Physics Quiz — Chapter 11: Energy and Power

Monadi, Winter 2026, Physics 122-07

Name:_____ Date:_____

A horizontal-axis wind turbine has blades that sweep out a steady wind which blows perpendicular to the turbine blades with a speed of $v = 10\,\mathrm{m/s}$.

(a) The kinetic energy of a mass m of air moving at speed v is $K = \frac{1}{2}mv^2$. calculate the **power available in the wind**. Find the power output of the turbine if the blades capture 20% of wind's kinetic energy. Assume every second 1000 kg of air flows through the area swept out by the turbine blades.

(b) Suppose the turbine converts **35%** of the available wind power into electrical energy. How much electric power does the turbine produce?