

Answer on Question #45842-Physics-Mechanics-Kinematics-Dynamics

$m = 0.2 \text{ kg}$ mass of body suspended by $l = 1 \text{ meter}$ length of string if we displaced the body by using force at which the string make $\theta = 30 \text{ Degree}$ angle with horizontal then find the work done against with gravity.

Solution

The work done against with gravity is the difference between final and initial gravitational potential energy:

$$W = U_f - U_i.$$

Let initial gravitational potential energy be

$$U_i = -mgl,$$

where $g = 10 \frac{m}{s^2}$ is the acceleration due to the gravity.

Then final gravitational potential energy is

$$U_f = -mgl \sin \theta.$$

The work done against with gravity is

$$W = U_f - U_i = -mgl \sin \theta - (-mgl) = mgl(1 - \sin \theta) = 0.2 \cdot 10 \cdot 1(1 - \sin 30^\circ) = 1 \text{ J}.$$

Answer: 1 J.