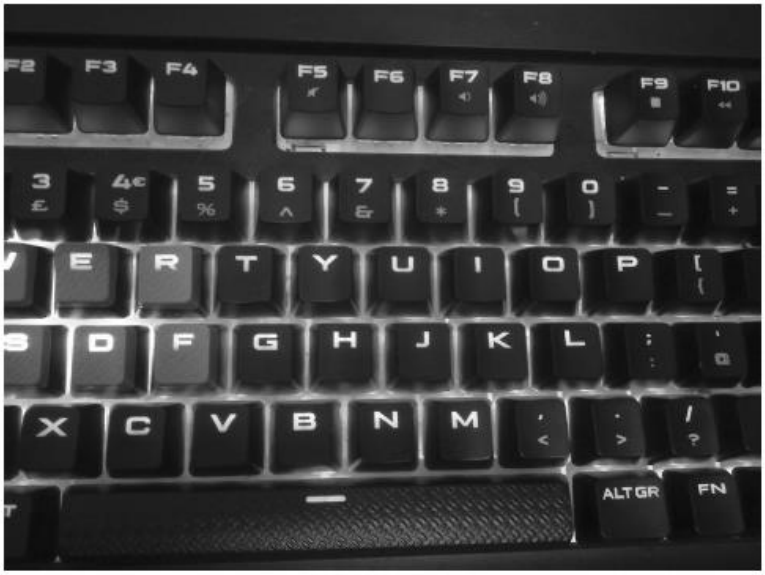
AQA - Force and elasticity – GCSE Combined Science Physics

1. June/2020/Paper_2F/No.2

0 2 **Figure 3** shows a computer keyboard.

There is a spring under each key.

Figure 3



0 2 . 1 Why do the keys have springs under them?

[1 mark]

Tick (✓) **one** box.

Springs make the keys easier to press. ☐

Springs make the keys lighter. ☐

Springs push the keys back to their original position. ☐

0 2 . 2 Why does every spring used in the keyboard have the same spring constant?

[1 mark]

Tick (✓) **one** box.

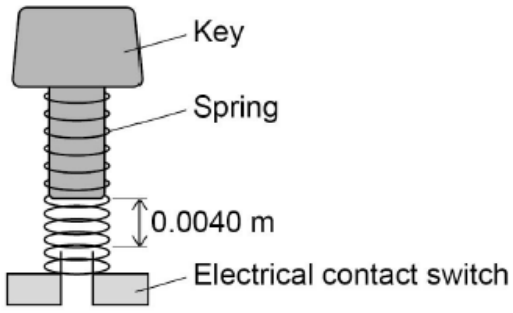
So that more than one key can be pressed at the same time. ☐

So that the same force is needed to press each key. ☐

So that the springs are all the same length. ☐

Figure 4 shows one of the keys and its spring.

Figure 4



0 2 . 3 What happens to the length of the spring when the key is pressed?

[1 mark]

0 2 . 4 How far must the key move before it touches the switch?

[1 mark]

Tick (✓) **one** box.

4.0 mm ☐ 4.0 cm ☐ 4.0 µm ☐

0 2 . 5 If a key is not pressed with enough force, no signal is sent to the computer.

Explain why.

[2 marks]

0 2 . 6 The spring in **Figure 4** has a spring constant of 200 N/m

Calculate the force on the spring when the key moves a distance of 0.0040 m

Use the equation:

force = spring constant × compression

[2 marks]

Force = _____ N

0 2 . 7 Suggest **two** ways the spring in the key in **Figure 4** could be changed so that the switch can be closed more quickly.

[2 marks]

1 _____

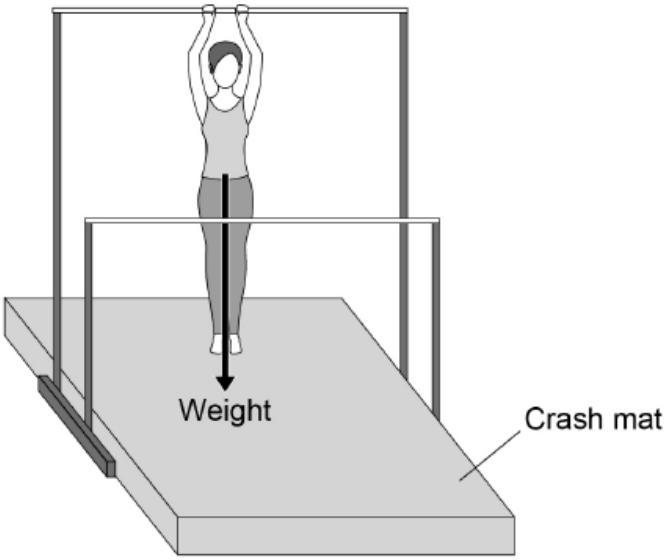
2 _____

2. June/2019/Paper_2F/No.2

0 2 **Figure 3** shows a gymnast on a piece of gymnastic equipment.

The equipment consists of two bars at different heights.

Figure 3



0 2 . 1 The gymnast exerts a downward force on the bar.

What is the size of the upward force acting on the gymnast from the bar?

[1 mark]

Tick (✓) **one** box.

It is greater than the downward force. ☐

It is less than the downward force. ☐

It is the same size as the downward force. ☐

0 2 . 2 Why is the weight of the gymnast represented by an arrow?

[1 mark]

Tick (✓) **one** box.

Weight is a constant. ☐

Weight is a scalar. ☐

Weight is a unit. ☐

Weight is a vector. ☐

0 2 . 3 **Figure 3** shows the weight of the gymnast acting from a point.

What name is given to this point?

[1 mark]

Tick (✓) **one** box.

Centre of force ☐

Centre of mass ☐

Centre of tension ☐

Centre of weight ☐

0 2 . 4 The gymnast has a mass of 45 kg

gravitational field strength = 9.8 N/kg

Calculate the weight of the gymnast.

Use the equation:

weight = mass × gravitational field strength

[2 marks]

Weight = _____ N

0 2 . 5 The gymnast swings from one bar to the other bar several times.

Describe how the gravitational potential energy store and the kinetic energy store of the gymnast change as she moves between the bars.

[4 marks]

0 2 . 6 Falling on the crash mat reduces the average deceleration of the gymnast compared with falling on a hard surface.

Explain why reducing the deceleration is important to the gymnast.

[2 marks]