Advanced microeconomics, second midterm exam.

● Write on the first page under your name either

'I WRITE AN ESSAY AND ANSWER ONLY THREE QUESTIONS'

or

'I DO NOT WRITE AN ESSAY AND ANSWER FOUR QUESTIONS'

depending on which of the statements applies to you.

1. In Allais' paradox a decision maker chooses from lotteries A and B. Lottery A gives with probability 0.33 income 27500, with probability 0.66 income 24000 and with probability 0.01 income zero, and lottery B gives with probability one income 24000. Then the decision maker chooses from lotteries C and D where lottery C gives with probability 0.33 income 27500 and with probability 0.67 income zero, and D gives with probability 0.34 income 24000 and with probability 0.66 income zero. Show that if the choice is B in the first instance and C in the second instance, the choices violate the maximisation of expected utility.

2. Consider a game where two players simultaneously choose a number from $A = \{1,2,3\}$. Each player gets what s/he chooses except when both players choose 3. Then each player gets utility zero. Present the game in strategic form (=normal form, matrix), and determine all its Nash-equilibria including equilibria in mixed strategies.

3. Three oligopolists interact in a market where the inverse demand is $p = 1 - q$. The firms have constant marginal cost $c > 0$. The timing is as follows: In the first stage firm-1 chooses quantity q_1. In the second stage firm-2 and firm-3 observe firm-1's choice, and simultaneously choose quantities q_2 and q_3. Determine the subgame perfect equilibrium.

4. Consider an adverse selection problem. There are sellers with paintings which are worth X to sellers where X is uniformly distributed between zero and 100 000 (thus, the expected value of a random painting is 50 000). The only way to know the value of a painting for a buyer is to buy it and have it appraised, while sellers know the values of their paintings. Buyers value any painting at 150% of the seller's valuation (a painting that is worth 1000 to a seller is worth 1500 to a buyer).

    i)   Show that there is no price P such that some sellers sell their paintings and buyers buy them at price P.

Assume that sellers can credibly get an appraisal (=verification of a painting's value) at price 5000.

    ii)   Show that there is an equilibrium with a treshold value V^* such that all the sellers whose paintings are more valuable than V^* have their paintings appraised and trade, while no seller whose painting is less valuable than V^* has the painting appraised, and none of these sellers trade.