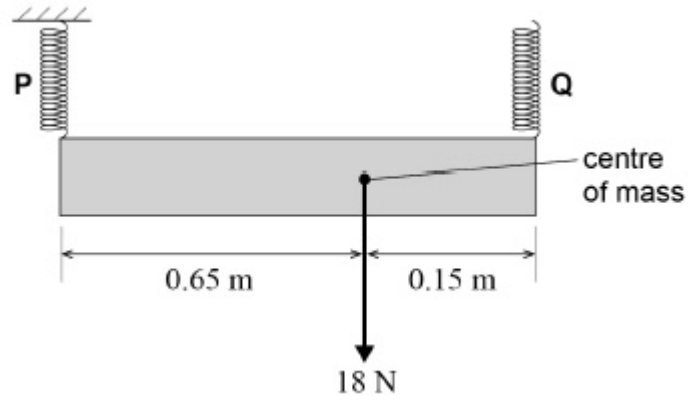


7

A non-uniform sign is 0.80 m long and has a weight of 18 N. It is suspended from two vertical springs **P** and **Q**. The springs obey Hooke's law and the spring constant of each spring is  $240 \text{ N m}^{-1}$ .



The top end of spring **P** is fixed and the top end of spring **Q** is adjusted until the sign is horizontal and in equilibrium.

What is the extension of spring **Q**?

- A 0.014 m
- B 0.038 m
- C 0.049 m
- D 0.061 m

(Total 1 mark)

**8**

A steel wire **W** has a length  $l$  and a circular cross-section of radius  $r$ . When **W** hangs vertically and a load is attached to the bottom end, it extends by  $e$ .

Another wire **X** made from the same material has the same load attached to it.

Which length and radius for **X** will produce an extension of  $\frac{e}{4}$  ?

	Length of X	Radius of X	
<b>A</b>	$0.5l$	$2r$	<input type="checkbox"/>
<b>B</b>	$l$	$4r$	<input type="checkbox"/>
<b>C</b>	$2l$	$2r$	<input type="checkbox"/>
<b>D</b>	$4l$	$4r$	<input type="checkbox"/>

(Total 1 mark)

**9**

What **cannot** be used as a unit for the Young modulus?

**A**  $\text{N m}^{-2}$

**B** Pa

**C**  $\text{kg m}^{-2} \text{s}^{-2}$

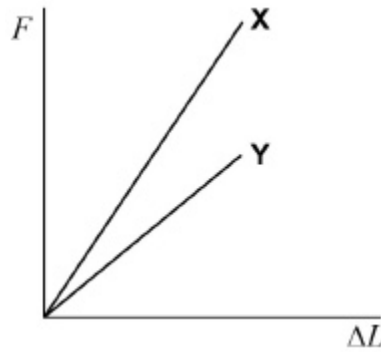
**D**  $\text{kg m}^{-1} \text{s}^{-2}$

(Total 1 mark)

10

Two separate wires **X** and **Y** have the same original length and cross-sectional area.

The graph shows the extension  $\Delta L$  produced in **X** and **Y** when the tensile force  $F$  applied to the wires is increased up to the point where they break.



Which statement is **incorrect**?

- A For a given extension more energy is stored in **X** than in **Y**.
- B The Young modulus of the material of wire **Y** is greater than that of wire **X**.
- C Both wire **X** and wire **Y** obey Hooke's law.
- D Wire **X** has a greater breaking stress than wire **Y**.