NATIONAL UNIVERSITY OF LESOTHO

B.A. ECONOMICS

EC2501: INTERMEDIATE MICROECONOMICS I

January 2024	100 Marks	Time: 3 hours

Instructions*:*

Use your time wisely. If you get stuck on a question move onto the next question and return if time permits.

• There are two sections to the examination:

Section A: Answer any two questions from this section.

Section B: Answer any two questions from this section

Question 1

a. Suppose Mathabo has two 5-year-old girls, Mpho and Mphonyane, at home. She begins the day by giving each girl 10 toy cars and 10 princess toys. She then asks them to plot their indifference curves that contain these endowment bundles on a graph with "cars" on the horizontal and "princess toys" on the vertical axis. Mpho's indifference curve appears to have a marginal rate of substitution of -1 at her endowment bundle, whereas Mphonyane's appears to have a marginal rate of substitution of -2 at the same bundle.

    i)   Assume Mathabo does not actually have any toys in her store and simply wants her store to help the girls make trades between themselves and she fixes the price at which princess toys are bought and sold to R1. Without being specific about what the price of toy cars would have to be, illustrate, using final indifference curves for both girls on the same graph, a situation where the prices in Mathabo store result in an efficient allocation of toys. **(5)**

    ii)   What values might the price for toy cars take to achieve the efficient trades you described in your answer to (**i**)? **(5)**

b. As a student, assume you have no exogenous income but you own 6 pairs of shirts and 2 pairs of jeans. The price of the shirt is R200, and the price of one jean is R600. On a graph with shirts on the horizontal axis and jeans on the vertical axis,

    i)   Illustrate your budget constraint. **(4)**

    ii)   How does your constraint change when the price of the shirt decreases to R100? How does this change affect your opportunity cost of jeans? **(3)**

                               i. Suppose NUL students have a monthly income of R1,100, and they allocate half of this amount among two goods; Eggs and Yogurt.

i) Suppose a tray of eggs costs R55 while yogurt costs R22 per case. Draw budget constraint (BC) for a typical NUL student, indicating clearly the intercepts and slope of the BC, with yogurt on the horizontal axis. **(5)**

ii) In NUL's Innovation Hub, there is a special promotion. If a student buys 10 cases of yogurt (at R22 per case), he/she gets the next 5 cases for free. This offer applies only to the first 10 cases students buy. All cases of yogurt in excess of the first 10 cases (excluding bonus cases) are still R22 per case. On the new graph, draw the student's budget constraint, with yogurt on the horizontal axis. **(3)**

Question 2

Suppose you have R10,000 sitting in a savings account, 600 hours of leisure time this summer, and an opportunity to work at a R30 hourly wage. Next summer is the last summer before you start working for a living, and so you plan to take the whole summer off and relax. You need to decide how much to work this summer and how much to spend on consumption this summer and next summer. Any investments you make for the year will yield a 10% rate of return over the coming year.

a. On a three-dimensional graph with this summer's leisure (L,), this summer's consumption (C1), and next summer's consumption (C2) on the axes, illustrate your endowment point as well as your budget constraint. Carefully label your graph and indicate where the endowment point is. **(5)**

b. How does your answer change if you suddenly realize you still need to pay R5,000 in tuition for next year, payable immediately? **(5)**

i) How does your answer change if instead the interest rate doubles to 20%? **(5)**

ii) Derive the mathematical expression for your budget constraint and explain how elements of this expression relate to the slopes and intercepts you graphed. **(10)**

Question 3

a. Suppose beer comes in 6 and 12 packs. In this exercise, we will see how your model of tastes for beer and other consumption might be affected by the units in which we measure beer. Let X_1 represent beer and let X_2 represent Rands of other consumption. Suppose that, when X_1 is measured in units of 6-packs, your tastes are captured by the utility function:

$$U(X_1, X_2) = X_1 X_2.$$

    i)   What is the MRS of other goods for beer and what does the MRS have to be if X_1 is measured in units of 12-packs? **(5)**

    ii)   Use this example to explain why it is useful to measure the substitutability between different goods using percentage terms rather than basing it simply on the absolute value of slopes at different bundles? **(5)**

b. Mpho cares about how much money she has in her pocket. She doesn't care whether a particular bill comes in R5 bills or R10 bills. Let R5 bills be denoted X_1 and R10 bills be denoted X_2.

