**CHUKA**                                                    **UNIVERSITY**

## UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF**
**MASTER OF SCIENCE IN ECONOMICS**

**MSEC 812: ADVANCED MICROECONOMIC THEORY**

**STREAMS: MSEC**                                        **TIME: 3 HOURS**

**DAY/DATE: MONDAY 03/12/2018**               **2.30 PM – 5.30 PM**

**INSTRUCTIONS:**

**ANSWER ALL QUESTIONS**

**QUESTION ONE**

(a)     Explain clearly the theory of second best as used in economics.          [5 marks]

(b)     State whether the following statements are True, False or Uncertain. Explain your answers         using functions of your choice and show your workings

(i)     The upward sloping part of Marginal Cost (MC) curve above the Average Fixed
Cost (AFC) curve represent the supply function of perfect competitive firm.                                                                                                          [5 marks]

(ii)     The marginal cost curve of a perfectly competitive firm cuts the average cost curve         from below at its minimum point.                              [5 marks]

(iii)     The joint profit of the oligopolistic firms will be higher than the monopolistic profit,         but lower than the competitive profit.                         [10 marks]

(c)     (i)     With the use of well labeled diagram, explain the inefficiency associated with
monopoly                                                                                                              [5 marks]

(ii)     consider a monopolist who faces the following demand function;
P=100-Q. In addition, the monopolist's total cost function is as; TC= +50+40Q,
where P is price per unit of output and Q is output produce and sold.

Compare the monopolist's equilibrium and a competitive equilibrium. What is the value of deadweight loss due to the monopoly behavior?
    [10 marks]

**QUESTION TWO**

(a)    Consider a market with three oligopoly firms. Suppose that the market demand curve is given by P=80-Q, where $Q=q_1+q_2+q_3$. Supposed there is a constant marginal cost of 10. Suppose these firms choose quantities as follows; first firm 1 choses $q^1$. Then firms 2 and 3 observe $q^1$ and then simultaneously choose $q^2$ and $q^3$ respectively. Calculate the equilibrium quantities, price and profits.                    [8 marks]

(b)    The following information is for an extended Cournot model to n number of firms. P=a-Q where $Q=q_1+q_2+q_3+….+q_n$

    Required:
    (i)    Compute the equilibrium quantities, price and profits.              [6 marks]

    (ii)    How does entry affect the equilibrium output (Q), price (P) and profit of the industry? Show your working clearly.                              [6 marks]

**QUESTION THREE**

Consider a hypothetical market share war game between Celtel Kenya and Safaricom. The game begins after Celtel Kenya has announced a reduction of the charges on its cellphone services to its subscribers to Ksh 1 per minute every day from 11 pm to 5am. Safaricom moves first, and can either chose not to react to Celtel's action or defend its market share position. If Safaricom chooses not to react, the game ends; Safaricom gets a payoff of 0 and Celtel gets a payoff of 10. If Safaricom prepares a defense to protect its market share position, it can either lower the daily call charges on its services to its subscribers to ksh 2 per minute from 2pmto 8 pm, or lower daily call charges from Safaricom to Safaricom to Ksh 5 per minute for the whole day. Safaricom knows which defense strategy it is preparing but Celtel does not.
Celtel Kenya has to decide whether to rely primarily on lowering its charges on calls made to other networks by its subscribers to ksh 4 per minute or to introduce free services on Friday 5pm to 10pm.

If Safaricom charges Ksh 5 per minute and Celtel Kenya charges Ksh 4 per minute, Safaricom gets a payoff of -1 and Celtel gets a payoff of 1. If Safaricom charges Ksh 2 per minute and Celtel Kenya introduces free services on Friday, Safaricom gets a payoff of 3 and Celtel gets a payoff of 0. If Safaricom charges Ksh 5 per minute for the whole day and Celtel Kenya introduces free service day on Friday from 5pm to 10 pm, Safaricom gets a payoff of 2 and Celtel gets a payoff of -2. If Safaricom lowers the daily charges on its subscribers Ksh 2 per minute from 2pm to 8pm and Celtel Kenya lowers the charges on calls made to other networks by its subscribers Ksh 4 per minute, Safaricom gets a payoff of -1 and Celtel gets a payoff of -1.

Required:

(a)     Set up the payoff matrix of this game                                    [2 marks]

(b)     Identify the Nash Equilibrium of the game                          [2 marks]
(c)     Draw the game tree for this game                                        [4 marks]

(d)     Describe how the Celtel Kenya's optimal strategy depends on his beliefs about Safaricom's   strategy.                                                                                  [6 marks]

(e)     Describe how Safaricom's optimal strategy depends on the Celtel's strategy.
                                                                                                      [6 marks]

**QUESTION FOUR**

Consider the following principal agent situation. We have a principal, P and an agent A. P wants to hire A for a one-time project. If A works for P, A can choose high effort, $e_H$, or low effort $e_L$.

Profits are either high, medium or low $\left(\pi_H, \pi_M \vee \pi_L, where\, \pi_H > \pi_M > \pi_L\right)$ if A chooses $e_H$ then profits are $\pi_H$ with probability $P_{HH}, \pi_m$ with probability $P_{HM}$ and $\pi_L$ with probability $1 - P_{HH} - P_{HM}$. If A chooses $e_L$ then profits are $\pi_H$ with probability $P_{LH}, \pi_m$ with probability $P_{LM}$ and $\pi_L$ with probability $1 - P_{LM} - P_{LM.}$ P maximizes expected profits from the project, less the expected wages to the agent A. P maximizes expected utility as follows given a wage, w, and effort, e .
$U\left(w, e\right) = V\left(w\right) - e$

Where V'(w)>0 and V''(w)<0
P designs a contract, A then accepts it or not, and if A accepts, A then chooses an effort level. Assume that A has a reservation utility level of $U_0$

(a)     Show how to implement $e_L$ and $e_H$ if effort is observable and verifiable and agent is risk  averse.                                                                              [8 marks]

(b)     Answer part (a) above given that the agent is risk neutral.              [4 marks]

(c)     If e is not observable and agent is risk neutral, show that P can still obtain the same payoffs      as in case (a)                                                                   [8 marks]
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