MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411
Fax: 064-30321
Website: www.must.ac.ke Email: info@must.ac.ke

University Examinations 2013/2014

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF COMMERCE

AND

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF PURCHASING AND SUPPLIES MANAGEMENT

HBC 2205 / HPS 2241: INTERMEDIATE MICROECONOMICS THEORY

DATE: APRIL 2014 **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE – (30MARKS)

(a) Label each of the following statements TRUE, FALSE, OR UNCERTAIN and justify your answer:

(i) A consumer with convex, well-behaved indifference curves is indifferent between two bundles of $X = (4, 1)$ and $Y = (2, 9)$. She therefore prefers the bundle (3,6) to either of the first two. (4 Marks)

(ii) If a production technology with two inputs exhibits decreasing returns to scale, then it must be the case that marginal returns to each input is diminishing. (4 Marks)

(iii) If price of all inputs rise by 10%, the firm's cost of producing Y units of output will rise by less than 10% if the technology exhibits increasing return to scale, and will rise by more than 10% if it exhibits decreasing return to scale. (4 Marks)

(iv) A firm producing the same product in several plants will organize production such that the resulting marginal costs are equal in all plants. (4 Marks)

(b) A firm has two plants with cost functions $c_1(y) = \frac{y^2}{2}$ and $c_2(y) = y$. What is its minimal cost of producing an output $y > 1$ (4 Marks)

(c) Office space in a building Q, is equal to the number of floors, F, times the number of square meters per floor, L. The capital needed to build a building with F floors of size L per floor is $K = L\ exp^{(F-1)}$. Find the production function for office space, Q, as a function K and L, and determine whether returns to scale are constant, increasing or decreasing. (Hint: $\ln exp^x = x$) (4 Marks)

(d) Mark launders his coloured clothes using the production function $q = 2S + 05F$, where F is the number of sups of Sunlight detergent powder and F is the number of cups of clothes softener. Draw an isoquant. What is the marginal product of S? what is the marginal rate of technical substitution at each point on the isoquant? (6 Marks)

QUESTION TWO – (20 MARKS)

A perfectly competitive industry consists of a large number of firms. Each firm in this industry has the following production technology: $y = (x_1 x_2)^{\frac{1}{4}}$. The price of the output is p, and the prices of the inputs $w_1\ and\ w_2$, are both equal to 1. All firms incur a non-sunk fixed cost $F = 2$ if they choose to produce $y > 0$. In case they choose $y = 0$, they do not incur any long-run fixed costs. The demand for the output is given by: $D(p) = 100 - 10p$.

(a) Determine the cost and supply function of each firm. (8 Marks)

(b) What is the competitive equilibrium? This includes finding:

(i) The equilibrium value of p. (4 Marks)

(ii) The output/production of each firm, (4 Marks)

(iii)The equilibrium number of firms. (4 Marks)

QUESTION THREE – (20 MARKS)

Colonel Blotto has four companies that he can distribute among three locations in three different ways: $(3,1), (2,2)\ and\ (1,3)$. His opponent, Colonel Baloney has three companies that can distribute among the same two locations in two different ways: $(2,1) and\ (1,2)$. Suppose that Blotto sendsm_1 companies to location 1 and Baloney sends $n_1$companies to location 1. If $m_1 = n_1$, the result is a standoff and each commander gets a payoff of zero for location 1. If $m_1 \neq n_1$, the larger force overwhelms the smaller force without loss to itself. If $m_1 > n_1$, Blotto gets a payoff of $-m_1$ and Baloney gets a pay-off of $-n_1$ for location 1. Each player's total payoff is the sum of his payoffs at both locations.

(a) Find the strategic form representation of this simultaneous move game. (10 Marks)

(b) Show that there is no saddle point (i.e. show that the minimax and maximin values of the game are not equal) (5 Marks)

(c) Find the mixed strategy Nash equilibrium. (5 Marks)

QUESTION FOUR – (20 MARKS)

A monopolist supplies rides at an amusement park. There is a large pool of identical consumers. The inverse demand for rides of each consumer, $p(q)$, is shown in the figure below. The capital letters in the figure represent the corresponding areas. The per-unit cost of supplying rides has two components: c, the cost of supplying the equipment and d, the cost of printing and collecting tickets at each ride. Each per-unit cost is independent of the number of rides offered at the park. The monopolist is considering two pricing policies:

Policy 1: an entrance fee and a per-unit charge for each ride.

Policy 2: Just an entrance fee. The advantage of this policy is that the monopolist does not incur the costs of printing and collecting tickets.

Using the information given in the graph, determine the following under each policy:

(a) The entrance fee (4 Marks)
(b) Per-unit charge (4 Marks)

(c) Total number of rides supplied per consumer (4 Marks)
(d) Total profits under policy 1 and, (4 Marks)
(e) Total profits under policy 2. (4 Marks)

QUESTION FIVE – (20 MARKS)

Suppose that identical duopoly firms have constant marginal costs of 10/= per unit. Firm 1 faces a demand function of $q_1 = 100 - 2p_1 + p_2$, where q_1 is firm 1's output, p_1 is firm 1's price and $p_2$is 2's price. Similarly, the demand firm 2 faces is $q_2 = 100 - 2p_2 + p_1$.

(a) Solve for the Bertrand equilibrium. (10 Marks)
(b) Solve for the Bertrand if firm 1's marginal cost is 30/= per unit and firm 2's marginal cost is 10/= per unit. (10 Marks)