4 **(a)** State what is meant by *elastic potential energy*.

.....

.....[1]

(b) A spring is extended by applying a force. The variation with extension x of the force F is shown in Fig. 4.1 for the range of values of x from 20 cm to 40 cm.

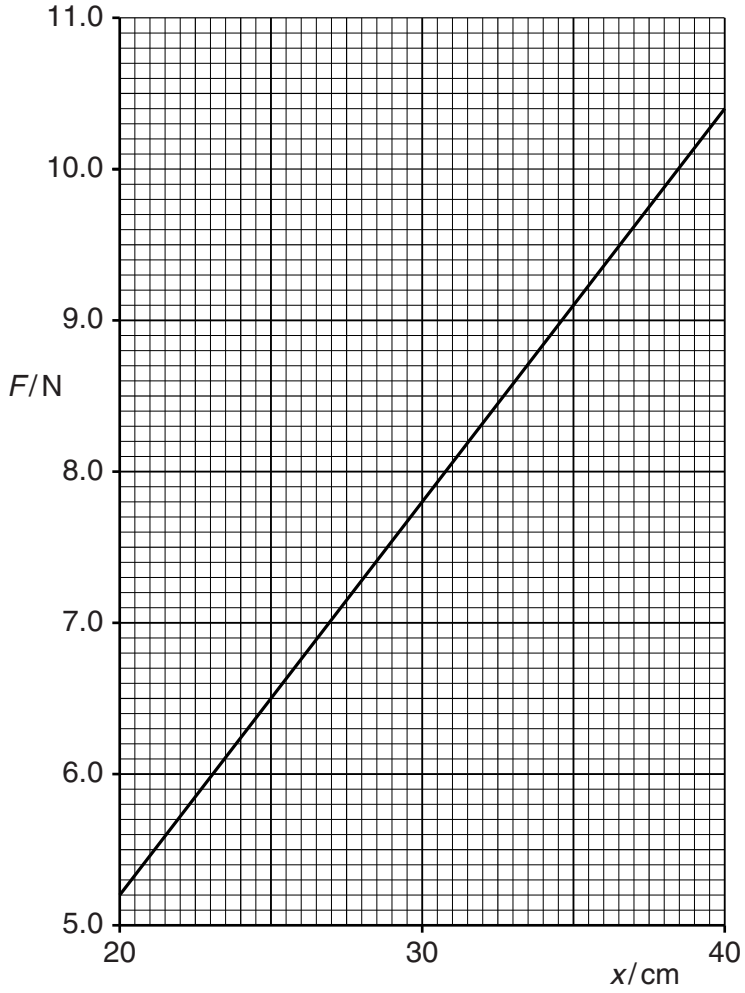

Fig. 4.1

(i) Use data from Fig. 4.1 to show that the spring obeys Hooke's law for this range of extensions.

.....

.....

.....[2]

(ii) Use Fig. 4.1 to calculate

1. the spring constant,

spring constant = ... $N\,m^{-1}$ [2]

2. the work done extending the spring from $x = 20\,cm$ to $x = 40\,cm$.

work done = ... J [3]

(c) A force is applied to the spring in **(b)** to give an extension of 50 cm.

State how you would check that the spring has not exceeded its elastic limit.

.....

.....[1]

[Total: 9]

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