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Exam Preparation and Free Resources

Name of the Student:_____

Max. **Marks : 21 Marks**

Time : 21 Minutes

Q1.

The Shanghai Maglev Train is the first commercially operated high-speed magnetic levitation train in the world, connecting the airport and central Shanghai.

The total distance travelled is 29.9 km and the total journey time is 440 s. The train starts from rest and reaches a speed of 97 m s^{-1} in 120 s.

(i) Calculate the average acceleration of the train during the first 120 s.

(2)

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Average acceleration of train = ...

(ii) Calculate the average speed of the train for the period following the 120 s acceleration.

(3)

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Average speed of train = ...

(Total for question = 5 marks)

Q2.

In the sport of curling, two teams of 'curlers' take turns sliding polished granite stones across an ice surface towards a circular target marked on the ice.

commons.wikimedia.org

A stone of mass 19.6 kg is accelerated uniformly for 1.25 s before being released by a curler. The stone then decelerates uniformly to rest, travelling 32.5 m in a time of 17.5 s.

Calculate the average useful power developed by the curler in accelerating the stone.

(4)

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Average power = ...

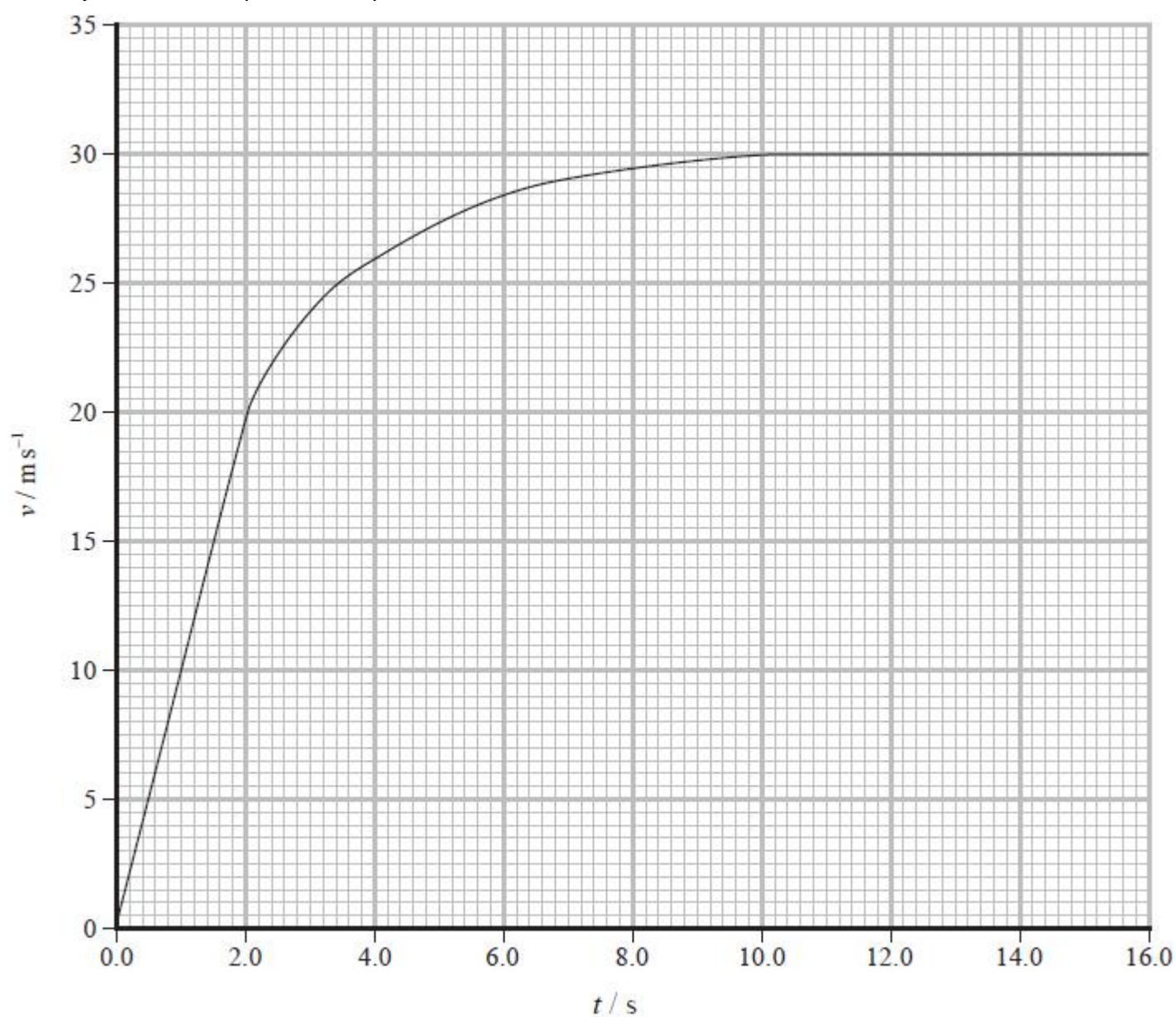**(Total for question = 4 marks)**

Q3.

A skydiver made a skydive from a plane.

(Source: © Sky Antonio/Shutterstock)

The graph shows how the velocity v of the skydiver varied with time t, from the instant she left the plane to the instant just before the parachute opened.

Determine the acceleration of the skydiver when t = 4.0 s.

(3)

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Acceleration of skydiver = ...

