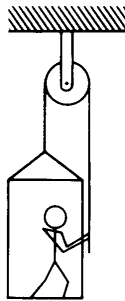AP Physics C   Name _____
1986M1 – Elevator Power Problem

Directions: Show all of your work in order to receive full credit. Include all of your givens, units, and original
equations used in each solution. All answers should fit in the space provided.

The figure above shows an 80 kilogram person standing on a 20 kilogram platform suspended by a rope passing over a
stationary pulley that is free to rotate. The other end of the rope is held by the person. The masses of the rope and
pulley are negligible. You may use g = 10 m/ s^2. Assume that friction is negligible, and the parts of the rope shown
remain vertical.
   a. If the platform and the person are at rest, what is the tension in the rope?

$$\boxed{T = 500 \text{ N}}$$

   b. The person now pulls on the rope so that the acceleration of the person and the platform is 2 m/s^2
   upward.
      i. What is the tension in the rope under these new conditions?

$$\boxed{T = 600 \text{ N}}$$

      ii. Under these conditions, what is the force exerted by the platform on the person?

$$\boxed{F = 360 \text{ N}}$$

After a short time, the person and the platform reach and sustain an upward velocity of 0.4 m/ s.
   c. Determine the power output of the person required to sustain this velocity.

$$\boxed{P = 400 \text{ W}}$$