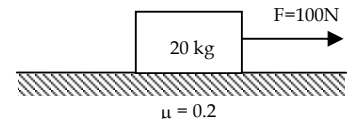


W6.03**Energy**

Solve Using Energy Methods

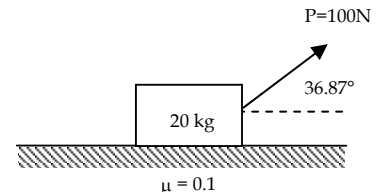
1. A 10-kg box is dropped from a height of 5 m. The instant before the box strikes the ground its speed is 8 m/s.
 - a. How much GPE did the box have prior to being dropped?
 - b. How much KE did the box have prior to striking the ground?
 - c. How much energy was lost to the force of the air pushing up as it fell down (drag force)?
 - d. How large was the average “drag force”?

2. A 20 kg block, originally at rest, is pulled across a rough surface ($\mu = 0.2$) by a 100 N force for 20 m.



- a. Since only forces which are parallel to Δs “give” or “take” energy from objects, how much work (energy transfer) does the weight of the box “give” or “take” from the box?
- b. Find the work done by $\text{Force}_{\text{normal}}$ [Hint: see above]
- c. Find the work done by $\text{Force}_{100 \text{ N}}$
- d. Find the work done by $\text{Force}_{\text{Friction}}$
- e. Find the total work done by all of the above forces.
- f. Find the speed of the block the instant it is 20 meters to the right of its starting position.

3. A 20 kg block, originally at rest, is pulled across a rough surface ($\mu = 0.1$) by a 100 N force angled at 36.87° for 20 m. Find the work done by each of the following forces.



- a. Find the work done by $\text{Force}_{\text{Friction}}$
- b. Find the work done by $\text{Force}_{100 \text{ N}}$ or done by the combination of $\text{Force}_{100 \text{ N X}}$ & $\text{Force}_{100 \text{ N Y}}$.
- c. Find the total work done by all of the above forces.
- d. Find the speed of the block the instant it is 20 meters to the right of its starting position.

KEY6.03

1.
 - a. 500 joules
 - b. 320 joules
 - c. 180 joules
 - d. 36 N [180 J divided by 5-m]

2.
 - a. none
 - b. none
 - c. 2,000 joules
 - d. 800 joules [40N times 20-m]
 - a. 1,200 joules
 - b. 10.95 m/s [KE=1,200 J]

3.
 - a. -280 joules [14 N times 20-m]
 - b. 1,600 joules
 - c. 1,320 joules
 - d. 11.49 m/s [KE=1,320 J]