

## MEEG 2013 Quiz #3

- A. (2 pts) Define **work of a force** on a body.
- B. (2 pts) Define **potential energy** of a body.
- C. (2 pts) Describe the **first law of thermodynamics**.
- D. (4 pts) Using the first law of thermodynamics, derive the **principle of work and kinetic energy**:

$$T_1 + U_{1 \rightarrow 2} = T_2$$

and the **principle of conservation of mechanical energy**:

$$T_1 + V_1 = T_2 + V_2$$

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- A. The **work of a force** on a body is equal to the force acting on the body times the displacement of the body in the direction of the force.
- B. The **potential energy** of a body in its current position with respect to a reference datum in a conservative force field is defined as the amount of work done by the conservative force on the body if the body travels from its current position to the reference datum.
- C. The **first law of thermodynamics** states that the net energy transfer to a system from its surroundings is equal to the net increase in the total energy of the system. For a closed system,
- $$Q_{\text{net}} + W_{\text{net}} = \Delta E$$
- D. (See the paper by Jong, Couvillion, and Roe, 2002.)