AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



EXAM QUESTION PACK

4.5.6.2.3 NEWTON'S THIRD LAW (PACK 1)

SCORE	PERCENTAGE
/26	%

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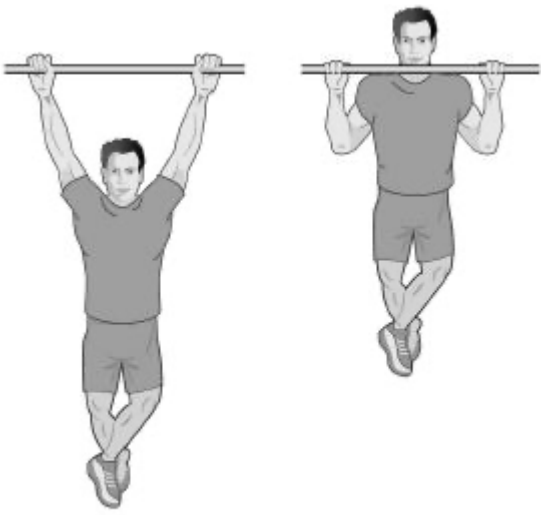
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Q1.

The diagram below shows a man doing two stages of a pull up. In both diagrams the man is stationary.



Stage 1 Stage 2

(a) Complete the sentence.

Choose the answers from the box.

equal to	**less than**	**more than**

In stage 1 the downwards force of the man on the bar is _____

the upwards force of the bar on the man.

(1)

(b) The man has a mass of 85 kg

Gravitational field strength = 9.8 N/kg

Calculate the weight of the man.

Use the equation:

weight = mass × gravitational field strength

_____

_____

Weight = _____ N

(2)

(c) The man raises his body a vertical distance of 0.63 m to go from stage 1 to stage 2

Calculate the work done by the man.

Use your answer to part **(b)**

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Use the equation:

work done = force × distance

_____

_____

Work done = _____ J

(2)

(d) The man was **not** moving at stage 2

How much work is done by the man at stage 2?

Work done = _____ J

(1)

(e) A woman uses the bar to do a pull up.

The woman has a mass of 62 kg

She accelerates at 11 m/s^2

Calculate the resultant force on the woman.

Use the equation:

force = mass × acceleration

_____

_____

Force = _____ N

(2)

(Total 8 marks)

Q2.

Figure 1 shows a cyclist with a trailer attached to his bike.

Figure 1



(a) Describe how Newton's Third Law applies to the forces between the bike and the trailer.

_____

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_____

_____

_____

(2)

(b) A student investigated how the stopping distance of the bike was affected by the mass of the load.

The same person rode the same bike throughout the investigation.

Give **two** other variables which the student should have controlled.

