AQA - Work done and energy transfer – GCSE Combined Science Physics

1. June/2020/Paper_2F/No.4(4.3_4.4)

0 4 . 3 The bicycle travels a distance of 250 m

The bicycle exerts a constant horizontal force of 30 N on the ground.

Calculate the work done.

Use the equation:

work done = force × distance

Choose the unit from the box.

[3 marks]

J	**kg**	**m**

Work done = _____ Unit _____

0 4 . 4 The bicycle travels at a constant speed.

Complete the sentences.

Choose answers from the box.

[3 marl

chemical	**frictional**	**kinetic**
magnetic		**tension**

As the bicycle moves, work is done against _____ forces.

There is no change in the cyclist's _____ store of energy.

There is a decrease in the cyclist's _____ store of energy.

2. June/2020/Paper_2F/No.1(1.6)

0 1 . 6 When the pin is struck it accelerates.

Complete the sentences.

Choose answers from the box.

Each answer can be used once, more than once, or not at all.

[3 marks]

decreases	**increases**	**stays the same**

The displacement of the pin from the girl _____ .

The mass of the pin _____ .

The kinetic energy of the pin _____ .

3. June/2020/Paper_2H/No.3

0 3 **Figure 5** shows a computer keyboard.

There is a spring under each key.

Figure 5

0 3 . 1 The springs behave elastically when a force is applied.

What is meant by elastic behaviour?

[1 mark]

Tick (✓) **one** box.

The spring will be compressed when the force is applied to it. ☐

The spring will become deformed when the force is applied to it. ☐

The spring will become longer when the force is removed. ☐

The spring will return to its original length when the force is removed. ☐

0 3 . 2 Suggest **two** properties that should be the same for each spring.

[2 marks]

1 _____

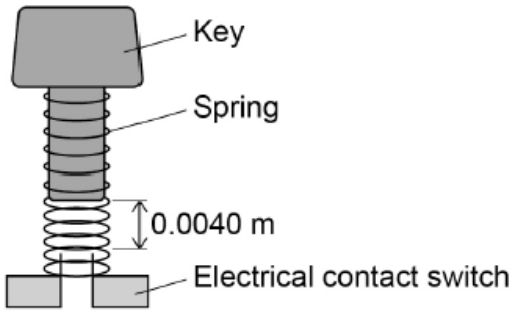
_____

2 _____

_____

0 3 . 3 **Figure 6** shows one of the keys and its spring.

Figure 6



The key must be pressed with a minimum force of 0.80 N before the key touches the switch.

Calculate the spring constant of the spring in **Figure 6**.

[3 marks]

_____

_____

_____

_____

_____

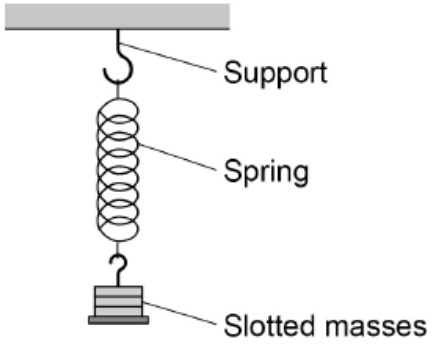
_____

Spring constant = _____ N/m

0 3 . 4 **Figure 7** shows a spring that has been hung from a support.

The spring is stationary and has been stretched beyond its limit of proportionality.

Figure 7



Which **two** statements are true for the spring in **Figure 7**?

[2 marks]

Tick (✓) **two** boxes.

- The elastic potential energy of the spring is zero. ☐
- The extension of the spring is directly proportional to the force applied. ☐
- The upward force on the spring is equal to the downward force. ☐
- The spring cannot be stretched any further. ☐
- The spring is inelastically deformed. ☐

4. June/2019/Paper_2F/No.4(4.7_4.8)

0 4 . 7 Write down the equation that links distance, force and work done.

[1 mark]

0 4 . 8 When the driver applies the brakes, there is a constant resultant force of 6.0 kN on the car.

The car travels a distance of 75 m before stopping.

Calculate the work done in stopping the car.

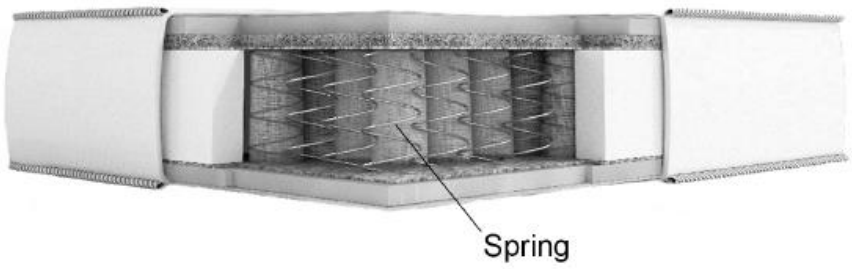
[3 marks]

Work done = _____ J

5. June/2019/Paper_2H/No.5

0 5 **Figure 8** shows some springs inside a mattress.

Figure 8



0 5 . 1 Which proportionality is true when a force is applied to a spring?

[1 mark]

Tick (✓) **one** box.

Force ∝ energy stored ☐

Force ∝ extension ☐

Force ∝ length ☐

Force ∝ spring constant ☐

A mattress contains 1200 identical springs.

A person lies on the mattress and the springs compress.

The mean force on each spring in the mattress is 0.49 N

0 5 . 2 Calculate the mass of the person.

gravitational field strength = 9.8 N/kg

[4 marks]

Mass = _____ kg

0 5 . 3 The mean compression of each spring is 3.5×10^{-3} m

Calculate the spring constant of each spring in the mattress.

Give the unit.

[4 marks]

Spring constant = _____

Unit = _____

0 5 . 4 For a given force, different springs compress by different amounts.

Explain what property of the springs would make the mattress soft.

[2 marks]