**Homework Set 1**

**EGR 310**

**(100 pts)**

1. (10 pts) Select the correct economic criterion (maximize profit, minimize cost, maximize benefit) for each of the following scenarios and briefly explain why: *(Chapter 1)*
   1. A community collected $200,000 to put on a 4th of July fair, parade and fireworks show. What is the economic criterion for organizers?
   2. A restaurant has found that spending on flyer advertising through the mail increases sales but at a decreasing rate as the number of flyers increase. What is the economic criteria for the restaurant?
   3. A services contractor received a fixed price contract to install and maintain IT equipment for the county of San Diego. What is the economic criteria for the services contractor?
2. (10 pts) Why is step 9 of the decision making process, audit the results, important? Why do you think firms often ignore this step? *(Chapter 1)*
3. (10 pts) A bagel shop has fixed costs of $200 per day and variable costs 10 cents per bagel. How many bagels must be sold at 50 cents each to break even? To make $100 in one day? To make $200 in one day? *(Chapter 2)*
4. (10 pts) A manufacturing plant that makes boomerangs has a fixed cost of $500/day and a variable cost of $40/hr for labor for the first 8 hours of production and $60/hr for each hour of production over 8 hours. Assume that the laborers are sent home after completing the required output and paid only for hours worked. If the output of boomerangs is 75/hr, what are the marginal and average costs per boomerang for producing: *(Chapter 2)*
   1. 450 boomerangs –
   2. 525 boomerangs
   3. 675 boomerangs
   4. 750 boomerangs
5. (10 pts) A company plans to design and build transport vehicles for the Army. The cost for the design is $10M. The cost for the test prototype is $2M. The cost to produce and test each production vehicle is $0.5M. What is the non-recurring cost? What is the recurring cost per vehicle? What price per vehicle must the company sell the vehicles to the government to make $50K profit per vehicle if the company sold 50 vehicles? 100 vehicles? Why does the price per vehicle go down when production goes up? *(Chapter 2)*
6. (10 pts) Using Fig 2-3, list some possible life cycle activities needed for a nuclear power plant. For example, for the Needs Assessment and Justification phase, you may be doing feasibility studies, projecting power needs studies, etc. Just one activity per phase is fine. *(Chapter 2)*
7. (10 pts) Eight years ago when the relative cost index was 60, a 10 MW power generation facility cost $5M to build. Today the cost index is 110. What would the cost be to produce a 25MW facility today if the power sizing factor is 0.6? *(Chapter 2)*
8. (10 pts) You own an apartment complex with 85 bedroom units. Each unit rents for $1250/mo. Annual costs to operate the complex is $1M. If the vacancy rate is 5%, what profit do you earn per year? *(Chapter 2)*
9. (10 pts) Draw a 5-year cash flow diagram representing the following cash flows to build springs: *(Chapter 2)*
   1. Initial investment in plant and equipment $50K
   2. Annual maintenance: $3K after year 1 and increasing $1K per year after that
   3. Annual production costs – $10K/year
   4. Annual revenue - $25K/year
10. (10 pts) Label each of the following as sunk cost, opportunity cost, or incremental costs and briefly explain why: *(Chapter 2)*
    1. You are deciding which car to buy. Car A is $24,000 and car B is $32,000. The difference in price is $8,000. What kind of cost does this represent?
    2. Your company invested $300,000 into a study to determine the feasibility of introducing a new product line into the business. The study recommended 2 mutually exclusive feasible alternatives. What kind of cost does the $300K represent?
    3. You have 2 alternatives for a $10,000 investment. Investment A provides a $500 return and investment B provides a $700 return. If you choose Alternative B, what does the $500 return from Alternative A represent?