Name:

E-mail: *@illinois.edu*

All questions must be answered on this test form!
For each question you must show your work and (or) provide a clear argument.
Use the last two pages and the back of the form as scratch paper.

Question 1

(a) Insurance company *A* offers health insurance with the following features: The cost of the insurance per year is 3,000 Dollars. A person can choose to get treatment in any hospital of his/her choice. The insurance has a deductible of 1,000 Dollars. Suppose company *B* starts to offer the following policy. At a cost of 1,400 Dollars per year, the deductible is 3,000 Dollars, and patients have to choose a hospital on a list of preferred providers. *4 points*

Answer the following question (*to get credit your answer must be short and to the point —fit in the box*).

1. Will anyone sign up for insurance *B*? If yes, what type of costumers?

2. How will profits of company *A* be affected when *B* enters the market.

(b) What fundamental informational problem can cause some countries with higher health care expenditures to have a lower quality of care? *2 points*

(c) List two ways how to lower the impact of the problem in (b). *4 points*

1.)

2.)

Question 2 Suppose that each person is characterized by the accident probability $\alpha \in [0,1]$. If the person's Bernoulli utility function is $\sqrt{x}$, and if the income is 400 Dollars and the accident causes a loss of 400 Dollars, then one can check that a person of type α is willing to pay at most $p = 800\alpha - 400\alpha^2$ for insurance — if we write this equation as a function of p then we get $\alpha = 1 - 0.05\sqrt{400 - p}$. Clearly, the expected cost of providing insurance to a person of type α is 400α. Finally, suppose that the types α are uniformly distributed on $[0,1]$, i.e., the fraction of types $[0,\overline{\alpha}]$ in the whole population $[0,1]$ is exactly $1/\overline{\alpha}$.

(a) First, suppose that by law everyone must have insurance. Determine the insurance premium p at which the insurance company breaks even (i.e., makes zero profits). *5 points*

The insurance premium is

(b) Now suppose that insurance is voluntary. Suppose the insurance company charges a rate of 300 Dollars. Then among people who get insurance *5 points*

The average accident probability is

The insurance companies expected profit per costumer is

Question 3 Suppose that a trader at an investment bank has the choice between three investment strategies. *Investment 1* pays a return of 3% with probability 0.6 and 0% with probability 0.4. *Investment 2* pays 20% with probability 0.8 and -5% with probability 0.2. *Investment 3* has a payoff of 60% with probability 0.4 and -50% with probability 0.6. The trader must decide which of the following three investment strategies to use (in particular, for simplicity we assume that they cannot be combined). The trader has m Dollars to invest

(a) Suppose that the trader's payoff is in form of a bonus that is a fraction α of trading profits (i.e., if the investment's return is 0 or negative, then the trader receive zero payments). *4 points*

Then the trader's expected bonus when choosing investment 1 is ☐,

from investment 2 is ☐, from investment 3 is ☐

Therefore the trader will chose investment ☐

(b) Now suppose that the trader receives a salary of $100,000$ Dollars. However, if his trading results in a negative return his salary is reduced by a penalty of β times the amount of money lost. *4 points*

Then the trader's expected payoff when choosing investment 1 is ☐,

from investment 2 is ☐, from investment 3 is ☐

Therefore the trader will chose investment ☐

(c) Now suppose the trader receives a bonus of \$1 Million if he has the highest trading return among all traders in the firm. He believes that highest return of other traders in the company are: 80% with probability 0.2, 50% with probability 0.5, and 15% with probability 0.3. Suppose the trader's own returns from investments 1 to 3 are stochastically independent of the other traders' returns. *4 points*

Then the trader's expected bonus when choosing investment 1 is ☐,

from investment 2 is ☐, from investment 3 is ☐

Therefore the trader will chose investment ☐

Question 4 Suppose that all firms in an industry have cost function $C(Q) = 5Q^2$. There are 100 such firms. Demand is given by $Q_D(P) = 2,000 - 40P$. Then in equilibrium, *10 points*

P = , and Q =

Question 5 A firm's cost function is given by $C(Q) = 100,000 + 20Q$. Suppose there are 1,000 costumers, each of them has a demand function $Q_D(P) = 100 - 2P$. The firm wants to do two-part pricing, i.e., charge a fixed fee F and a price per unit P. *12 points*

The profit maximizing $F =$, $P =$

The firm's total profit (from all costumers) is

Question 6 Suppose a firm has two types of costumers. Each type A costumer has a demand function $Q_D^A(P) = 20 - P$, while each type B costumer's demand function is $Q_D^B(P) = 18 - 2P$. The firm's marginal costs are zero.

Suppose the firm currently sells the good at a price of 6Dollars per unit, but would like to offer a quantity discount to type A costumer, i.e., a quantity Q and a price F that allows type A costumers to consume Q units at a total cost of F Dollars. Since the type is private information, the firm must choose Q and F such that type A costumers are better off with the (Q, F) contract (than with paying 6 Dollars per unit). Also, the firm wants to choose (Q, F) to maximize profits. *12 points*

The profit maximizing $F =$, $Q =$

The quantity discount increases the profit from each type A costumer by **$**

Question 7 **(a)** Suppose that total demand for movie tickets by students is $Q_D^S(P) = 200 - 20P$, while total demand by non students is $Q_D^N(P) = 160 - 10P$. The movie theater's cost function is $C(Q) = 800$. *10 points*

If the movie theater uses price discrimination then the profit maximizing price P^S for students and P^N for non-students is

P^S = , P^N =

The theater's profit is

If, instead, the firm does not use price discrimination and charges the same price to students and non-students then

the profit maximizing price is P =

The theater's profit is

(b) When going from price discrimination to no price discrimination: *6 points*

The net-benefit of all students **increases** **decreases** (*circle the correct answer*) by _____.

The net-benefit of non students **increases** **decreases** (*circle the correct answer*) by _____.

Thus, producer + consumer surplus **increases** **decreases** (*circle the correct answer*) by _____.

Question 8 (a) Suppose there are two airlines A, B, offering service between two cities. Their cost functions are given by $C^A(Q) = 10,000 + 20Q$ and $C^B(Q) = 10,000 + 40Q$. Suppose that demand is given by $Q_D(P) = 1,050 - 10P$. Using the Oligopoly model determine the following: *8 points*

The equilibrium price P =

The firms' market shares are s_1 = , s_2 =

***A*'s profit is , *B*'s profit is**

(b) Now suppose that airline *B* stops offering service on the route and only *A* remains. Then *4 points*

The equilibrium price $P =$, and $Q =$

***A*'s profit is**

(c) Determine the change in consumer surplus when moving from (a) to (b). *6 points*

Consumer surplus **increases** **decreases** (*circle the correct answer*) by .

Thus, producer + consumer surplus **increases** **decreases** (*circle the correct answer*) by .

Not graded: Use as Scratch Paper

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