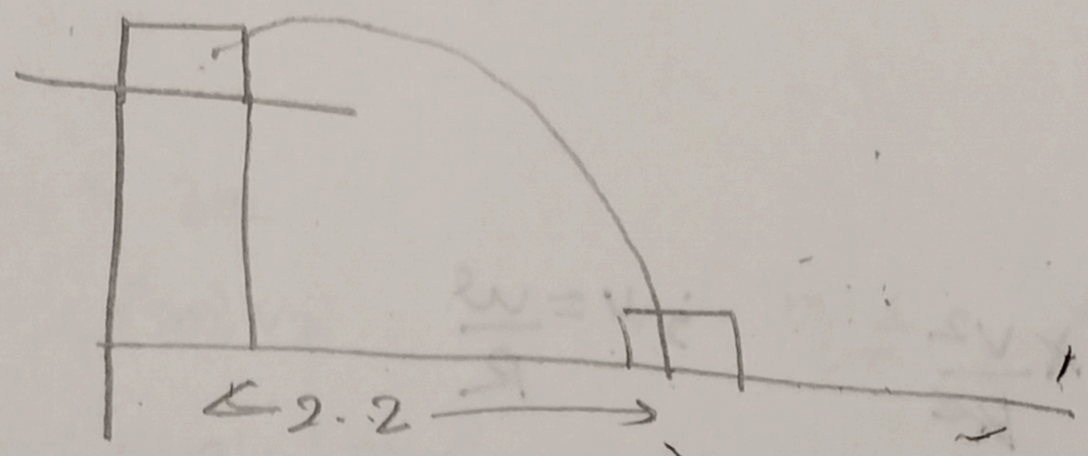
Q 9.]



Potential energy of spring = K.E of marble

$$V_S = \frac{1}{2} k x^2$$

$$V_S = \frac{1}{2} k x (1.1)^2$$

$$\frac{k \times 1.1 \times 1.1}{2}$$

∴ let, the distance at which the marble falls in to the box $= \frac{27}{10} + 2.2 = \boxed{2.47}$

∴ The Δx final should be 2.47 m

∴ $\Delta x = 2.47$

$\Delta y = 0$

∴ Conservation of energy,

$$mgh = \frac{1}{2} mv^2 \quad \& \quad \frac{1}{2} k x^2 = \frac{1}{2} mv^2$$

$$\therefore mgh = \frac{1}{2} k x^2$$

∴ Spring force = (ma) ⟶ acceleration of marble