OLABISI ONABANJO UNIVERSITY, AGO-IWOYE
FACULTY OF THE SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
HARMATTAN SEMESTER EXAMINATION 2017/2018 SESSION

Course Code: ECO 401
Course Title: Advanced Microeconomics **Time Allowed: 2Hrs 15 Minutes**

Instructions: *(1) This question comprises of **TWO PARTS** and each part must be answered in **DIFFERENT BOOKLET;** well labeled accordingly as provided.*
*(2)Attempt Any **Three Questions** in Part A and **Question ONE** is compulsory.*
*(3) Attempt Any **One Question** in Part B*

PART A: *Attempt Any **Three Questions** in Part A in a Separate Script as provided and **Question ONE** is compulsory.*

Question 1a: *Answer TRUE, FALSE or AMBIGOUS with brief explanation to justify your choice.*

i. A production function is assumed to be regular strictly quasi concave function when profit is maximized.
ii. When a non-homogeneous production function has degree less than 1 it is referred to as a situation of increasing returns to scale.
iii. An increase in one input, with a decrease in the other will result in greater output shifting the isoquant upward.
iv. A rational producer will select only inputs combinations which lie on the expansion path.
v. Monopolistic competition is akin to perfect competition in the sense that each seller possesses a negatively sloped demand curve for her product.
vi. The production function of the form $Q = Ax_1^{\beta} x_2^{1-\beta}$ belongs to the CES class.
vii. The demonstration of bordered Hessian determinant in the theory of demand always ends at convexity cum concavity.
viii. The Cardinalist approach is a twin's sister to Ordinalist approach to utility maximization.
ix. The second order condition (SOC) for a profit maximizing monopolist requires that the slope of the marginal cost must be equal to the slope of the marginal revenue.
x. Competitive market equilibrium will exist if there is one or more non-negative prices at which demand equal supply are equal in any quadrant. **15 marks**

Question 1b: Short Answer Questions

i. Given two commodities 1 and 2; if the prices of these commodities are N3 and N4 respectively and units of commodity 1 and 2 consumed are 10 and 15 inversely while the consumer's income is N100. Assuming that $\varepsilon_{11} = -0.9$ and $\eta_2 = 1.5$, find cross elasticity of demand and income elasticity of demand for commodity 1. (Hint: ε_{11} is price elasticity of demand and η_2 is income elasticity of demand for commodity 2).

ii. State the properties of the function $Q = aK + bL$, where Q is output, K is unit of capital and L is unit of labour.

iii. With a well labelled diagram only, distinguish between short-run and long-run costs.

iv. What do you understand by 'Conjugal Variation'?

v. State the conditions that necessitate the decreasing in profit of a firm in a perfect market.

vi. Enumerate the assumptions of this function $q = f(\bar{X}_1 X_2)$ if X_i is an input and i ranges from 1 to 2 with a fixed input.

vii. State the conclusions that can be derived from these functions: $P^1X^1 \geq P^1X^2 \Rightarrow P^2X^2 \prec P^2X^1$; $P^2X^2 \geq P^2X^1 \Rightarrow P^1X^1 \prec P^1X^2$

viii. Consider the Cobb-Douglas production function $f(k_1, k_2) = Ak_1^{\beta_1} k_2^{\beta_2}$.

(a) Determine the marginal rate of substitution of production factor 1 for production factor 2 in the production factor bundle $(k_1, k_2) = (3,4)$.

(b) What type of returns to scale has this production function?

ix. Solve the function $q = x_1 x_2$ using scalar approach and Euler's approach. **15 marks**

Question 2

(a) Derive an expression for the followings: (i) Cournot Aggregate Solution (ii) Engel Aggregate Solution. (iii) The relationship between average product and marginal product.

(b) Two firms are duopoly with differential ideas in which the demand and cost functions $p = 100 - 0.5(q_1 + q_2), C_1 = 5q_1$, and $C_2 = 0.5q_2^2$ respectively. Find the quantities produced, prices and the duopoly respective profits if (i) to be a quasi-competitive; (ii) to act in collusive solution (iii) to maintain Cournot solution and; (iv) Duopoly I and II is a leader and follower respectively.

(c) State the two conditions that make profit function to be strictly concave. **15 Marks**

Question 3

(a) The function, $u(x_1, x_2) = (x_1^{\rho} + x_2^{\rho})^{\frac{1}{\rho}}$, where $0 \neq \rho < 1$, is known as a CES utility function, verify that this utility function represents preferences that are strictly monotonic and strictly convex.

(b) Show that consumer's expenditure on q_1 is $q_1 (1+\varepsilon_{11})$ and interpret your result in respect to change in the price of commodity one using the range of $-1 < \varepsilon_{11} < 2$

(c) A firm Cobb Douglas production function $q = x_1^{\alpha} x_2^{\beta}$, and its cost constraint is $C = r_1 x_1 + r_2 x_2$, find the (i) rate of technical substitution (ii) input demand function of x_1 and x_2. **15 marks**

Question 4

(a) Determine the domain of the following utility functions if they are regular strictly quasi-concave and convex: $U = q_1^{0.2} + q_2^{0.3}$, $U = q_1^{0.7} q_2^{0.4}$.

(b) The monotonic consumer's utility function is given as $U = q_1^6 q_2^4 + 1.5 \ln q_1 + \ln q_2$ and his budget constraint is $3q_1 + 4q_2 = 100$, find the optimum ordinary and compensated commodities purchased by the consumer. Hence, calculate the marginal income spent by the consumer in deriving extra satisfaction from the commodities bundle.

(c) Define production function and describe the underlying assumptions. **15 marks**

PART B: *Attempt Any* ***One Question.***

Question 5

An hypothetical economy has two consumers A and B. The satisfaction function and the budget lines' equations of the two consumers are as follows: $U_A = 6X_A^2 + 4X_B^2$, $U_B = 4X_A + 4X_B^3$, $Y_A = 4X_A + 6X_B = 120$ and $Y_B = 6X_A + 8X_B = 240$. Each consumer consumes his respective goods.

a. Confirm the satisfaction of the Pareto Optimality in exchange.

b. The same economy has two firms A and B using labour and capital inputs. Their respective equal-quantities functions are: $Q_A = 2L^2 + 6\sqrt{K}$ and $Q_B = 4L^2 + 6\sqrt{K}$ while their similar equal-cost equation is $6L + 10K = 4800$. Assuming firm A specialized in the utilization of capital only, justify whether the Pareto Optimality condition of production is satisfied or not.

c. The economy's isoquant function possibility curve is specified as $Q = 6L^2 + 10\sqrt{K}$ and the price line ratio is given as $\frac{P_A}{P_B} = \frac{1}{2}$, confirm the satisfaction or otherwise of Pareto Optimality in both exchange and production. **15 marks**

Question 6

a. Define the term Social Welfare function and discuss the concept relating to Arrow's impossibility theorem.

b. With the use of algebraic and graphical analysis, discuss the pre-conditions for Pareto Optimality. Hence, highlight any four shortcomings of the criteria. **15 marks**