



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF MANAGEMENT SCIENCES**

**DEPARTMENT OF ACCOUNTING, ECONOMICS AND FINANCE**

<b>QUALIFICATION: BACHELOR OF TECHNOLOGY IN ECONOMICS</b>	
<b>QUALIFICATION CODE: 12BECO</b>	<b>LEVEL: 7</b>
<b>COURSE CODE: AME311S</b>	<b>COURSE NAME: APPLIED MATHEMATICAL ECONOMICS</b>
<b>SESSION: JULY 2019</b>	<b>PAPER: THEORY</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>SUPPLEMENTARY/ SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	<b>MR EDEN TATE SHIPANGA</b>
<b>MODERATOR:</b>	<b>PROF T. SUNDE</b>

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li></ol>

**PERMISSIBLE MATERIALS**

1. PEN,
2. PENCIL
3. CALCULATOR

**THIS QUESTION PAPER CONSISTS OF 2 PAGES (Including this front page)**

**Question 1 [25 Marks]**

Consider the following microeconomic model.

$$\begin{aligned} Q_d &= D(P, Y_0) & [D_P < 0; D_{Y_0} > 0] \\ Q_s &= D(P, T_0) & [S_P > 0; S_{T_0} < 0] \end{aligned}$$

Where  $Y_0$  is income and  $T_0$  is the tax on the commodity.

Analyse the comparative statics of the model to find the effect of change in Income and Tax on the equilibrium Q and P? **25 marks**

**Question 2 [25 Marks]**

1. Use the Jacobian to test for functional dependence in the following system of equations

$$\begin{aligned} y_1 &= 6x_1 + 4x_2 \\ y_2 &= 7x_1 + 9x_2 \end{aligned}$$

**5 marks**

2. Maximize utility  $u = xy + x$ , subject to the budget constraint  $6x + 2y = 110$  by a) finding the critical values  $\bar{x}$ ,  $\bar{y}$  and  $\bar{\lambda}$ , b) use the Hessian bordered. **20 marks**

**Question 3 [25 Marks]**

In a three–industry economy, it is known that industry I uses 20 cents of its own product, 10 cents of commodity III and 60 cents of commodity II to produce a dollar’s worth of commodity I. Industry II uses 10 cents of its own product, 30 cents of commodity III and 50 cents of commodity I to produce a dollar’s worth of commodity II. While industry III uses none of its own product and commodity I; but uses 20 cents of commodity II in producing a dollar’s worth of commodity III. The open sector demands N\$ 1,000 billion of commodity I, N\$ 2,000 billion of commodity II and 500 billion of commodity III

- a) Write out the input matrix, and the specific input matrix equation for this economy. **10 marks**
- b) Find the solution output levels by Cramer’s rule. **15 marks**

**Question 4 [25 Marks]**

1. Given the marginal propensity to consume  $C'(Y) = 8 + 0.1Y^{1/2}$  and information that  $C = Y$  when  $Y = 100$ , find the consumption function  $C(Y)$ . **10 marks**

2. Evaluate the following

a)  $\int_0^4 \left( \frac{1}{1+3x} + 2x \right) dx$  where  $x \neq -1$

b)  $\int_0^4 (2x^3 - 1)^2 (6x^2) dx.$

**15 marks**

**Total**

**[100 marks]**