



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF ECONOMICS

EET 400: MICROECONOMIC THEORY IV

DATE: Friday, 2nd December 2016

TIME: 11.00 a.m. - 1.00 p.m.

INSTRUCTIONS:

Answer Question ONE and any other TWO Questions

Question One (Compulsory)

- i. With help of relevant economic methodologies, state any four characteristics of a competitive market and demonstrate their implications. (12 marks)
- ii. Considering the two special cases under monopoly, demonstrate the effect of a change in the marginal cost of production on the price of the output. (10 marks)
- iii. Consider the following game depicting the process of standard setting in high-definition television (HDTV). The United States and Japan must simultaneously decide whether to invest in high or a low value into HDTV research. Each country's payoffs are summarized in the following figure.

US/JAPAN	Low	High
Low	(4,3)	(2,4)
High	(3,2)	(1,1)

- a) Are there any dominant strategies in this game? (2 marks)
- b) Suppose now that the US has the option of committing to a strategy before Japan's decision is reached. Model this situation by a game tree and solve it by backward induction (6 marks)

Question Two

- a) Prove mathematically that the supply curve of a profit maximizing firm is the positively sloped part of the marginal cost curve above the average variable curve. (5 marks)
- b) In game scenario where firms compete to win the market share, if a firm does not play its Nash equilibrium strategy, the opponent must always stick to its Nash equilibrium strategy. True and False? (5 marks)
- c) Monopolist output is social welfare maximizing. True or False? (5 marks)
- d) A competitive equilibrium is a pareto efficient equilibriums. True or False? (5 marks)

Question Three

- i. Consider a case of two goods, an x good and a y good, and two agents. Each agent cares about the other's consumption of the x good, but neither agent cares about the other's consumption of the y good. The initial units of the x good and the y good are $\bar{x}$ and $\bar{y}$ respectively. Derive the general efficiency conditions in the presence of externalities. (10 marks)
- ii. Derive the condition for efficient provision of a continuous public good. (10 marks)

Question Four

Suppose two firms produce an identical good. The (inverse) demand function for the good is given as $P = 130 - Q$, where Q is the total quantity produced by the two firms. Each firm had a constant marginal cost 10 of producing the good and a fixed cost of 100.

- a) Suppose firms compete as quantity setting duopolists. Find the Cournot Nash equilibrium of this game. What quantities will they produce, what is the market price and how much profit does each firm earn? [3 Marks]
- b) What happens if firm 2's marginal cost becomes private information and takes either 0 or 10 with probability 1/2? Note that only firm 2 knows the true cost while firm 1 cannot observe it. Assume firm 1's cost remains to be 10 and this information is common knowledge. Find Bayesian Nash equilibrium at this game. What quantities will they produce? *{Note that firm 2's strategy is a function (or, a complete plan of actions depending on realized costs) from each possible cost to its output}* [4 Marks]

- c) Now, suppose firm 1 decides how much to produce first; firm 2 chooses only after observing firm 1's choice. Find the sub-game perfect Nash equilibrium (Stackelberg equilibrium) of this game. What quantities will they produce, what is the market price and how much profit does each firm earn? [3 Marks]
- d) Suppose the firms form a cartel: each firm produced the same output and maximizes their joint profit. What quantity would each firm produce? What would be the market price? What would be the profit of each firm [4 Marks]
- e) Now suppose the firms play this Cournot game infinitely many times, and discount future profits at a discount factor δ . For what value of δ is there an equilibrium where firms follow the "trigger strategies". *{Note in trigger strategies, each firm produces the cartel output in (your answer in (d)) as long as no firm has deviated before, and starts producing the Cournot output forever after someone deviates}* [6 Marks]

Question Five

State and prove the two fundamental theorems of welfare economics. (20 marks)