

Changes in Energy

AQA GCSE Physics · Energy

Gravitational Potential Energy

How do we calculate how much an object's energy is increased when it is raised above the ground?

Formula in words

Formula in algebra

Example



Question

The decrease in gravitational potential energy of a person on the slide was 5.67 kJ. The person moved through a vertical distance of 15 m, and the gravitational field strength = 9.8 N/kg. Calculate the mass of the person.

Prose question

Describe the energy transfers in this system. (Use the format from the previous page.)

[2 marks]

Calculation question

Calculate the mass of the person.

[4 marks]

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Kinetic Energy

How do we calculate how much energy an object has when it is moving — i.e. when it has speed?

Formula in words

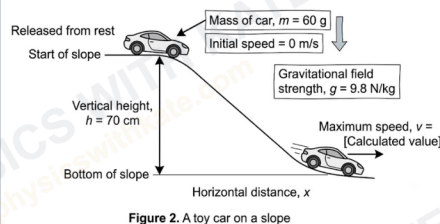
Formula in algebra

Example



Question

A toy car is released from rest at the top of a slope and accelerates due to gravity down the ramp to the bottom. Mass of the toy car = 60 g, the vertical height between the top and bottom of the ramp is 70 cm, and the gravitational field strength is 9.8 N/kg. Calculate the maximum speed of the toy car at the bottom of the ramp.



Prose question

Describe the energy transfers in this system.

Calculation question

Calculate the maximum speed of the toy car.

[5 marks]

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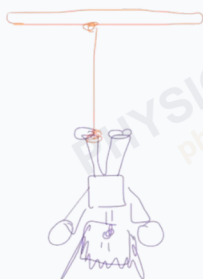
Elastic Potential Energy

How do we calculate how much an object's energy increases when it is stretched or squashed?

Formula in words

Formula in algebra

Example



Question

A student does a bungee jump. At the lowest point of the jump the energy stored by the stretched bungee cord is 35.5 kJ. The bungee cord behaves like a spring. It was originally 20 m long, but stretched to a total length of 50 m. Calculate the spring constant of the bungee cord.

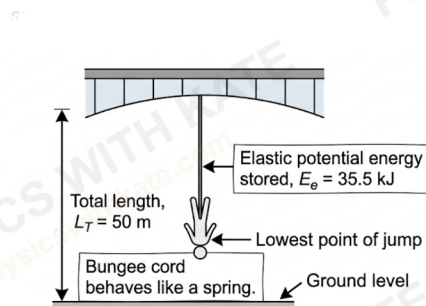


Figure 3: Bungee jump scenario

Prose question

Describe the energy transfers in this system. (Use the format from the previous page.)

[2 marks]

Calculation question

Calculate the spring constant of the bungee cord.

[3 marks]

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Work Done

See also the Forces topic (Paper 2).

The energy transferred when a force pushes (or pulls) an object a distance.

Formula in words

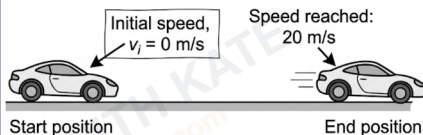
Formula in algebra

Example



Question

A 2500 kg car accelerates to a speed of 20 m/s. This takes a distance of 40 m. Calculate the force of the engine doing work on the car to reach this speed.



Prose question

Describe the energy transfer in the petrol car as it accelerates.

[2 marks]

Calculation question

What is the average force on the car to accelerate it to 20 m/s?

[5 marks]