AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



EXAM QUESTION PACK

4.5.2 WORK DONE AND ENERGY TRANSFER (PACK 3)

SCORE	PERCENTAGE
/33	%

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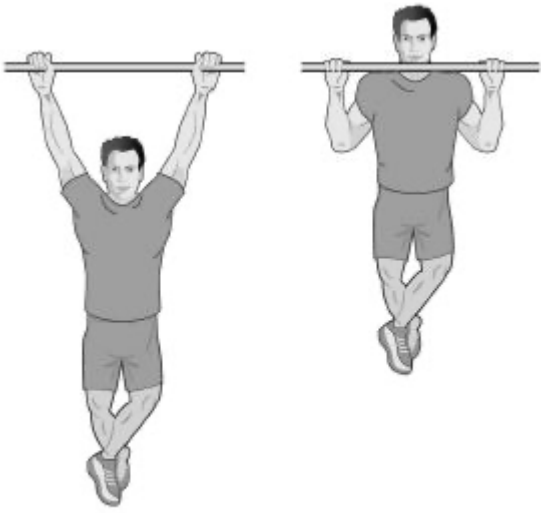
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Q1.

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 an electric wheelchair.

Figure 1



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(a) The wheelchair moves at a constant speed of 2.4 m/s for 4.5 seconds.

Calculate the distance moved by the wheelchair.

Use the equation:

distance = speed × time

_____

_____

_____

_____

Distance = _____ m

(2)

(b) What could be a reason for the speed of the wheelchair decreasing?

Tick **one** box.

It started going downhill.	☐
It started going uphill.	☐
Its store of kinetic energy increased.	☐
It used more power from its battery.	☐

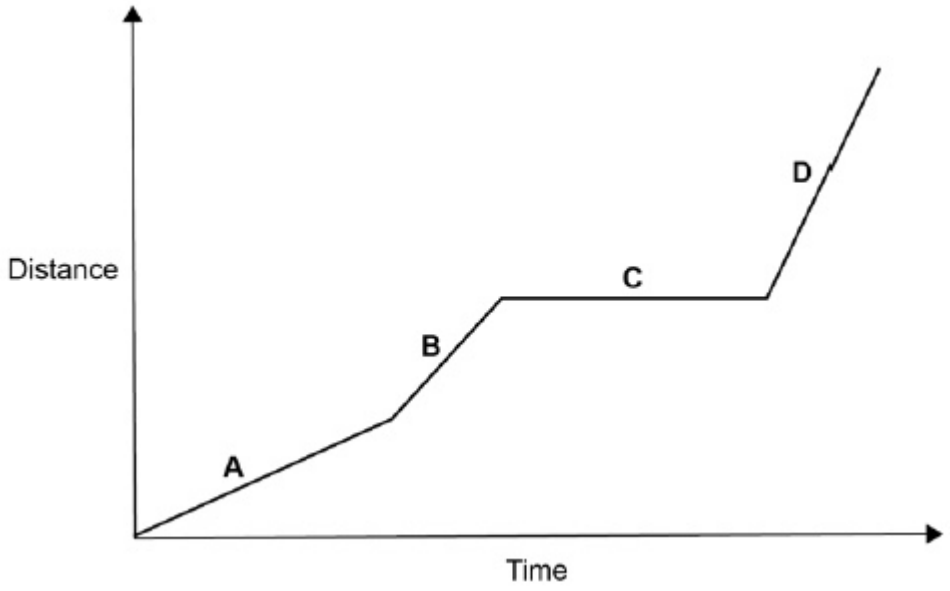
(1)

A student measured how the distance travelled by the wheelchair changed over time.

Figure 2 shows a sketch-graph of the results.

Figure 2

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(c) In which section of the graph, **A**, **B**, **C**, or **D**, did the wheelchair travel fastest?

Give the reason for your answer.

Section _____

Reason _____

_____

(2)

(d) The student used a data logger with a distance sensor to record the data.

Give **two** advantages of using a data logger rather than using a stopclock and tape measure.

