Written Exam at the Department of Economics summer 2017

Microeconomics II

Final Exam

9 June 2017

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language for which you registered during exam registration.

This exam consists of three pages in total

NB: If you fall ill during the actual examination at Peter Bangsvej, you must contact an invigilator in order to be registered as having fallen ill. Then you submit a blank exam paper and leave the examination. When you arrive home, you must contact your GP and submit a medical report to the Faculty of Social Sciences no later than seven (7) days from the date of the exam.

Please answer all six questions.

1. A firm produces gadgets at a constant marginal cost equal to MC = 2. The firm has a monopoly and sells to two types of customers, "rich" and "normal", with the same number of each type. Each "rich" customer has demand function $D_R(p) = 42 - 2p$. Each "normal" customer has demand function $D_N(p) = 38 - 2p$.
   (a) If the firm does not price discriminate, and simply sets a unit price of *p*, what price will maximize its profit? Exactly how big will a normal customer's consumer surplus be?
   (b) Now suppose the profit-maximizing second-degree price discrimination is implemented. Assuming the firm will sell gadgets to both types of customers, exactly how many gadgets will a rich customer purchase? Exactly how big will a normal customer's consumer surplus be?
2. The ACME Corporation has monopolized the market for widgets, and maximizes its profit without engaging in any kind of price-discrimination. The production technology has constant returns to scale: the cost of producing a widget is MC=5. The market demand function is $D(p)= 44-4p$.
   (a) How big is the deadweight loss in this market?
   (b) Is it possible to eliminate the deadweight loss by subsidizing the consumption of widgets? If yes, exactly how big should the subsidy be? (Show your calculations.) If no, explain why it is not possible.
3. In an economy with two individuals, there is a private good which can be transformed into a public good; it costs one unit of the private good to produce one unit of the public good. Each individual has utility function $u(x,y) = xy$, where x is his private good consumption and y is the level of the public good. Each has income I=300.
   (a) Calculate the efficient (i.e., Pareto-optimal) level of the public good (and show your calculations).
   (b) Suppose the public good is completely financed via private voluntary contributions. (No government subsidies or taxes). In Nash equilibrium, exactly how much public good is produced? (Show your calculations). Is the outcome efficient?

4. Consider the market for ice-cream in Christianshavn. Bruno is the incumbent ice-cream vendor. Adam is a potential entrant. The game is sequential-move. Adam moves first, and chooses either to *Enter* or to *Stay Out*. Then, after observing what Adam did, Bruno chooses whether or not to buy a new Italian ice-cream machine. Payoffs are as follows. If Adam stays out then Adam surely earns 0, while Bruno earns 200 if he buys a new machine and 250 if he doesn't. If Adam enters, then: If Bruno buys a new machine they each lose 50 (i.e., earn negative profits); If Bruno doesn't buy a new machine, then Adam earns 100 while Bruno earns 0.
   (a) Find all (pure strategy) Nash equilibria. Explain your reasoning.
   (b) Which Nash equilibrium is subgame-perfect? Explain.

5. A large number of residents live in the area around a lake. They enjoy eating fish which can be purchased at the price of 1 dollar (per fish) in the supermarket. An alternative way of having fish for dinner is to go fishing in the lake. Each resident who decides to go fishing incurs a disutility equivalent to a loss of five dollars (as fishing is not enjoyable), but he can bring home and eat the fish he catches. If n residents go fishing, the *total* catch (i.e., total number of fishes caught) in the lake will be $100 \cdot n^{1/2}$. The residents are equally skilled at fishing, so every resident who goes fishing will bring home the same share (1/n) of the total catch.
   (a) In equilibrium, how many residents choose to go fishing? (Explain your reasoning).
   (b) In an efficient outcome, how many residents should go fishing? (Show your calculations.) Is the equilibrium you found in part (a) efficient?

6. There are three rational voters, Bart, Lisa and Milhouse. Collectively, they have to agree on one alternative: either Fishing (F), Swimming (S) or Hiking (H). Their preferences are as follows. Bart prefers F to S, and S to H. Lisa prefers S to H, and H to F. Milhouse prefers H to F, and F to S.
   (a) Does there exist a Condorcet winner? Explain.
   (b) Suppose Lisa is the *agenda setter* who can determine a *sequence of pairwise majority votes* (i.e., they first vote over two alternatives, and whichever alternative wins goes up against the third alternative in a second majority vote.) All voters are "sophisticated" (so when casting their first vote, they anticipate what will happen in the second vote). Which agenda should Lisa choose (i.e., which two alternatives should go up against each other in the first vote), in order for her to get her favorite outcome? Explain your reasoning.