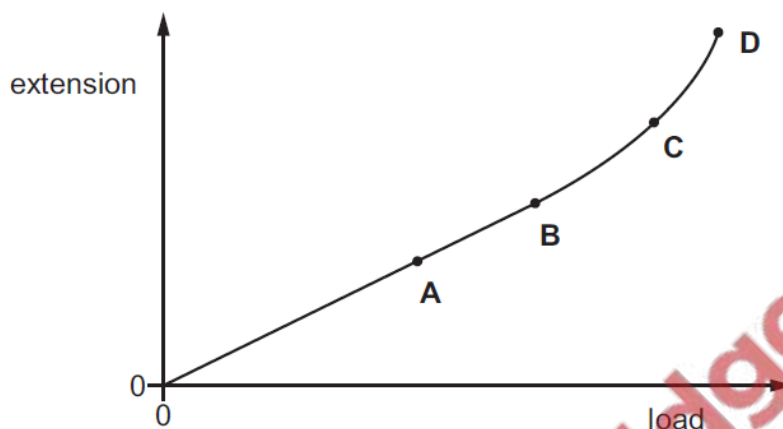1. Nov/2020/Paper_11/No.12
   An extension–load graph is plotted for a spring.

   Which point marks the limit of proportionality for this spring?
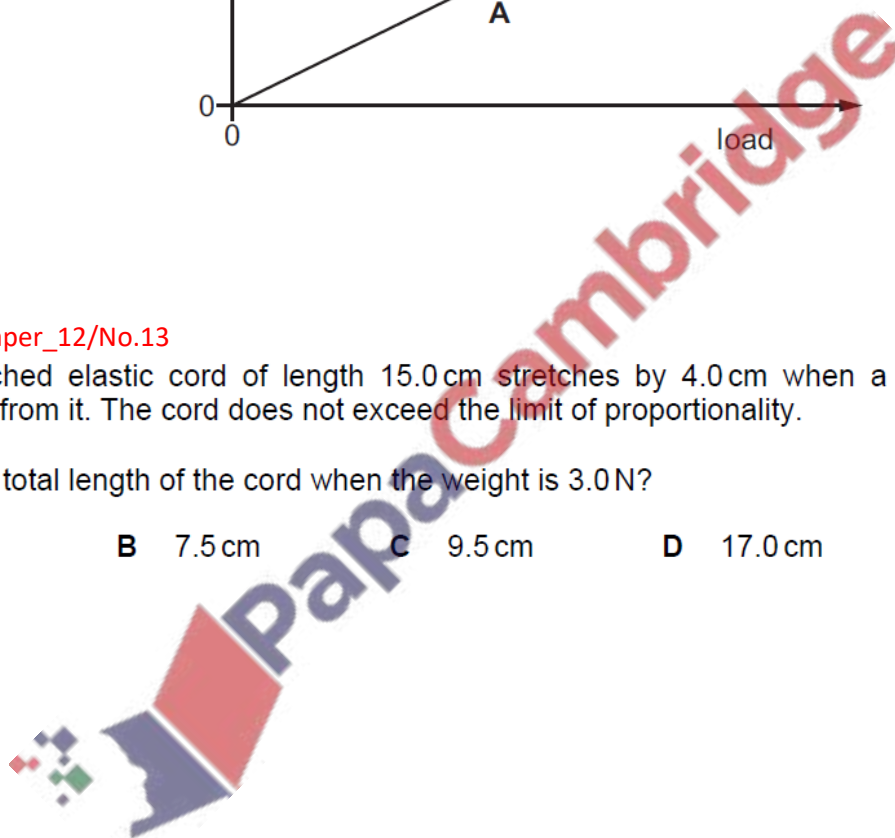


2. June/2020/Paper_12/No.13
   An unstretched elastic cord of length 15.0 cm stretches by 4.0 cm when a weight of 6.0 N is suspended from it. The cord does not exceed the limit of proportionality.

   What is the total length of the cord when the weight is 3.0 N?

   A   2.0 cm        B   7.5 cm        C   9.5 cm        D   17.0 cm

A student suspends a spring from a support. He attaches different loads to the lower end of the spring. For each load attached, he measures the extension of the spring.

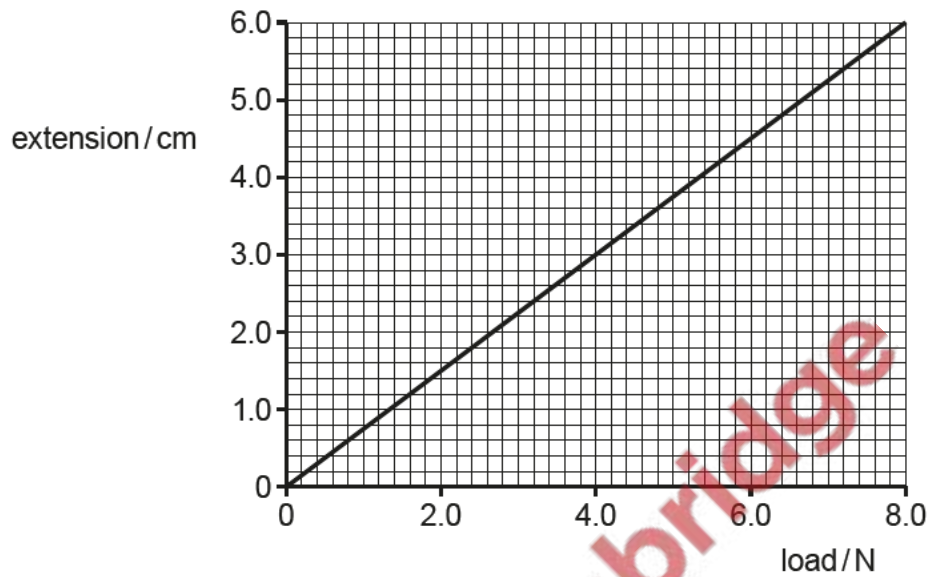Fig. 3.1 shows the extension–load graph obtained.



