7.2 Deformation: Elastic & Plastic Behaviour

Question Paper

Course	CIE A Level Physics (9702) 2019-2021
Section	7. Deformation of Solids
Topic	7.2 Deformation: Elastic & Plastic Behaviour
Difficulty	Hard

Time allowed: **10**

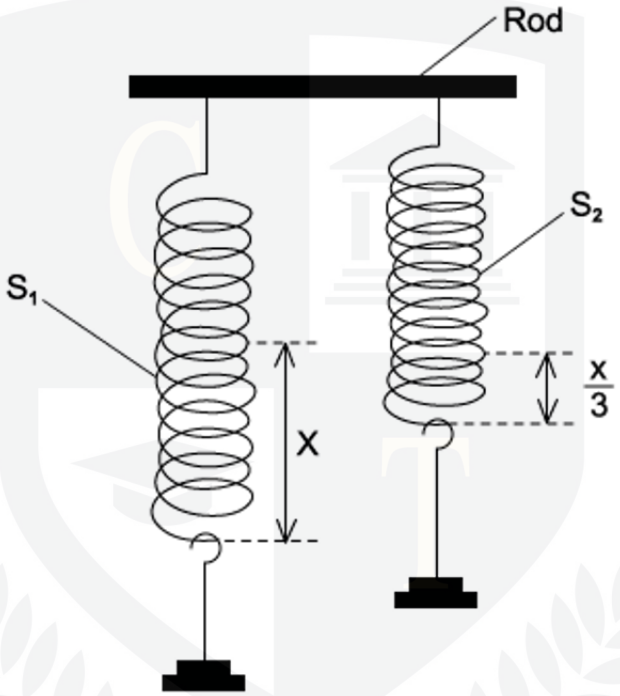
Score: **/5**

Percentage: **/100**

Question 1

Two springs are attached to a rod, S_1 and S_2. A load is applied to the bottom of S_1, and it extends by *x* with an elastic potential energy in the spring of *E*.

The same load is applied to the bottom of S_2. The extension of S_2 is $\frac{x}{3}$, as shown in the diagram



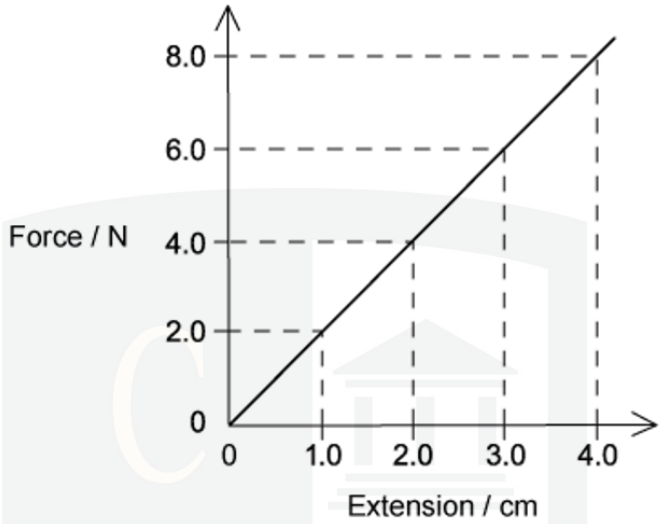
Which equation shows the elastic potential energy in S_2?

A $9E$ **B** $3E$ **C** $\frac{E}{3}$ **D** $\frac{E}{9}$

[1 mark]

Question 2

The graph below shows how force changes the extension of a spring.



The length of the spring with no force applied was 1 cm.

