YLIOPISTOTENTTI - UNIVERSITY EXAM

Opiskelijan nimi / Student name:	Opiskelijanumero / Student number:

Opettaja täyttää / Lecturer fills in:

Opintojakson koodi and nimi / The code and the name of the course:

Koodi / Code 721333S
Tentin nimi / Exam name Industrial Organization

Tiedekunta / Faculty: Business School (OBS)

Tentin pvm / Date of exam: 30.1.2019	Tentin kesto tunteina / Exam in hours: 3 h
Tentaattori(t) / Examiner(s):	**Opintopistemäärä / Credit units: 6**
Maria Kopsakangas-Savolainen	**Sisäinen postios. / Internal address:**

Sallitut apuvälineet / The devices allowed in the exam:

☒ 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

Answer all questions. Each question gives you max 6 points.

721333S, Industrial Organization   30.1.2019
Maria Kopsakangas-Savolainen
(Each question gives you max 6 points)

1. Consider the following game depicted the process of standard setting in highdefinition television (HDTV). The United States and Japan must simultaneously decide whether to invest a high or a low value into HDTV research. Each country's payoffs are summarized in figure below.

Japan

		Low	High
U.S.	Low	4, 3	2, 4
	High	3, 2	1, 1

a. Are there any dominant strategies in this game? What is the Nash equilibrium of the game? What is the rationality assumption implicit in this equilibrium?
b. Suppose now that the United States has the option of committing to a strategy before Japan's decision is reached. How would you model this new situation? What are the Nash equilibria of this new game?
c. Comparing the answers to a) and b), what can you say about the value of commitment for the United States?

2. Two firms produce a homogenous product. Let p denote the product's price. The output level of firm 1 is denoted by q_1, and the output level of firm 2 by q_2. The aggregate industry output is denoted by Q, $Q = q_1 + q_2$. The aggregate industry demand curve for this product is given by $p = \alpha - Q$. Assume that the unit cost of firm 1 is c_1 and the unit cost of firm 2 is c_2, where $\alpha > c_2 > c_1 > 0$. Perform the following:

   a. Solve for a competitive equilibrium.

   b. Solve for Cournot equilibrium.

   c. Solve for the sequential-moves equilibrium, assuming that firm 1 sets its output level before firm 2 does.

   d. Solve for Bertrand equilibrium.
(Note: Make sure that you solve for the output level of each firm and the market price.)

3. Consider a market for computer systems. A computer system is defined as a combination of two complementary products called computers (denoted by X), and monitors (denoted by Y). We denote p_X the price of one computer and by p_Y the price of a monitor. Therefore, since a system consists of one computer and one monitor, the price of a system is given by

$p_S = p_X + p_Y$. Let Q denote the quantity of systems purchased by all consumers, and assume that the aggregate consumer demand is given by $Q = \alpha - p_S$. where $Q = x = y$.
We denote by x the amount of computers sold to consumers and by y the amount of monitors sold.

Answer the following questions assuming that production is costless.

a. Suppose that the X producer and the Y producer are independent. Solve for the Nash-Bertrand equilibrium in prices. Calculate the equilibrium prices and quantity produced of each product and firms' profit levels.
b. Now suppose that firms X and Y merge under a single ownership. Calculate the monopoly equilibrium prices, the quantity produced of each product, and the monopoly's profit.
c. Is this merger welfare improving? Compare system price and profits of the firms before and after the merger.

4. Give short answer to the following questions

a.   Explain what we mean by two-part tariffs in general and by using some example.
b.   Explain when does the Stackelberg competition give first mover advantage and when second mover advantage.
c.   Explain what is moral hazard problem (in regulation procedure) and how it can be solved?

5. Consider a situation where an authority wants to regulate a firm but it does not know the true costs of the firm. Explain what kind of economic mechanism would give the firms sufficient incentive to report its true costs.