

**ME 1065 – HW 6**

Due 11/24/08

- 1) A young engineer wishes to buy a house but can only afford monthly payments of \$500. Thirty year loans are available at 8% interest, compounded monthly. If he can make a \$7000 down payment, what is the price of the most expensive house that he can afford to purchase?
- 2) The lining of a chemical tank in a certain manufacturing operation is replaced every 5 years at a cost of \$5,000. A new type of lining is now available which would last 10 years, but costs \$10,000. The tank needs a new lining now, and you intend to use the tank for 40 years, replacing the linings when necessary. With an interest rate of 9%, compute the present worth of costs for 40 years of service for 5-year and 10-year linings. On the basis of your results, which lining would you recommend?
- 3) An oil refinery has to replace approximately 795,000 m of pipe. Three alternative types of pipe are being considered:

	Useful Life (Yr)	Initial Cost (\$/m)	Annual O&M (\$/10,000 m)	Installation cost (\$)
Iron Pipe	7	3	50	105,000
Iron Alloy Pipe	10	5	40	105,000
Chrome-iron Alloy Pipe	15	6	30	105,000

If the established discount rate is 8%, compounded annually, and the salvage value at the end of the useful life for each type of pipe is 20% of the initial cost, determine the most attractive alternative.

- 4) A small oil company constructs oil drilling works at the Hibernia oil fields with a capital cost of \$15,000,000. The useful life of the venture is 20 years. The cost of operation and maintenance (O&M) at the end of the first year is estimated to be \$200,000 and is expected to go up by \$100,000 per year. If the price of oil is fixed at \$20.00 per barrel for the 20 years of operation, what minimum constant production (number of barrels to be produced) per year from the oil well is necessary to earn the company a rate of return of 15%?
- 5) Give one example (not discussed in class) for each of the four quadrants of the legal-ethical continuum (I: Illegal and Unethical, II: Legal and Unethical, III: Illegal and Ethical, and IV: Legal and Ethical). Explain why each your examples fits in the chosen quadrant.
- 6) Compare Pittsburgh (15213) with Houston (77001) using the link to [www.scorecard.org](http://www.scorecard.org) on the class website. (Some of their data should be taken with a grain of salt, of course.)
  - a. Which city has a higher risk of lead poisoning in the home? Why?
  - b. Which city is worse in terms of Superfund sites? Why?