LuTK, OyKKK, KaTK, TTK, TST ja BMTK (Linnanmaan tentit)
SCI, OBS, OMS, TECH, ITEE and BMM (Linnanmaa campus)

UNIVERSITY OF OULU

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: **721333S** **Industrial Organization**	
Tiedekunta / Faculty: **Oulun yliopiston kauppakorkeakoulu**	
Tentin pvm / Date of exam: 22.3.2017	**Tentin kesto tunteina / Exam in hours: 3**
Tentin nro / No. of the exam: 1 (esim. Tentti, 1. uusinta, 2. uusinta / e.g. Exam, 1. retake, 2. retake)	**Opintopistemäärä / Credit units: 6**
Tentaattori(t) / Examiner(s): **Mikko Leppämäki**	**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

University of Oulu
Industrial Organization
Exam (3 hours), March 22, 2017

Instructions

- Please answer all questions.
- In case you feel that a particular question (or part of it) is not sufficiently clear, state explicitly the additional assumptions on which you base your answers.
- Please do write your answers clearly, since badly written answers are impossible to read and grade.
- Good luck!

Please return the question sheet with your answers at the end of the exam.

1. Consider two firms that play a Cournot competition game with demand $p = 100 - q$ and costs of each firm given by $c_i(q_i) = 10q_i$. Imagine that before the two firms play the Cournot game firm 1 can invest in cost reduction. If it invests the costs of firm 1 drop to $c_1(q) = 5q_1$. The cost of investment is $F > 0$. Firm 2 does not have this investment opportunity.

(i) Find the value $F^*$for which the unique subgame perfect equilibrium (SPE) involves firm 1 investing.
(ii) Assume that $F > F^*$. Find a Nash equilibrium (NE) of the game that is not subgame perfect.

2. Suppose the Big Stadium has a capacity of 50000 and is used for exactly seven games a year. Three of these are ordinary games, with a demand for tickets given by $q = 150000 - 3p$ per game, where p is ticket price. (For simplicity, assume there is only one type of ticket.) Three of the season games are not so important, the demand being $q = 90000 - 3p$ per game. Finally, one of the games is really big, the demand being $q = 240000 - 3p$. The costs of operating the Big Stadium are essentially independent of the number of tickets sold.

(i) Determine the optimal ticket price for each game, assuming the objective of profit maximization.
(ii) Given that the Big Stadium is frequently full, the idea of expanding the Stadium has arisen. A preliminary study suggests that the cost of capacity expansion would be 100 per seat per year. Would you recommend that the project of capacity expansion goes ahead?

3. Consider a contracting situation between a local government (e.g. city of Oulu) that hires a private firm to produce some good (or service) for the recident population. The local government contracts with the firm, but it does not know exactly production costs of the firm, $c(q) = \theta q$. The local government only knows that with probability λ the private firm is "efficient" low cost firm with $\theta = \theta_1$ and that with probability $(1 - \lambda)$ the firm is "inefficient" high cost firm with $\theta = \theta_2$,where $\theta_1 < \theta_2$ and $\Delta\theta = \theta_2 - \theta_1$.The firm's profits are $\pi = t - \theta q$,where q stands for output and t as a transfer that the firm receives from the local government. The local government maximizes the following payoff: $S(q) - t$, where $S'(q) > 0, S''(q) < 0$.You can assume that the reservation utility of the firm is zero.

(i) Compute as a reference case the optimal contract (transfers t_i and output levels q_i) in the case of first best (symmetric information).

(ii) Compute the optimal contract (transfers t_i and output levels q_i) under asymmetric information, when the local government does not know the firm's type.

(iii) How does the target output level q_2 for the inefficient type that you derived in **(ii)** change when $\Delta\theta$ decreases? How does the target output level q_2 for the inefficient type change when λ increases? Explain the economic intuition behind these changes in q_2?

4. Peer-to Peer markets also known collectively as a sharing economy has emerged as an alternative way of supplying goods and services to consumers. In some markets the economic impact of a sharing economy "production mode" on the incumbent firms following more traditional ways of doing business have been substantial. It is only relatively recently that economists have started to pay attention to these new ways the market and marker participants operate:

i) How peer-to peer markets solve the market design problems in terms of search, matching customers and producers, pricing of goods and services and sustaining reputation?

ii) What are the simple economic principles and underlying economic conditions that make peer-to peer market to flourish?

iii) Based on what we have witnessed until now and having an understanding on the basic economic forces behind the success of peer-to-peer markets, in which markets/industries we can expect to see sharing economy "production mode" to appear in future?

THE QUESTIONS MUST BE RETURNED