I. **Answer four out of the six questions**. Use a diagram or two to evaluate if the following statements are true or false. (24 points)

1. The indifference curves for the ideas that "A day without wine is like a day without sunshine" and "If he doesn't wear English Leather , he wears nothing at all" have similar shapes.
2. It is irrational for a profit-maximizing firm to produce at a price lower than average costs (here we assume the firm is a price taker and he/she operates in the short run).
3. Concavity of the production possibility frontier suggests "there is no free lunch."
4. Being an inferior good is a necessary condition for being a Giffen's good.
5. A risk-averter will purchase an insurance policy even it's an unfair one.
6. The short-run total cost curves represent the minimal costs for producing various output levels.

II. Essay questions

1. (14 points) Suppose we're looking at an industry that entry of new firms causes the average cost of all firms to rise.

a. How would the individual firm and the industry as a whole adjust to equilibrium in the short and long run?

b. What will be the tax incidence of a specific tax? Specifically, who bears the burden in the short run and who will that be in the long run?

2. (12 points) Individuals derive utility from two goods, housing (H) and all other goods (AOG).

a. Show that if the government requires individuals to buy more housing than they would freely choose (say, by setting minimum housing standards) such a policy may reduce utility.

b. Which group would you expect to suffer the greatest losses of utility from such a policy?

c. Suppose maintaining the same level of real income is defined as purchasing the original combination. What are the income and substitution effect for a price reduction in housing?

3. Consider the following game between one firm and one consumer. The firm, which can produce at zero cost, must select one of three prices: $25, $50, and $100. After the firm has selected a price, the consumer must decide whether or not to purchase one unit. Then, payoffs are collected. If the consumer does not purchase, he receives a payoff of zero. If he does purchase at price p he receives a payoff of (110- p). Assume the firm has no costs and its payoff from any sale is equal to gross revenue. Draw the extensive from of the game assuming that the consumer can distinguish whether the firm chose the highest price ($100) or did not choose the highest price but cannot directly observe which of the other two prices the firm might have chosen. (5%) Also, find the Nash equilibrium. (5%)

4. Suppose that it costs a homeowner $20 to purchase and install a smoke detector. Moreover, suppose that each fire costs $50,000 but the insurance company covers only 80% of fire damage owing to co-payment. If the smoke detector can reduce the probability of fire accident by 1%.

   a. How much of a discount will perfectly competitive insurance companies give to someone who has installed a smoke detector? (5%) Why do they give this discount? (5%)

   b. Suppose that there is a monopoly provider of fire insurance. How much of a discount will it offer policyholders who install smoke detectors? (5%) Why will the monopolist grant this discount? (5%)

5. a. "If all markets but one are competitive, a removal of the imperfection would represent an actual Pareto improvement." True, false or uncertain? Why? (10%)

   b. Consider an economy with one good and two periods where 25% of each unit stored in period 1 decays and cannot be consumed in period 2. What is the smallest real rate of interest which can occur in equilibrium? Explain briefly. (10%)