

Ayman Ghannam

Chapter 7''Kinetic energy and work''

1. Which of the following bodies has the largest kinetic energy?

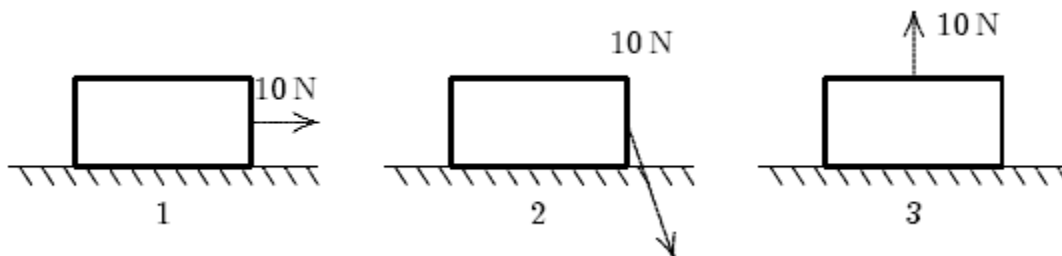
- A) Mass $3M$ and speed V
- B) Mass $3M$ and speed $2V$
- C) Mass $2M$ and speed $3V$
- D) Mass M and speed $4V$
- E) All four of the above have the same kinetic energy

2. An 8000-N car is traveling at 12 m/s along a horizontal road when the brakes are applied. The car skids to a stop in 4.0 s. How much kinetic energy does the car lose in this time? (5.9×10^4 J)

3. An object is constrained by a cord to move in a circular path of radius 0.5m on a horizontal frictionless surface. The cord will break if its tension exceeds 16N. The maximum kinetic energy the object can have is: (4 J)

4. A boy holds a 40-N weight at arm's length for 10 s. His arm is 1.5 m above the ground. The work done by the force of the boy on the weight while he is holding it is: (0 J)

5. A crate moves 10 m to the right on a horizontal surface as a woman pulls on it with a 10-N force. Rank the situations shown below according to the work done by her force, least to greatest. (3,2,1)



6. A sledge (including load) weighs 5000 N. It is pulled on level snow by a dog team exerting a horizontal force on it. The coefficient of kinetic friction between sledge and snow is 0.05. How much work is done by the dog team pulling the sledge 1000 m at constant speed? (2.5×10^5 J)

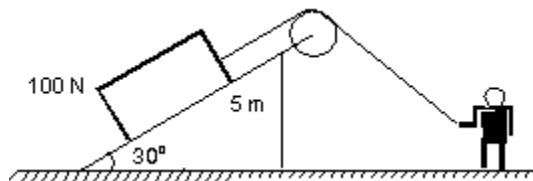
7. A particle moves 5 m in the positive x direction while being acted upon by a constant force

$\vec{F} = (4 \text{ N})\hat{i} + (2 \text{ N})\hat{j} - (4 \text{ N})\hat{k}$. The work done on the particle by this force is: (20 J)

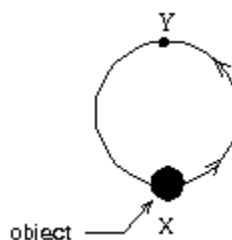
8. A 100-kg piano rolls down a 20° incline. A man tries to keep it from accelerating, and manages to keep its acceleration to 1.2 m/s^2 . If the piano rolls 5 m, what is the net work done on it by all the forces acting on it? (600 J)

9. At time $t = 0$ a 2-kg particle has a velocity of $(4 \text{ m/s})\hat{i} - (3 \text{ m/s})\hat{j}$. At $t = 3 \text{ s}$ its velocity is $(2 \text{ m/s})\hat{i} + (3 \text{ m/s})\hat{j}$. During this time the work done on it was: (-12 J)

10. A man pulls a 100-N crate up a frictionless 30° slope 5 m high as shown. Assuming that the crate moves at constant speed, the work done by the man is: (500 J)



11. A man moves the 10-g object shown in a vertical plane at a constant speed from position X to position Y along a circular track of radius 20 m. The process takes 0.75 min. The work done by the man is about: (4 J)



12. A force $\vec{F} = (4.1 \text{ N})\hat{i} + (2.6 \text{ N})\hat{j} - (4.7 \text{ N})\hat{k}$ acts on a mass of 2.3 kg as it moves in the x direction at a speed of 7.2 m/s. What is the rate at which the force is doing work? (30 W)