**Fig. 3.1**

**(a)** The extension of the spring is directly proportional to the load.

State the **two** features of the graph that show this.

1. ..............................................................................................................................................

2. ..............................................................................................................................................

[2]

**(b)** Describe how the student can show that the spring reaches its limit of proportionality at 8.0 N.

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................................................................................................................................... [2]

(c) The spring is used in a simple device known as an accelerometer, shown in Fig. 3.2.



5.0 kg mass

spring

smooth surface

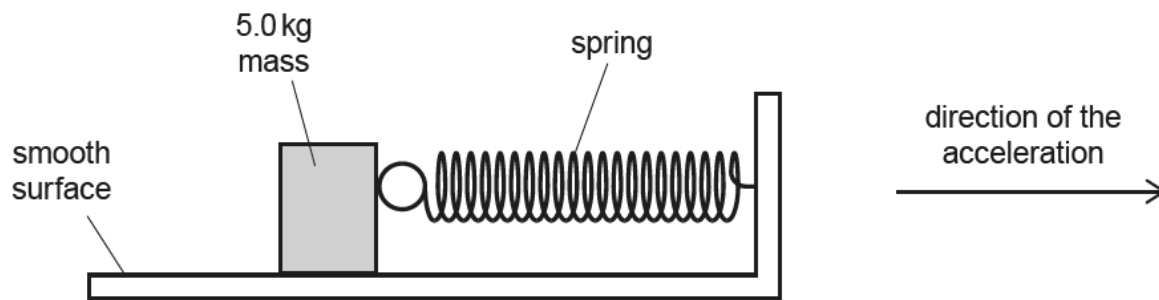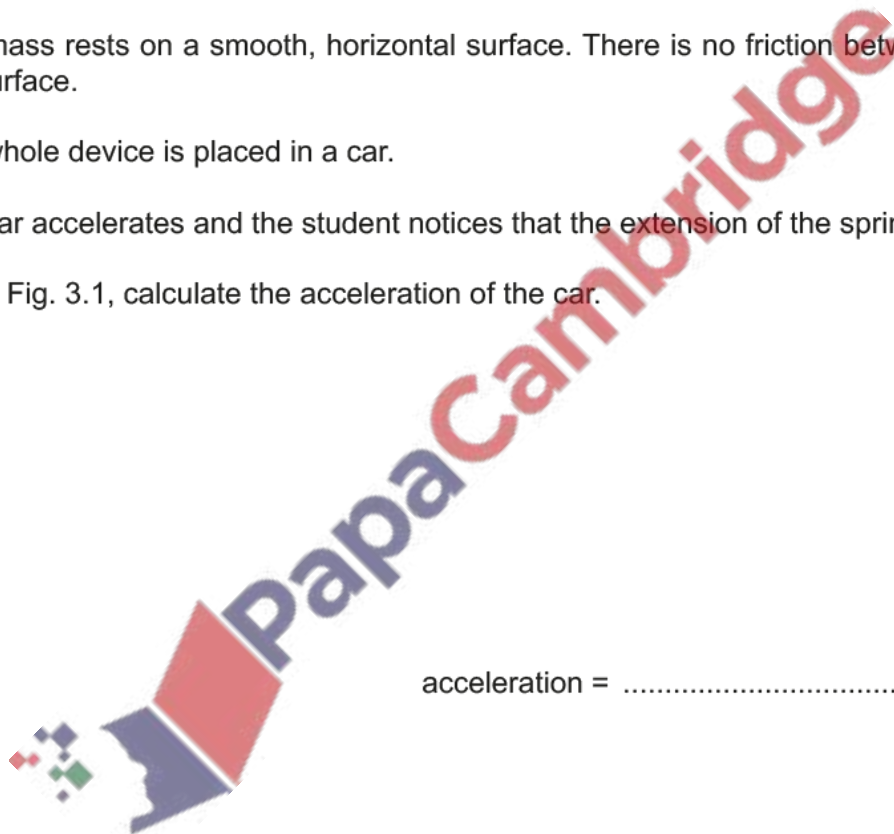direction of the acceleration

**Fig. 3.2**

The spring is fixed at one end and attached to a mass of 5.0 kg at the other end.

The mass rests on a smooth, horizontal surface. There is no friction between the mass and the surface.

The whole device is placed in a car.

The car accelerates and the student notices that the extension of the spring is 3.0 cm.

Using Fig. 3.1, calculate the acceleration of the car.

acceleration = ............................................................ [3]

[Total: 7]