1. _____

_____

2. _____

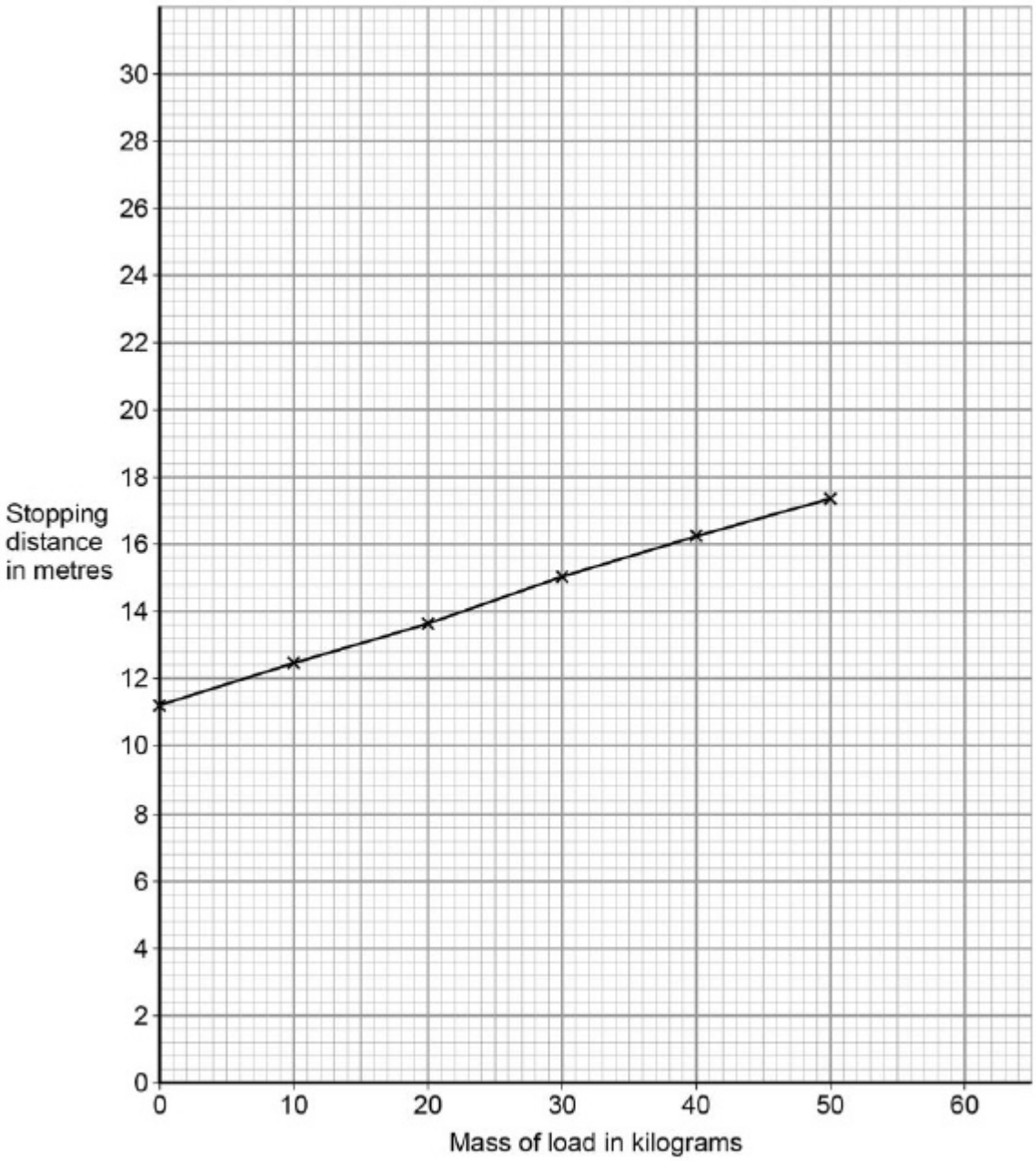
_____

(2)

(c) **Figure 2** shows the results of the investigation.

Figure 2

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Draw a line on **Figure 2** to show how the stopping distance would be different if a heavier cyclist rode the bike.

(1)

(d) At one time in the investigation the cyclist was distracted.

The distraction increased the stopping distance of the bike but did **not** affect the braking distance.

Explain why the stopping distance increased.

_____

_____

_____

_____

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_____

_____

(3)

(Total 8 marks)

Q3.

The figure below shows an ice skater standing on the ice.



Mass
70 kg

(a) Write down the equation that links acceleration, change in velocity and time.

_____

(1)

(b) As the skater pushes away across the ice there is a small frictional force.

After pushing, the skater starts to move with a velocity of 5 m / s.

He slows to 3 m / s in 6 seconds.

Calculate the acceleration of the skater.

_____

_____

_____

Acceleration = _____ m / s^2

(2)

(c) Write down the equation that links acceleration, force and mass.

_____

(1)

(d) Friction reduces the speed of the skater.

Calculate the frictional force acting on the skater to slow him down.

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Frictional force = _____ N

(2)

(e) The skater stands still on the ice.

He throws his bag to a friend.

As he throws his bag forwards, the skater moves backwards across the ice.

Use the idea of conservation of momentum to explain why he moves backwards.

(4)

(Total 10 marks)

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