SFMS/14/15/0510

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DEPARTMENT OF ECONOMICS
2016/2017 HARMATTAN SEMESTER EXAMINATION

Course Code /Title: ECO 301/Intermediate Microeconomics

Instruction: Attempt any four questions
Time Allowed: 2 Hours

1. Given $U = q_1 q_2 - q_1^2$, where q_1 and q_2 are consumer goods with prices P_1 = N30 and P_2 = N60, if the consumer has a budget of N9000 to spend on these commodities

(a) determine the quantities of q_1 and q_2 that maximize his utility.

(b) Show that in the above case the FOC is satisfied where the SOC is satisfied.

(c) With the aid of a well-labeled diagram, explain the substitution and income effects of change in price for an inferior good. **(17.5 marks)**

2. Given the consumer's utility function U=AB and a budget constraint equation: $Y = P_A A + P_B B$, where P_A is the price of good A and P_B is the price of good B, derive:

(a) The consumer's ordinary demand functions for goods A and B

(b) The consumer's compensated demand functions for goods A and B.

(17.5 marks)

3. (a) Given the inverse demand function of a multiplant monopolist as $P = 100 - 0.5q$, where $q = q_1 + q_2$ and the cost facing the two plants as $C_1 = 10q_1$ and $C_2 = 0.25q_2^2$, determine:

(i) Equilibrium quantities to be produced in the two plants

(ii) Total profit of the monopolist.

(b) Given that the inverse demand functions for segmented markets are: $P_1 = 40 - 2.5q_1$ and $P_2 = 90 - 5q_2$ with the cost function given as: $C = 25 + 20q$, solve for: (i) q_1 and q_2 (ii) prices of q_1 and q_2 (iii) elasticity of demand in the two markets (iv) Total profit

(17.5 marks)

4. (a) Given X = f(K,L) with a financial (cost) constraint Y = rK + wL, derive mathematically the equilibrium conditions (first and second-order conditions) of the firm using the Lagrangier Multiplier.

(b) A firm homogeneous production function is given as $Q = AL^{\alpha}K^{\beta}$, derive the following concepts to show their economic relevancies: (i) marginal product of factors, MP_L and MP_K (ii) the marginal rate of technical substitution ($MRTS_{L,K}$) (iii) elasticity of substitution ($\sigma_{L,K}$) (iv) the factor intensity (v) returns to scale. **(17.5 marks)**

5. (a) *Illustrate the choice of optimal expansion path for homogeneous production function in the long-run and in the short-run.*

(b) *Assuming that a firm's short-run total cost function is:* $C = 2q^3 - 20q^2 + 34q + 132$, *determine: (i) The output level at which he maximizes profit if* $P = N10$. *(ii) The output elasticity of cost at this output.*

(c) *A Cobb-Douglas production function is given as:* $Q = 2000K^{0.5}L^{0.5}$ *where* $r = 40$, $w = 60$ *and* $C(q) = 120{,}000$ *represent the factor prices of K and L as well as the total cost respectively.*

(i) Determine the quantities of inputs of K and L that maximize output.

(ii) Ascertain the optimal output. **(17.5 marks)**

6. (a) *Enumerate* **six** *peculiar features of perfect competition.*

(b) With the aid of graph, distinguish between the short-run equilibrium of a perfect competitor.

(c) Explain any **four** *conditions that could make price discrimination to be successful.*

(d) With the aid of diagram, demonstrate the equilibrium position (maximization of output) of a firm with output $X = f(K, L)$ *subject to financial (cost) constraint* $Y = rK + wL$. **(17.5 marks)**