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UNIT 5: WORK ENERGY and CONSERVATION of ENERGY PRACTICE PROBLEMS

1. A 70 kg man runs at a constant velocity of 2 m/s. What is his kinetic energy? (140J)
2. A 10 N force is applied horizontally on a box to move it 10 m across a frictionless surface. How much work was done to move the box? (100J)
3. A constant net force of 500 N moves a 1000 kg car 100 m. If the car was initially at rest, then what is the car’s final velocity? (10 m/s)
4. A mover uses a pulley system to lift a grand piano with a mass of 500 kg from the ground to a height of 10 m. What is the change in the piano’s gravitational potential energy? ( 5 x 10^4 J)
5. A boy pulls a 10 kg box across an ice rink for a distance of 50 m. He exerts a constant force of 10 N on a rope attached to the box at an angle of 60 degrees. How much work has he done on the box? (250J)
6. A 5 kg box slides down a frictionless incline from a vertical height of 10 m. The box starts from rest. What is the box’s velocity at the bottom of the hill? (14 m/s)
7. A 9 kg box is attached to a horizontal spring with a spring constant of 2500 N/m. If the box is pulled 12 cm horizontally from the equilibrium position, what is its maximum kinetic energy? (18J)
8. A spring with a constant of 300 N/m is stretched by 0.5 m. What is the force on the spring? (150 N)
9. A spring with a constant of 400 N/m is stretched by 0.5 m. What is the elastic potential energy stored in the spring? ( 50J)
10. A man pushes a 100 kg box with a horizontal force of 100 N across a floor for a distance of 60 m in 2 min. What is his power? ( 50 W)
11. A man pushes a lawn mower with a handle at an angle of 60 degrees to the horizontal. He applies a constant 20 N force along the axis of the handle and moves the lawn mower a horizontal distance of 100 m in 5 min. What is the man’s power output? (3 W)