

CHUKA



UNIVERSITY

RESIT/ SPECIAL EXAMINATIONS

EXAMINATION FOR THE AWARD OF

ECON 230: MATHEMATICS FOR ECONOMICS I

STREAMS:

TIME: 2 HOURS

DAY/DATE: TUESDAY 24/07/2018

11.30 AM – 1.30 PM

INSTRUCTIONS:

Answer question one and any other two

Question One

(a) Find the derivatives of the following functions

(i) $y = 3x + 4x^3 - 2x^3$ [2 marks]

(ii) $y = \frac{3x+1}{x^3+1}$ [2 marks]

(iii) $f_{xy} = 20x^2y$ [2 marks]

(b) (i) Given the following production function $Q = 8K^{\frac{1}{2}}L^{\frac{1}{4}}$ find the MPL and MPK and compare the magnitude of MPL and MPK and APL and APK respectively.

[8 marks]

(ii) Determine whether or not the function are characterized to diminishing return to factor input. [6

marks]

(c) The national income model is given by

$$Y = C + I + G$$

$$c = a + by$$

$$I = I_o + I_1 Y$$

$$G = i G_o$$

Use matrix to calculate equilibrium income (I) consumption (E) and investment (T) [10 marks]

Question Two

(a) Determine the homogeneity of the following function and comment on returns to scale

(i) $f(x, y) = x^3 + x^2y + y^3$ [5 marks]

(ii) $f(x, y) = \frac{x^2 + xy}{y^2}$ [5 marks]

(b) (i) Demonstrate Euler's theorem

$Q = AK^{\frac{2}{5}}L^{\frac{8}{5}}$ [8 marks]

(ii) Command on returns to scale [2 marks]

Question Three

(a) Find the partial elasticity of Q with respect to K and L given the following production function $Q = AK^\alpha L^\beta$ [10 marks]

(b) Express MPL in terms above in terms of B, Q and L and MPK in terms of α , Q and K [10 marks]

Question Four

(a) Consider the following 4 sector input output

	1	2	D	X
1	α_{11}	α_{12}	D_1	X_1
2	α_{21}	α_{22}	D_2	
V	V_1	V_2	D_3	
X	X_1	X_2		

(i) How much primary inputs are sector 2 purchased. [2 marks]

(ii) How much output has sector 1 sold to sector 2 [2 marks]

(iii) How much final demand has sector 2 produced. [2 marks]

(iv) Compute the sectoral output that will enable the economy to realize the planned final demand. [4

marks]

$$(b) \quad A = \begin{bmatrix} 3 & 2 & 7 \\ 5 & 1 & 0 \\ 6 & 2 & 4 \end{bmatrix}$$

- (i) Find the principle sub matrices. [5 marks]
(ii) Compute the corresponding principle minors. [5 marks]
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