Examination: 5024 Economics I (Intermediate Economics)

Wintersemester 2003/04 **February 19, 2004**

Examiner: T. Riechmann

Name, First name

Student number

Degree/semester

Instructions:

- You have 120 minutes to answer *all four* questions.
- Use of non–programmable calculators is allowed.
- Please put your name on *all* sheets.
- Please hand in *all* exam materials.

Question 1

An industry faces the demand curve

$$x = M - a\,p$$

with x giving the demanded quantity and p giving the price of the good. M and a are positive constants.
The cost function of firm i is given by

$$c(y_i) = c\,y_i + Z.$$

y_i gives firm i's output quantity, c and Z are positive constants.

a) Write down the equations for average costs AC, variable costs VC, fixed costs F, average variable costs AVC, and marginal costs MC.

b) Consider a duopolistic supply side of the market. Write down the reaction function of firm number 1 in this market, assuming both firms decide at the same time. What is the (Cournot) equilibrium price and the (Cournot) equilibrium quantity in this market?

c) What is the price if the firms are engaged in a Bertrand competition?

d) Consider a monopolistic supply side of the market. Write down the first order condition for profit maximization of the monopolist in this market. What is the equilibrium price and the equilibrium quantity in this market?

Question 2

The demand function is given by

$$x = A\,p^{-\gamma}$$

with x giving the demand, p the price and a and γ as positive parameters.

a) Derive the price elasticity of demand, ε. What is the economic meaning of the price elasticity of demand? What is elastic, what is inelastic demand?

b) Denote revenues as a function of demand x and price p. How do revenues change as a reaction to an increase of the price, if demand is inelastic?

c) Is the good in focus a Giffen good? Explain your answer both verbally and analytically.

Question 3

a) What is a natural monopoly? Under what conditions does a natural monopoly occur?

b) What is a fish? (Graphical answers are o.k.)

c) What are substitutable goods? Give an example.

Question 4

A household has the following utility function:

$$u(x_1, x_2) = x_1 (x_2 + 5),$$

with x_1 and x_2 giving the quantities of goods no. 1 and 2, respectively.

a) Derive the general demand functions for the goods.

b) Assume the general demand function for the second good is

$$x_2(m, p_1, p_2) = \frac{1}{2} \frac{m}{p_2}.$$

Let the income be $m = 1000$ and the price for the second good $p_2 = 1$

aa) Compute the demanded quantity for the second good, $x_2(m, p_2)$.

bb) Assume the price for the good rises to $p_2' = 2$. What is the new (hypothetical) income m' that keeps the household's purchasing power constant at the new price p_2'?

cc) Compute the demanded quantity of the second good for the new price p_2' and the hypothetical income m', i.e. $x_2(m', p_2')$.

dd) Compute the demanded quantity for the original income m and the new price p_2', i.e. $x_2(m, p_2')$.

ee) Compute the substitution effect $\Delta_{x_2}^s$, the income effect $\Delta_{x_2}^e$ and the total effect Δ_{x_2} of the price change.