Energy Exam Questions
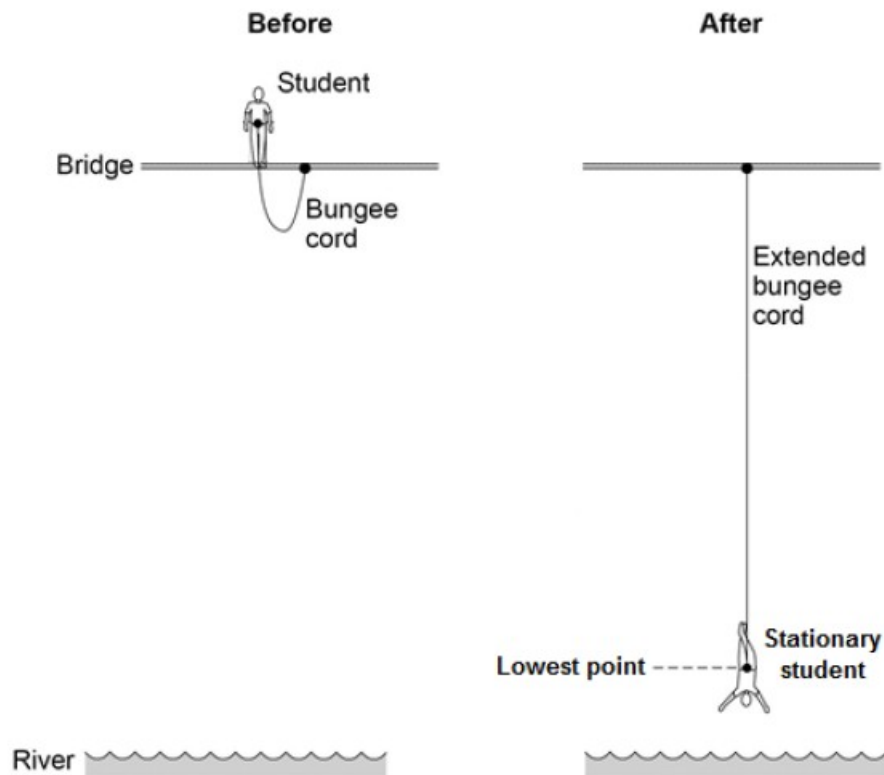
1.   **Figure 2** shows a student before and after a bungee jump.

   The bungee cord has an unstretched length of 20 m.

Figure 2

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

Give **two** reasons why.

[2 marks]

1 _____

_____

2 _____

_____

2.
The student jumps off the bridge.

Complete the sentences to describe the energy transfers.

Use answers from the box.

[3 marks]

| 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.

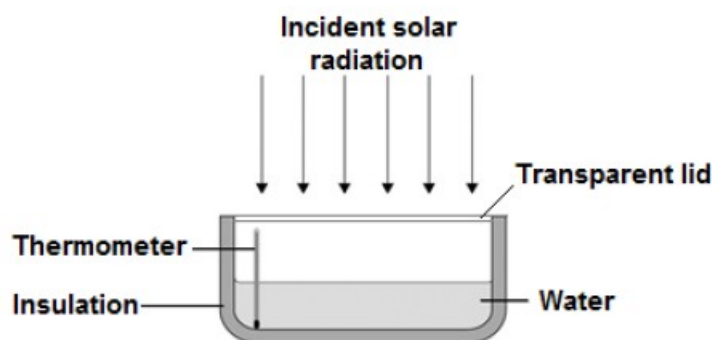When the bungee cord is stretched, the cord stores energy as

_____ energy.

3.
A student investigated how much energy from the Sun was incident on the Earth's surface at her location.

She put an insulated pan of water in direct sunlight and measured the time it took for the temperature of the water to increase by 0.6 °C.

The apparatus she used is shown in **Figure 14**.

Figure 14

Choose the most appropriate resolution for the thermometer used by the student.

[1 mark]

Tick **one** box.

0.1 °C	☐
0.5 °C	☐
1.0 °C	☐

4. The energy transferred to the water was 1050 J.

The time taken for the water temperature to increase by 0.6 °C was 5 minutes.

The specific heat capacity of water is 4200 J/kg °C.

Write down the equation which links energy transferred, power and time.

[1 mark]

_____

5. Calculate the mean power supplied by the Sun to the water in the pan.

[2 marks]

_____

_____

_____

Average power = _____ W

6. **Figure 1** shows a cyclist riding along a flat road.

Figure 1

Complete the sentence.

Choose answers from the box.

[2 marks]

chemical	elastic potential	gravitational potential	kinetic

As the cyclist accelerates, the _____ energy store in

the cyclist's body decreases and the _____ energy of

the cyclist increases.

7. The mass of the cyclist is 80 kg. The speed of the cyclist is 12 m/s.

Calculate the kinetic energy of the cyclist.

Use the equation:

$$\text{kinetic energy} = 0.5 \times \text{mass} \times (\text{speed})^2$$

[2 marks]

_____

_____

_____

_____

Kinetic energy = _____ J

8. **Figure 13** shows a lift inside a building.

Figure 13

The motor in the lift does 120 000 J of work in 8.0 seconds.

Calculate the power output of the motor in the lift.

Use the equation:

$$\text{Power output} = \frac{\text{work done}}{\text{time}}$$

[2 marks]

_____

_____

_____

_____

Power output = _____ W

9.   The power input to the motor is greater than the power output.

Tick **two** reasons why.

[2 marks]

Energy is transferred in heating the surroundings. ☐

Friction causes energy to be transferred in non-useful ways. ☐

The motor is connected to the mains electricity supply. ☐

The motor is more than 100% efficient. ☐

There are only four people in the lift. ☐

10.   Write down the equation that links gravitational field strength, gravitational potential energy, height and mass.

[1 mark]

_____

_____

11.   The lift goes up 14 m. The total mass of the people in the lift is 280 kg.

gravitational field strength = 9.8 N/kg

Calculate the increase in gravitational potential energy of the people in the lift.

Give your answer to 2 significant figures.

[3 marks]

_____

_____

_____

_____

Increase in gravitational potential energy = _____ J