

Name:

Key

ID :

Quiz (6)-Sec (9)-Ch(7&8)

Phys 101 (Term 041)-(F. Enaya)

S.N:

Show your steps clearly for full credit.!!

Q.1 A 2.5 kg hangs at rest from the free end of a vertical spring attached by one end to the ceiling. What is the change in elastic potential energy of the spring when the mass is lifted straight up until the spring reaches its unstretched position? ($k=240$ N/m)

Answer:

First, we need to find the extension of the spring caused by the hanged mass.(Hook's Law)

$$F = k X \Rightarrow mg = k (X) \Rightarrow X = (2.5) (9.8)/240$$

$$\Rightarrow X = 0.1 \text{ m}$$

Second, when we lift the mass to reach the unstretched position :

$X_i = 0.1 \text{ m}$ and $X_f = 0$ (Relax length).

$$\therefore \Delta U_s = \frac{1}{2} k (X_f^2 - X_i^2) = 0.5 (240) (0 - 0.1^2) = - 1.2 \text{ J}$$

$$\therefore \Delta U_s = - 1.2 \text{ J (Change in Elastic Potential Energy)}$$

