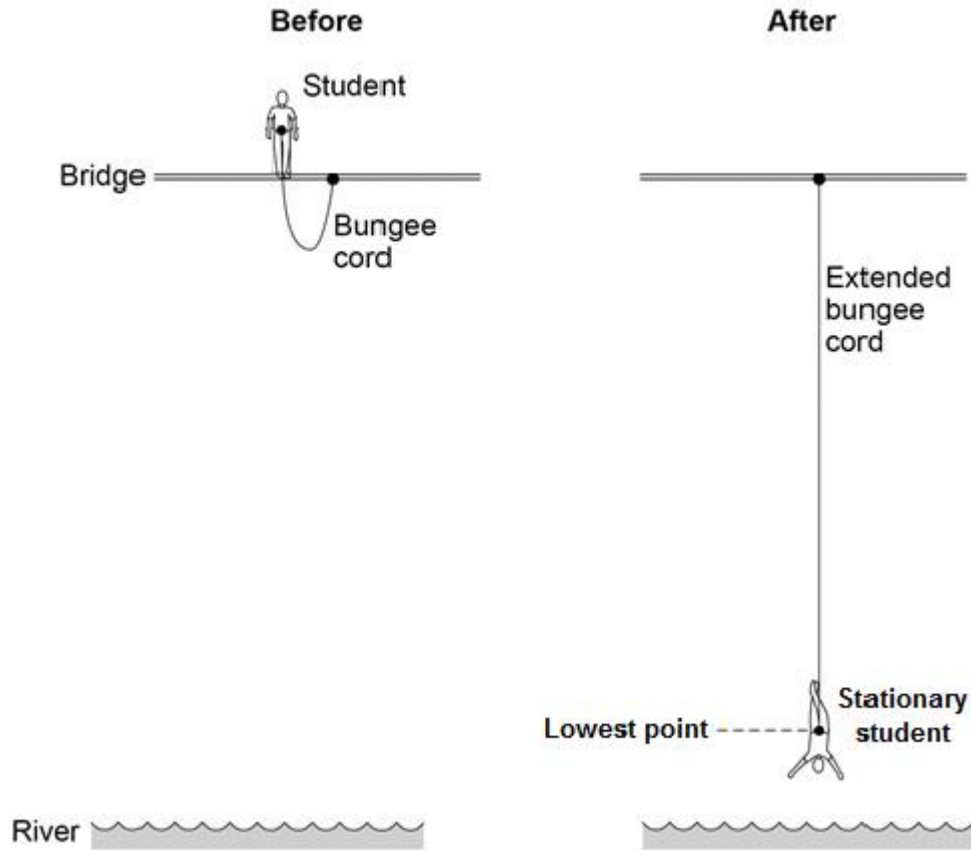


ENERGY STORES AND SYSTEMS

Q1.

The image below shows a student before and after a bungee jump.

The bungee cord has an unstretched length of 20 m.



- (a) For safety reasons, it is important that the bungee cord used is appropriate for the student's weight.

Give **two** reasons why.

1. _____

2. _____

(2)

- (b) The student jumps off the bridge.

Complete the sentences to describe the energy transfers.

Use answers from the box.

elastic potential gravitational

potential kinetic sound thermal

Before the student jumps from the bridge he has a store of _____ energy.

When he is falling, the student's store of _____ energy increases.

When the bungee cord is stretched, the cord stores energy as _____ energy.

(3)

- (c) At the lowest point in the jump when the student is stationary, the extension of the bungee cord is 35 metres.

The bungee cord behaves like a spring with a spring constant of 40 N / m.

Calculate the energy stored in the stretched bungee cord.

Use the correct equation from the Physics Equations Sheet.

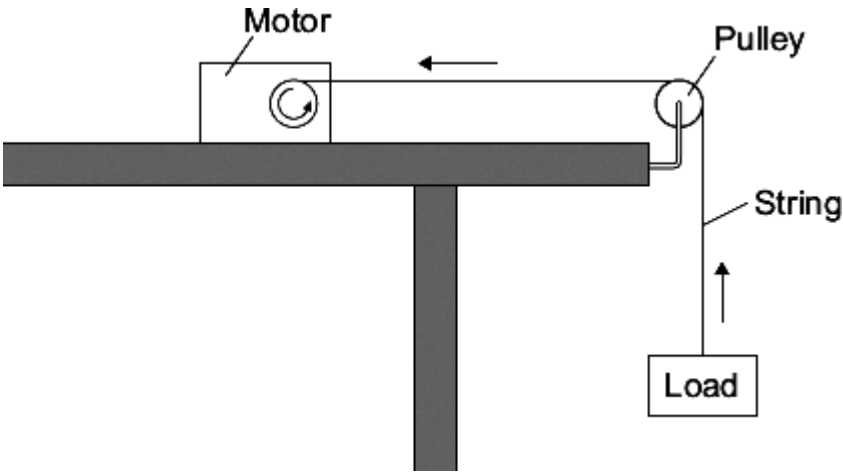
Energy = _____ J

(2)

(Total 7 marks)

Q2.