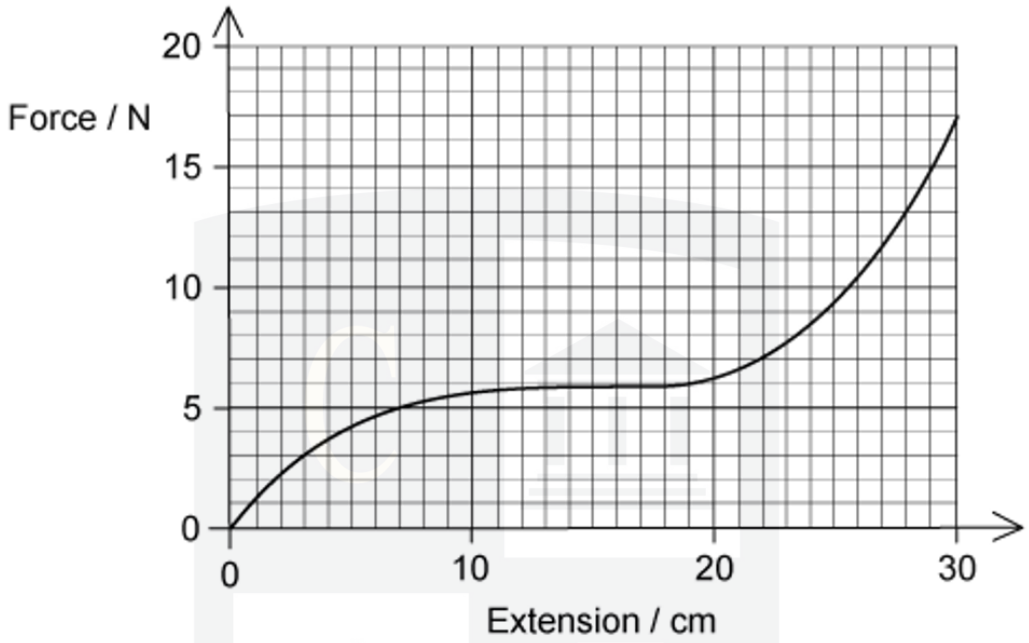
What is the **increase** in the strain energy stored in the spring when its **length** is increased from 2.0 cm to 3.0 cm?

A 0.050 J **B** 0.040 J **C** 0.030 J **D** 0.020 J

[1 mark]

Question 3

A graph was drawn of the effect on the length of applying a force to a rubber cord.



What is the maximum strain energy in this deformed rubber cord?

A 200 J **B** 5.1 J **C** 2.5 J **D** 1.9 J

[1 mark]

Question 4

A material with elastic properties that obeys Hooke's law has a Young modulus *E* and has a tensile stress of *S* applied.

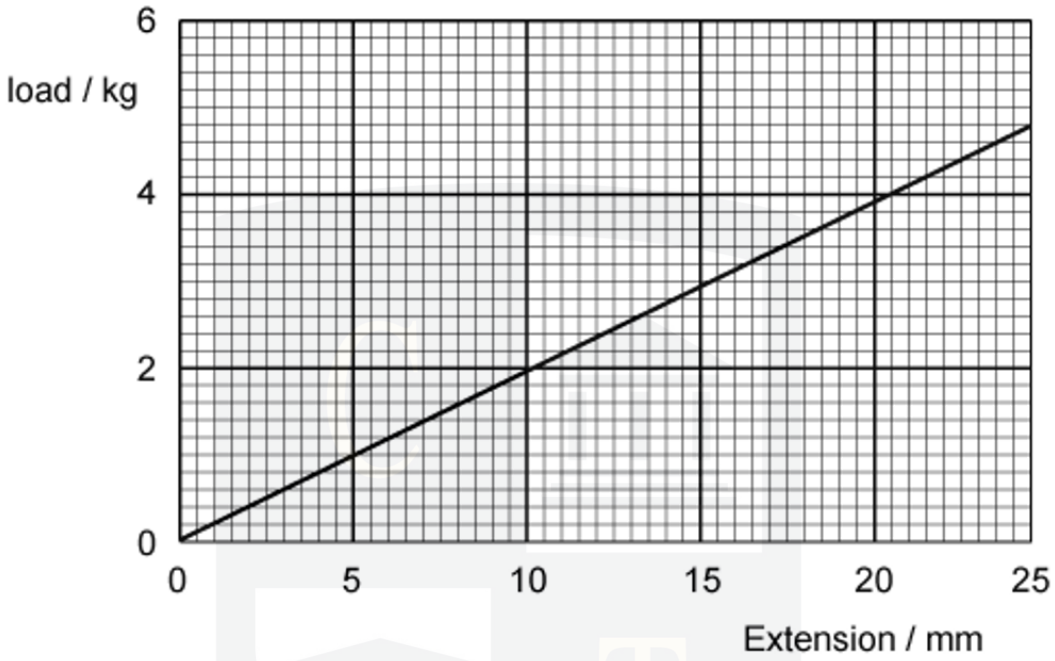
What is the expression for the elastic energy stored per unit volume of the material?

A $\frac{E}{2S^2}$ **B** $\frac{S^2}{E}$ **C** $\frac{S^2}{2E}$ **D** $\frac{2E}{S^2}$

[1 mark]

Question 5

A wire undergoes elastic deformation; the graph below shows the load-extension graph.



How much work is done on the wire to increase the extension from 10 mm to 20 mm?

A 0.37 J **B** 0.28 J **C** 0.184 J **D** 0.028 J

[1 mark]