

KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
ECONOMICS,**

EET 400: MICROECONOMIC THEORY IV

DATE: Tuesday 30th January 2018

TIME: 4.30 p.m.– 6.30 p.m.

Answer question ONE and any other TWO

QUESTION ONE (30 MARKS)

- a) Prove algebraically that a competitive firm produces positive output from a point in which price is equal to the minimum average variable cost. (5marks)
- b) Given a competitive market with m identical firms each with cost function $c_i(y_i) = 2y_i^2 + 4$ and five consumers each with demand function $x_i(p) = 20 - \frac{1}{2}P$.

Required:

- i) Determine the market equilibrium price and output level (5marks)
- ii) Compute and explain the effect of increase in the number of firms in the market on the market price. (5marks)
- c) Distinguish between the first, second and third degree price discriminations (5marks)
- d) With the help of relevant algebra and marginal analysis technique, show and explain the effect of monopolist's output quality and quantity on the social welfare (10 marks)

QUESTION TWO

- a) Assuming two agents with endowments for private good W_i , which they can use to contribute g_i for the provision of a public good G . if the public good is discrete with marginal cost equals c , show that the efficient provision of the good will take place if and

only if $r_1 + r_2 > c$, where r_1 is the agent i 's reservation price for the public good.

(6marks)

b) Now assume that the public good is continuous and marginal cost equals 1, show that the efficient provision of the public good will take place where $MRS_1 + MRS_2 = 1$

(10marks)

c) Define the following terms in game theory

(4marks)

i) Nash equilibrium

ii) Dominant strategy

iii) Zero sum game

iv) Sequential game

QUESTION THREE

a) With illustrations briefly discuss the theorems of welfare

(10marks)

b) Given

$$\text{Max } u_A(x_A^1, x_A^2)$$

st

$$u_B(x_B^1, x_B^2) = \bar{u}_B$$

$$x_A^1 + x_B^1 = w_A^1 + w_B^1$$

$$x_A^2 + x_B^2 = w_A^2 + w_B^2$$

Prove that a Pareto efficient allocation is one such that $MRS_{12}^A = MRS_{12}^B$ (10marks)

QUESTION FOUR

Consider a case of two firms, firm 1 and 2 located along a river. Firm 1 is located upstream and firm 2 downstream. Firm 1 has a production function of the form $y_1 = 50L_1^{0.5}K_1^{0.5}$

Where L_1 is the number of workers hired per day and y_1 is the level of the firm 1's output.

Firm 2 has a similar production function but its output might be affected by chemicals firm 1 empties into the river. The production function for firm 2 is given as

$$y_2 = 50L_2^{0.5}K_2^{0.5}(y_1 - y_0)^\alpha \text{ for } y_1 > y_0$$

$$y_2 = 50L_2^{0.5}K_2^{0.5} \text{ for } y_1 \leq y_0$$

Where y_0 represents the river's natural capacity for neutralizing pollutants, L_2 is the number of workers hired per day and y_2 is the level of firm 2's output. If $\alpha = 0$ the production of y_1 has no effect on y_2 . If $\alpha < 0$ an increase in y_1 above y_0 causes y_2 to decline. Assuming that the capital is constant at $K_1 = K_2 = 1600$; both firms sell output at ksh 100 per unit and workers earn ksh 500 per day

- i) Find the optimal levels of labor and output for both firms in absence of externalities ($\alpha = 0$) (4marks)
- ii) Find the optimal levels of labor and output for both firms when firm 1 has a negative externality. Assume $\alpha = -0.1$ and $y_0 = 30,000$ (6marks)
- iii) Further suppose that firms 1 and 2 can merge and that the manager must decide how to allocate the combined labor force. If one worker is transferred from firm 1 to firm 2, determine the effect on total output and comment on the efficiency of market based allocation in part ii. (6marks)
- iv) According to A.C Pigou, the most direct solution to the problem of externality would simply be to tax the externality – creating entity. Thus a suitable chosen tax on firm 1 can cause it to reduce its hiring to a level at which the externality vanishes. Determine the level of tax that will make firm 1 to reduce its production to $y_1 = y_0 = 30,000$ (4marks)

QUESTION FIVE

Consider an industry with two firms each having a marginal cost equals to zero. The inverse demand curve facing the industry is given as $P(Y) = 100 - Y$. where $Y = y_1 + y_2$

Required:

- a) If each firm behaves as a Bertrand competitor, what is the firm 1's optimal choice given firm 2's output (5marks)
- b) Calculate the Cournot's equilibrium amount of output for each firm (5marks)
- c) Calculate the cartel amount of output for the industry (5marks)
- d) If firm 1 behaves as a follower and firm 2 behaves as a leader, calculate the Stackelberg equilibrium output of each firm. (5marks)