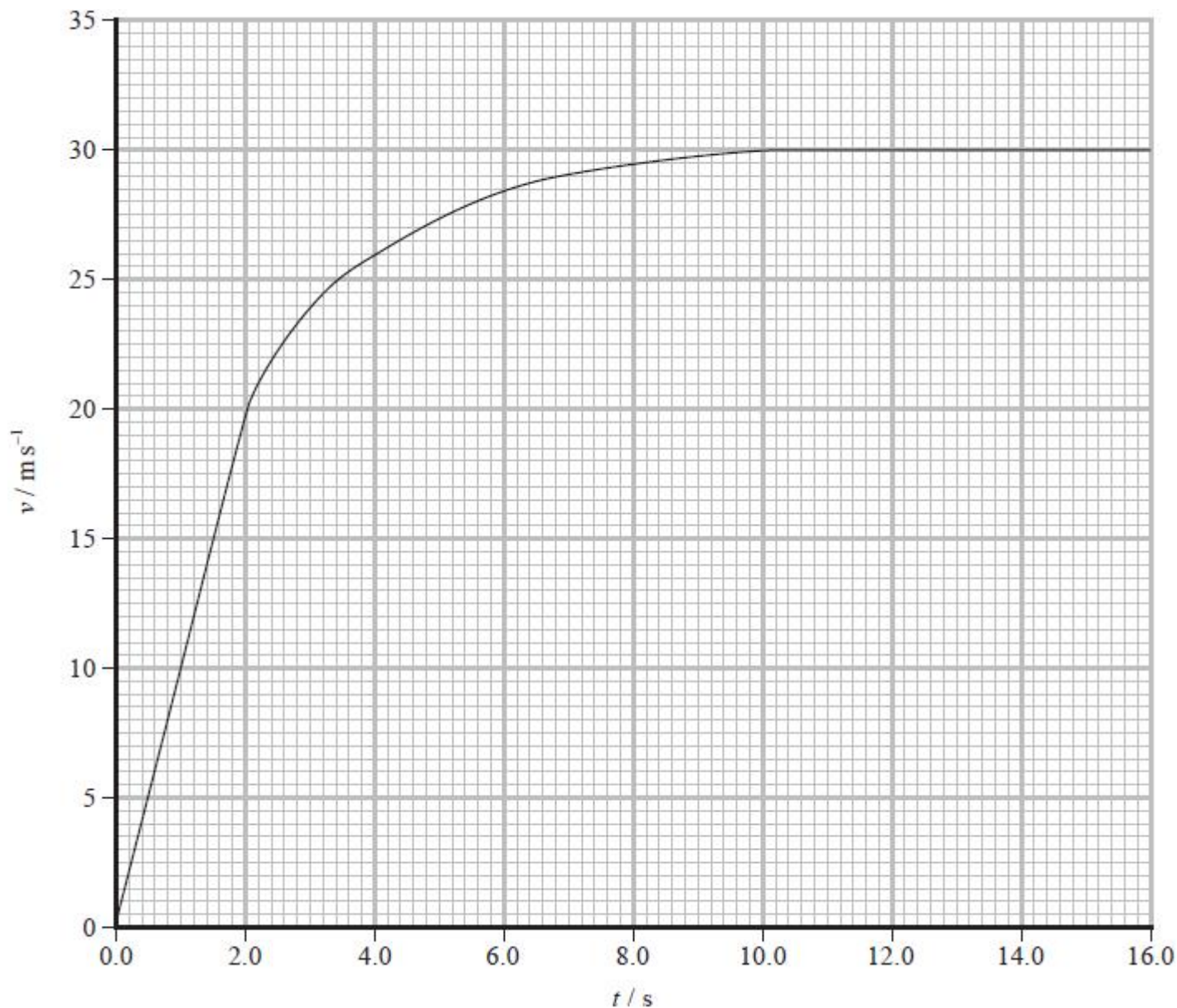**(Total for question = 3 marks)**

Q4.

A skydiver made a skydive from a plane.

(Source: © Sky Antonio/Shutterstock)

The graph shows how the velocity v of the skydiver varied with time t, from the instant she left the plane to the instant just before the parachute opened.

Determine an approximate value for the displacement of the skydiver over the first 16.0 s of the skydive.
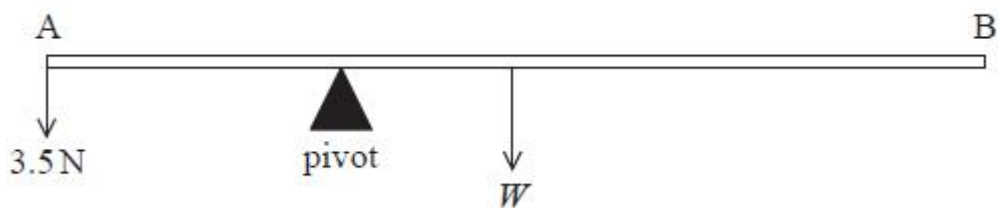
(3)

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Displacement of skydiver = ...

(Total for question = 3 marks)

Q5.

A uniform rigid rod AB of length 1.50 m has a weight W of 6.5 N. A force of 3.5 N applied at A balances the rod on a pivot as shown.

Diagram not to scale

A

B

3.5 N   pivot   W

Calculate the distance of the pivot from A when the rod is in equilibrium.

(2)

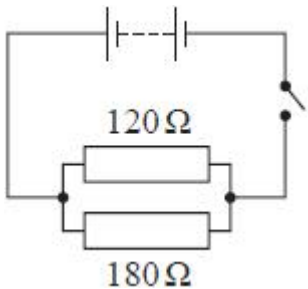...

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Distance of pivot from A = ...

(Total for question = 2 marks)

Q6.

This resistor combination is connected to a battery of e.m.f. ε and internal resistance r.

120 Ω

180 Ω

The switch is closed for 5 minutes.

Calculate the energy dissipated in the resistor combination.

$\varepsilon = 9.0$ V
$r = 2.5$ Ω

(4)

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Energy dissipated in resistor combination = ...

(Total for question = 4 marks)