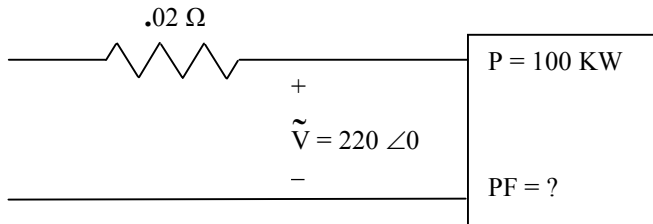


ASSIGNMENT #2 – Engineering Economy

DUE: At the beginning of your recitation section, September 12–14, 2006.
 Show all calculations and place the answer in the designated box.

- (a) Determine the rms line current for
 - (i) power factor, PF, of box = 1.0
 - (ii) power factor, PF, of box = 0.707 lagging.
- (b) Determine the annual economic cost (\$) of the energy dissipated in the line resistor for both cases (i) and (ii). Assume that the cost per kilowatt-hour is \$.06, and that the box (a large assembly line device) is in operation 16 hours per day, 5 days per week, 50 weeks per year.
- (c) Assume that the above device has a 10-year life, an initial cost of \$120,000, and a scrap value of \$5,000 at the end of its 10-year life. The first year maintenance expense is \$3,500, which increases by 4% every year for 10 years. Determine the present value of the lifecycle cost of the box, including the following considerations: purchase price, electricity cost to operate the box, maintenance expense, and scrap value; do not include the cost of the line loss from part (b), since it is not part of the box. The factory accountants state that an interest rate of 6% is relevant for this calculation.
- (d) Would it pay a factory to purchase the box to replace labor whose initial annual cost is \$35,000 per year, and which increases by \$4,000 per year during the 10-year life?



(a) $I_{\text{rms}} =$ $I_{\text{rms}} =$
(b) Cost = Cost =
(c) Cost =
(d) yes or no:

Name: _____

Recitation Section: _____