1. _____

_____

2. _____

_____

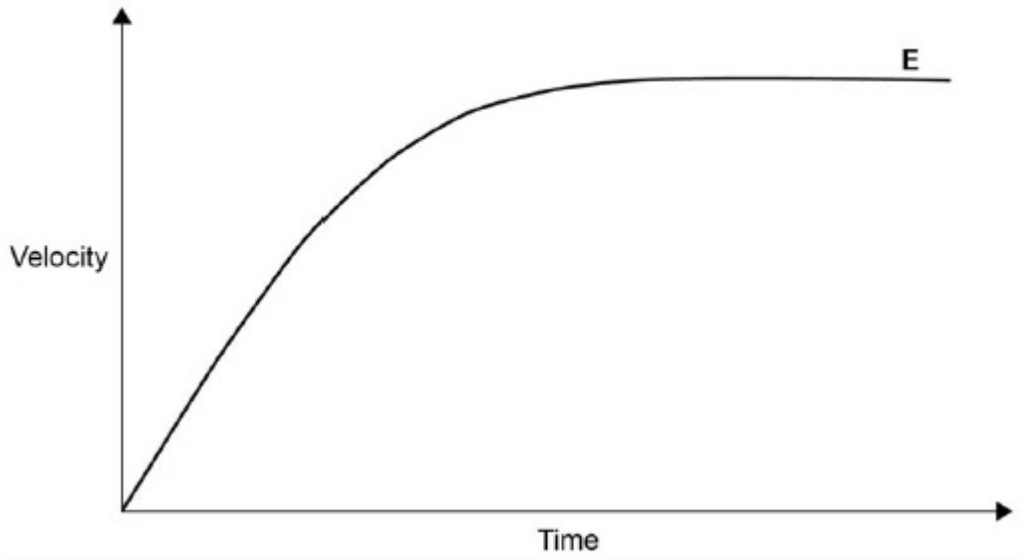
(2)

The velocity of the wheelchair changes as it accelerates to its top speed.

Figure 3 shows a sketch-graph of the changes.

Figure 3

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(e) The forward force on the wheelchair is constant as it accelerates on flat ground.

Which force reduces the acceleration?

Tick **one** box.

Air resistance	☐
Magnetism	☐
Tension	☐
Weight	☐

(1)

(f) Explain the acceleration of the wheelchair at point **E** on **Figure 3**.

_____

_____

_____

_____

(2)

(g) The wheelchair starts from rest.

It accelerates at a constant rate until it has a speed of 1.5 m/s

The wheelchair travels a distance of 2.0 m while it is accelerating.

Calculate the acceleration of the wheelchair.

Using the Physics Equations Sheet.

_____

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Acceleration = _____ m/s^2

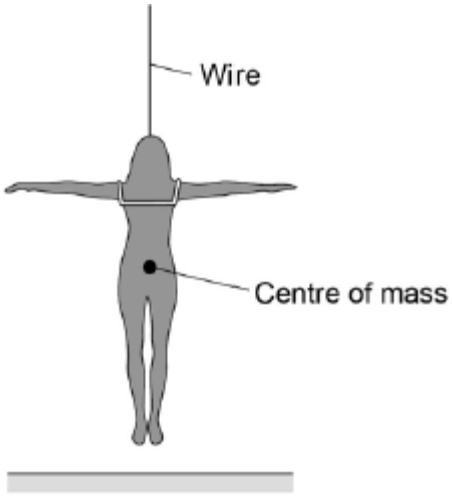
(3)

(Total 13 marks)

Q3.

An actor is attached to a wire so that she can hang above the stage.

Look at the figure below.



(a) On The figure above draw two arrows to show the forces acting on the actor.

(2)

(b) Which **two** forces are acting on the actor?

Tick **two** boxes.

Air resistance force ☐

Electrostatic force ☐

Gravitational force ☐

Magnetic force ☐

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Tension force 

(2)

(c) The actor hangs above the stage in a stationary position.

What is the resultant force on the actor?

Resultant force = _____ N

(1)

(d) The actor has a mass of 70 kg.

Gravitational field strength = 9.8 N / kg

Use the following equation to calculate the weight of the actor.

Weight = mass × gravitational field strength

Give your answer to 2 significant figures.

_____

_____

_____

Weight of actor = _____ N

(2)

(e) A motor pulls vertically upwards on the wire with a force of 720 N.

Calculate the resultant force on the actor.

_____

Resultant force = _____ N

(1)

(f) Another actor has a mass of 65 kg.

This actor is attached to the wire and the motor pulls her vertically upwards.

The resultant force on the actor is 25 N.

Write down the equation that links acceleration, mass and resultant force.

Equation _____

(1)

(g) Calculate the acceleration of the actor.

_____

_____

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Acceleration of actor = _____ m / s^2

(3)

(Total 12 marks)

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