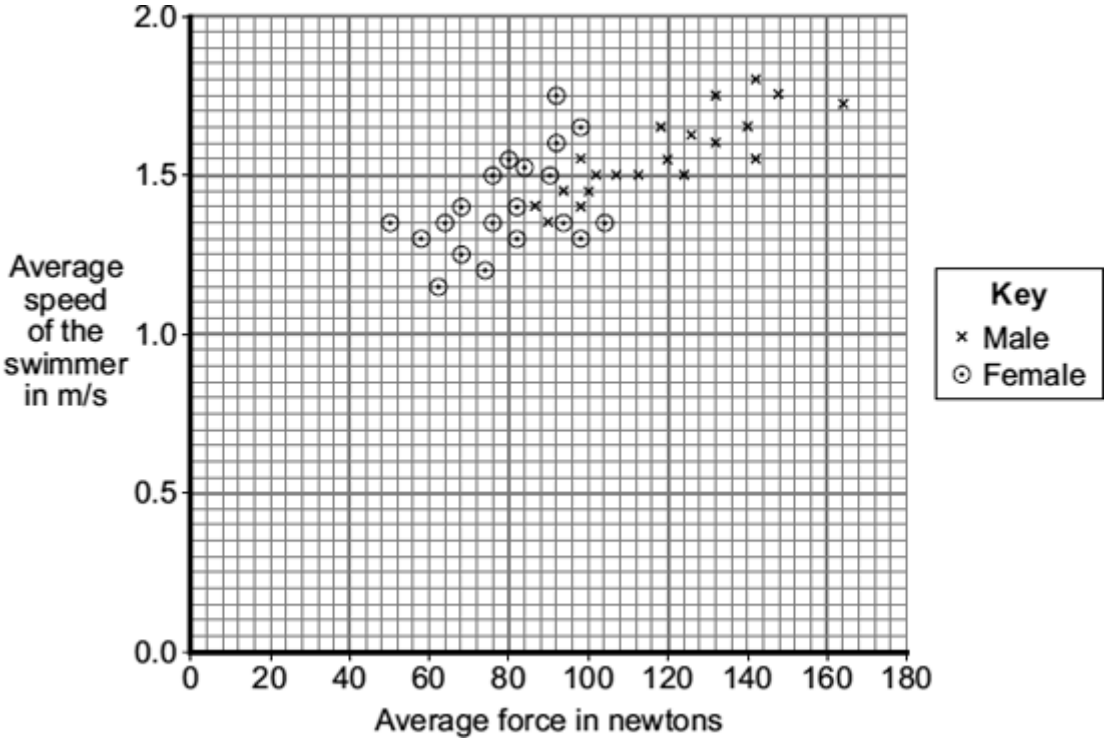
_____

_____

(3)

(b) A sports scientist investigated how the force exerted by a swimmer's hands against the water affects the swimmer's speed.
The investigation involved 20 males and 20 females swimming a fixed distance.
Sensors placed on each swimmer's hands measured the force 85 times every second over the last 10 metres of the swim.
The measurements were used to calculate an average force.
The average speed of each swimmer over the last 10 metres of the swim was also measured.

The data from the investigation is displayed in the graph.



(i) What was the dependent variable in this investigation?

_____

(1)

(ii) Explain **one** advantage of measuring the force 85 times every second rather than just

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once or twice every second.

_____

_____

_____

_____

(2)

(iii) Give **one** way in which the data for the male swimmers is different from the data for the female swimmers.

_____

_____

(1)

(iv) Considering only the data from this investigation, what advice should a swimming coach give to swimmers who want to increase their average speed?

_____

_____

(1)

(Total 10 marks)

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