A student uses an electric motor to lift a load.



In the motor, the electrical energy is transferred into other types of energy. Some of this energy is useful and the rest of the energy is wasted.

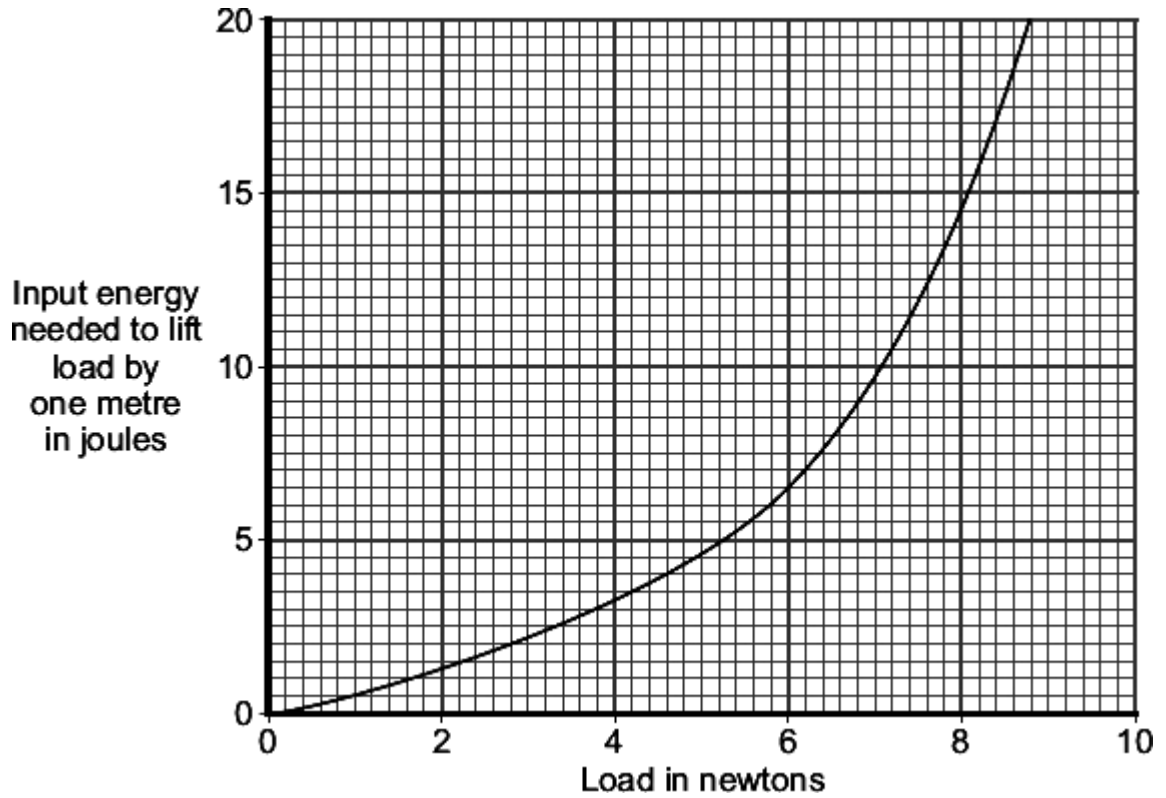
- (a) (i) Name the useful energy output from the electric motor.

(1)

(ii) What eventually happens to the wasted energy?

(1)

(b) The graph shows the input energy the motor needs to lift different loads by one metre.



What can you conclude from the graph about the relationship between the load lifted and the input energy needed?

(2)

- (c) A shop uses escalators to lift customers to different floor levels. The escalators use electric motors. When the shop is not busy some escalators are turned off. A sign tells the customers that the escalators are turned off to save energy.



- (i) Each escalator has one motor with an average power of 4000 W. The motor is turned on for an average of 8 hours each day, 6 days each week. Electricity costs 15 pence per kilowatt-hour.

Calculate the cost of the electricity used in an average week to run **one** escalator.

Show clearly how you work out your answer.

Cost = _____ pence

(3)

- (ii) Give **one** environmental advantage to turning off electrical appliances when they are not being used.

(1)

(Total 8 marks)

