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**Chapter 12-Work, Power, and Energy Practice**

**Work**

1. **A crane uses an average force of 5200 N to lift a girder 25 m. How much work does the crane do on the girder?**
2. **An apple weighing 1 N falls through a distance of 1 m. How much work is done on the apple by the force of gravity?**
3. **The brakes on a bicycle apply 125 N of frictional force to the wheels as the bicycle travels 14 m. How much work have the brakes done on the bicycle?**
4. **While rowing in a race, John uses his arm to exert a force of 165 N per stroke while pulling the oar 0.8 m. How much work does he do in 30 strokes?**
5. **A mechanic does 6000 J of work as he lifts a car on an hydraulic lift 0.5 m off the ground. What is the force used to carry out this process?**

**Power**

1. **Every second, a certain coal-fired power plant produces enough electricity to do 9 x108 J of work. What is the power output of this power plant in units of watts?**
2. **Using a jack, a mechanic does 5350 J of work to lift a car 0.5 m in 50 seconds. What is the mechanic’s power output?**
3. **Suppose you are moving a 300 N box of books. Calculate your power output in the following situations: *(HINT: You must first use the work equation to calculate the amount of work done before using the power equation)***
   1. **You exert a force of 60 N to push the box across the floor 12 m in 20 sec.**
   2. **You lift the box 1 m onto a truck in 3 sec.**

**Kinetic Energy**

1. **Calculate the kinetic energy in joules of a 1500 kg car moving at the following speeds:**
   1. **29 m/s**
   2. **42 km/s (Hint: convert the speed to m/s before substituting into the equation)**
2. **A 35 kg child has 190 J of kinetic energy after sledding down a hill. What is the child’s speed in m/s at the bottom of the hill?**
3. **A bowling ball traveling 2.0 m/s has 16 J of kinetic energy. What is the mass of the bowling ball in kg?**

**Potential Energy**

1. **Calculate the gravitational potential energy of a car with a mass of 1200 kg at the top of a 42 m high hill.**
2. **A diver has 3400 J of gravitational potential energy after stepping up onto a diving platform that is 6.0 m above the water. What is the diver’s mass in kilograms? (you will have to covert from g to kg)**