

Name:

Key

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1- A 4 kg bundle starts up a 30° incline with a speed of 5 m/s. How far will it slide up the incline if the coefficient of kinetic friction between bundle and incline is 0.30? (Find d).

$$\Delta K + \Delta U_g + \Delta E_{th} = 0$$

$$\frac{1}{2} m (v_f^2 - v_i^2) + mgh + f_k d = 0$$

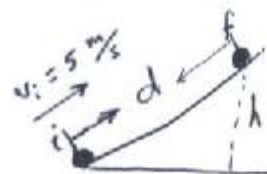
$$-\frac{1}{2} m v_i^2 + mg d \sin 30 + \mu_k N d = 0$$

$$-\frac{1}{2} m v_i^2 + mg d \sin 30 + \mu_k mg \cos 30 d = 0$$

$$-\frac{1}{2} (25) + \frac{1}{2} (9.8) d + (0.3) (9.8) \frac{\sqrt{3}}{2} d = 0$$

$$4.9 d + 2.5 d = 12.5$$

$$\Rightarrow d = \frac{12.5}{7.4} \approx 1.7 \text{ m}$$



2- A 10 kg object is dropped vertically from rest. After falling a distance of 50 m, it has a speed of 26 m/s. How much work is done by the air resistance on the object during this descent (fall)?

$$\Delta K + \Delta U_g = W_{ar}$$

$$\frac{1}{2} m (v_f^2 - v_i^2) + mg (y_f - y_i) = W_{ar}$$

$$\Rightarrow W_{ar} = \frac{1}{2} (10) (26)^2 - 10 (9.8) (50)$$

$$W_{ar} = -1520 \text{ J}$$