

BAE 103
Energy in Biological Systems

Quiz 2 - Supplemental
Concepts: Force, Work, Power and Energy

Name: _____

1. A pump is used to transfer cooking oil from a truck in the parking lot to the top of a 10,000 gal. storage tank. The oil has a specific weight of 7.06 lb_f/gal. Assuming the elevation difference is 25 m and the overall pump efficiency is 70%, what size of electric motor (hp) is required to drive the pump if the liquid transfer rate must be no less than 400 l/min?
2. A 3.0 kW pump is placed at the bottom of a 40 m. deep well. Assuming the pump is 80% efficient, what is the maximum potential flow capacity (L/min.) of the well?
3. A car engine produces 25 kW while the car travels along a road while facing a wind resistance of 1000 N. If the car's drive-train is 95% efficient, what is the groundspeed of the vehicle (km/h)? The car has a mass of 1250 kg.