Course Code: ECN 410 (3 credits)   **Course Title:** Microeconomic Theory II
Date: December 14th, 2020   **Time Allowed:** 1hour 30mins.

Instruction: Answer Question 1 And any other one question

1. Suppose Kayode has the following utility functions $U(x, y) = AX^\alpha Y^\beta$ **where α + β = 1 where X** represents his consumption of books and **Y** his consumption of data bundle for his online classes. The prices of books and data bundle are P_x and P_y respectively. Let **M** represent his money income.

(a) What the type of utility function does Kayode have?   1 mark
(b) Derive Kayode's uncompensated demand functions for books and data bundle   6 marks
(c) Obtain Kayode's indirect utility function for books and data bundle.   2 marks
(d) Derive his Hicksian demand functions .   6 marks
(e) Obtain and compute his expenditure function.   2 marks
(f) If Kayode's income, M = ₦100,000, P_x = ₦120, P_y = ₦150 and A= 50. Determine Kayode's optimal

consumption bundle of X and Y in items (b), and (d) above.   6 marks
(g) Suppose that P_x rises to ₦130. Compute the substitution and income effect and the total effect of the

price change.   5 marks
(h) Based on the sign of the substitution and income effect in (g), provide some economic explanation to why rational behind the signs and hence the nature of the good.   1 marks
(i) State the Slutsky equation in examining the income and substitution effect   1 mark

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30 Marks

2a.   State any two properties of the following
i. The indirect utility function   2 marks
ii. The expenditure function   2 marks
2b. i. Using graphical illustration provide clear explanation to the term returns to scale   1.5 marks
ii. Determine the nature of return to scale exhibited by the following production function below and explain the implication on the production process.

$$i. \quad F(Z_1, Z_2) = (Z_1^2 + Z_2^2)^{\frac{1}{2}}$$ 1.5 marks

$$ii. \quad F(Z_1, Z_2) = (Z_1 + Z_2)^{\frac{1}{2}}$$ 1.5 marks

$$iii. \quad F(Z_1, Z_2) = Z_1^2 + Z_2$$ 1.5 marks

10 marks

3. a. Given the production function $Y = L^\alpha K^{1-\alpha}$ where L depicts labour input and K capital input used in production
i. Determine the marginal product of capital and labour   2 marks

ii. Derive the elasticity of substitution   4 marks

b. Provide clear explanation to the various forms of elasticity of substitution depicting each form using an isoquant map.   4 marks

10 marks