UNIVERSITY OF OULU

YLIOPISTOTENTTI - UNIVERSITY EXAM

Opiskelijan nimi / Student name:	Opiskelijanumero / Student number:

Opintojakson koodi and nimi / The code and the name of the course: **721345S** **Intermediate Microeconomics**	
Tiedekunta / Faculty: Oulun yliopiston kauppakorkeakoulu / Oulu Business School	
Tentin pvm / Date of exam: 14.8.2017	**Tentin kesto tunteina / Exam in hours: 3**
Tentin nro / No. of the exam: kesätentti	**Opintopistemäärä / Credit units: 6**
Tentaattori(t) / Examiner(s): **Juha Teirilä**	**Sisäinen postios. / Internal address:** **6 OyKKK**

Sallitut apuvälineet / The devices allowed in the exam:

☒ Nelilaskin / Standard calculator ☒ Funktiolaskin / Scientific calculator ☐ Ohjelmoitava laskin / Programmable calculator

☐ Muu materiaali, tarkennettu alla / Other material, specified below:

Tenttiin vastaaminen / Please answer the questions:

☒ Suomeksi / in Finnish ☒ Englanniksi / in English

Suomenkielisessä tutkinto-ohjelmassa olevalla opiskelijalla on oikeus käyttää arvioitavassa opintosuorituksessa suomen kieltä, vaikka opintojakson opetuskieli olisi englanti. Tämä ei koske vieraan kielen opintoja. (Kts. Koulutuksen johtosääntö 18 §)

In a Finnish degree programme a student has a right to use Finnish language for their study attainment, even though the language of instruction is English, (excluding language studies) even when the language of instruction is other than Finnish. (See the Education Regulations 18 §)

Kysymyspaperi on palautettava / Paper with exam questions must be returned:

☒ Kyllä / Yes ☐ Ei / No

Please answer all 5 questions (6 points each).

Question 1.

Paul enjoys commodities *x* and *y* according to the utility function

$$U(x, y) = x + y + 8.$$

Commodity *x* costs 6 € per unit if it is consumed less than or equal to 10 units. After consuming 10 units the unit price of commodity *x* drops to 2 € (e.g. consuming 13 units of commodity *x* costs 10 x 6 € + 3 x 2 € = 66 €). The price of commodity *y* is always 4 €. Paul has *m* = 200 € to spend.

a) Write down Paul's budget constraint. What is the slope of the budget line?

b) What does the marginal rate of substitution (MRS) measure? Calculate the marginal rate of substitution for Paul.

c) Draw some of Paul's indifference curves and his budget constraint. Which affordable consumption bundle (x^*, y^*) maximizes Paul's utility? Mark the optimal consumption bundle in the graph.

Question 2.

Jimmy has utility function $U(m) = \sqrt{m}$ over his income *m*. Jimmy travels to city center every day, and has to spend money on subway ticket. Jimmy's daily income is 100 €. The subway ticket costs 7,84 €. If he does not buy the subway ticket, he knows there is a probability π of being caught in a given day. The fine for traveling without the ticket is 64 €.

a) What are Jimmy's preferences towards risk? Is he risk loving, risk averse or risk neutral? Explain your answer by studying the shape of the utility function analytically and/or graphically.
b) What is Jimmy's expected utility if he buys the subway ticket?
c) Write down Jimmy's expected utility if he does not buy the subway ticket.
d) Assume that Jimmy is an expected utility maximizer.
Solve the probability of getting caught, π, that would make Jimmy indifferent between paying for the ticket and taking the risk of riding without the ticket.

Question 3.

a) What does it mean if two goods are perfect complements? What if they are perfect substitutes? Give examples for both.

b) Explain what does consumer surplus mean? How is it used and why? Illustrate your answer with a graph.

c) What is meant by returns-to-scale in production? Give an example using an arbitrary production function of your choice.

Question 4.

Suppose the demand curve *D(p)* and the supply curve *S(p)* for the market are given by the following equations:

D(p) = 75
S(p) = p - 10

a) What is the market equilibrium (price and quantity) in this market? Calculate the producer surplus.

b) Suppose that the government imposes a quantity tax $t = 5$ on firms. Solve the new market equilibrium. What happens to the producer surplus? Draw a figure.

Question 5.

Aggregate market demand for milk is given by $q(p) = 50 - (p/2)$, where q is the amount of milk and p is the market price. The total cost function for any firm in the industry is $c(q) = 4q$.

a) Assume that there is only one milk producing firm in the market.
Write down the monopoly's profit function $\pi(q)$.
What is the profit maximizing level of output q^m for the monopolist?
What would be the market price?

b) Assume there are two Cournot firms (i.e. quantity competition) operating in the market.
What would be the reaction functions $R_1(q_2)$ and $R_2(q_1)$?
What would be the Cournot-Nash equilibrium quantities q_1^* and q_2^*?
What would be the market price?

c) Assume there are two Bertrand firms (i.e. price competition) operating in the market. What is the Nash equilibrium market price? Explain the adjustment process of price setting. What would be the market demand?