2 In an experiment, forces are applied to a spring as shown in Fig. 2.1a. The results of this experiment are shown in Fig. 2.1b.

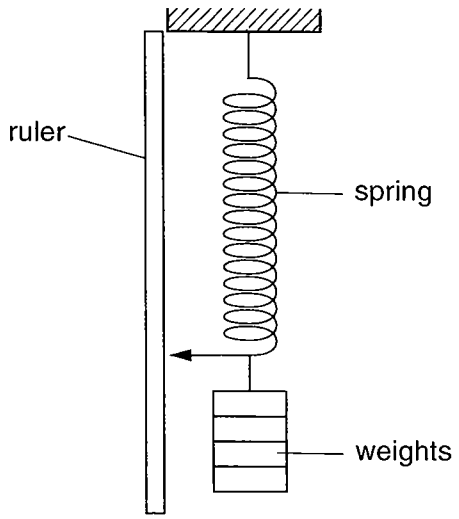

Fig. 2.1a

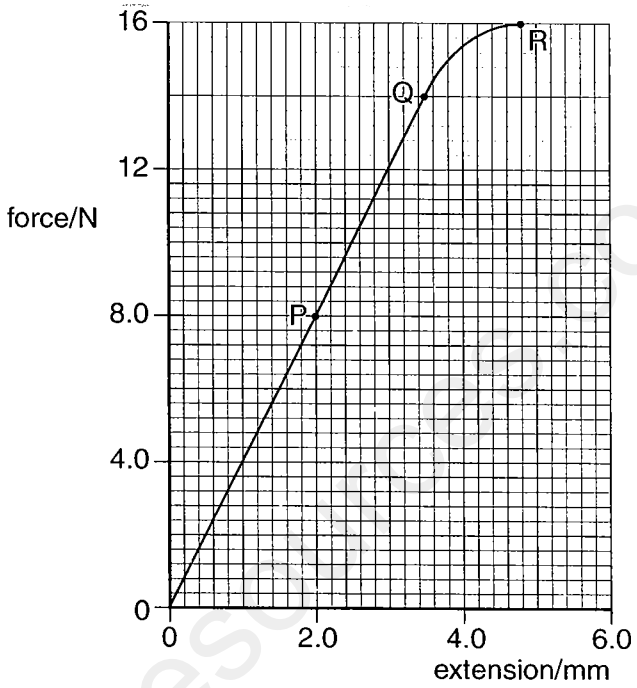

Fig. 2.1b

(a) What is the name given to the point marked Q on Fig. 2.1b?

limit of proportionality or elastic limit

(b) For the part OP of the graph, the spring obeys Hooke's Law.
State what this means.

force is proportional to extension

(c) The spring is stretched until the force and extension are shown by the point R on the graph. Compare how the spring stretches, as shown by the part of the graph OQ, with that shown by QR.

1. *Up to Q extension is proportional to the applied force*
2. *Q to R is the extension.*

(d) The part OP of the graph shows the spring stretching according to the expression

$$F = kx.$$

Use values from the graph to calculate the value of k.

$k = F/x$
$= 8/2 = 4N/m$