**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.

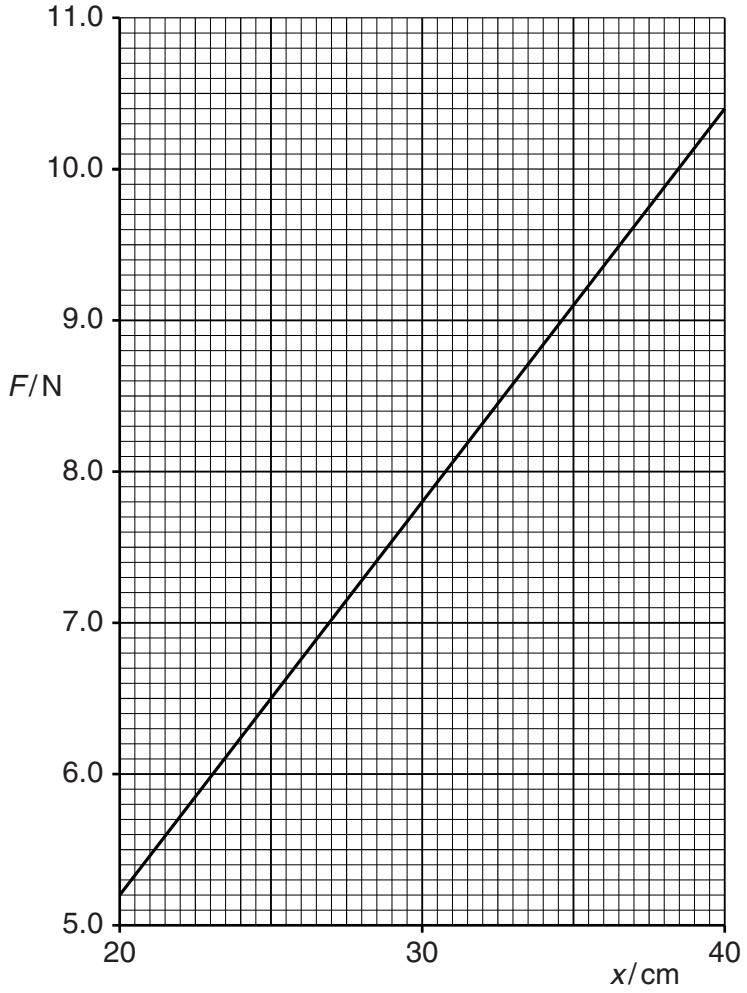


**Fig. 4.1**

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

.....

.....

.....[2]

**(ii)** 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]