    i)   Write down a utility functions that represents the tastes for R5 bills and R10 bills and calculate the marginal rate of substitution from the utility functions. **(5)**

    ii)   Can these tastes be represented by a utility function that is homogeneous of degree 1? Support your answer. **(5)**

    iii)   Do these tastes satisfy the concept of strong monotonicity, weak monotonicity, or local non-satiation? Explain. **(5)**

Section B

Question 4

    a. Discuss four important properties of an Indifference Curve. **(8)**

    b. Describe with the aid of appropriate diagram, "a Price Floor and Price Ceiling". Explain what impact a price floor has on the market. **(5)**

    c. Can you explain why tastes for perfect substitutes are the only tastes that are both quasilinear and homothetic? **(5)**

    d. In each of the following cases, can you tell whether a worker will work more or less as his wage increases? **Figure 1**: **(7)**
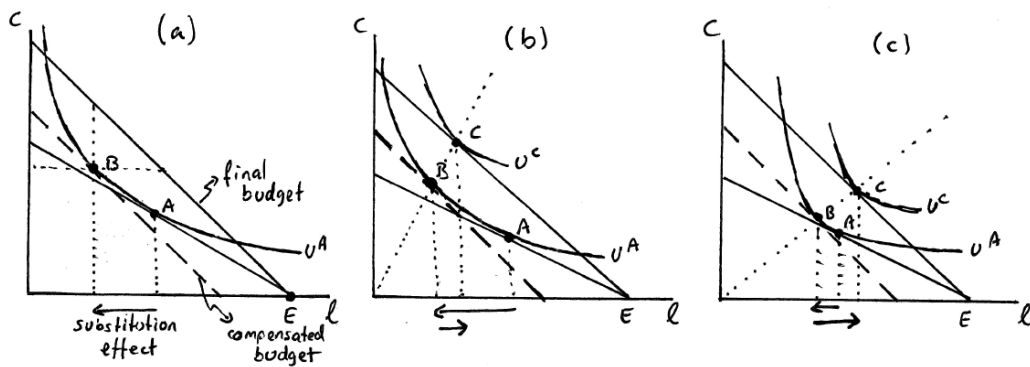
Wage Increases with Different Tastes

Question 5

a. Fill in the missing entries in the following cost, **Table 1:** **(15)**

OUTPUT	AVERAGE TOTAL COST	AVERAGE FIXED COST	AVERAGE VARIABLE COST	MARGINAL COST
1	160			40
2	95			
3			30	
4				
5	47			15
6			23	

c. By definition, the *elasticity of total cost* is the ratio of marginal cost to average cost; for the total cost function TC = $0.4Q^2 + 40$, find the elasticity of total cost at Q=5, Q=10, and Q=20 units of output. **(7)**

d. *True or False*: The Law of Diminishing Marginal Product implies that producer choice sets in single input models must be convex beginning at some input level. **(3)**

Question 6

ACME manufacturing has the linear *short run* production function Q = $13K + 2L + 41M$, where K capital is, L is labour and M is raw materials. Its stock of capital and raw materials are fixed at 5 units each; input prices were R8 for capital and R16 for raw materials, while labour is currently R5.

a. When the company produces 300 units of output, what are its average variable costs, average fixed average total costs and marginal costs at that point costs, average total costs and marginal costs at that point? **(6)**

b. ACME manufacturing is a producer of roadrunner traps. It may currently sell all the traps it can produce at R4 each. Its production is described by the Cobb-Douglas production functionQ = $8K^{\frac{1}{2}} L^{\frac{1}{4}}$. It may buy all the capital and labour it wants at the constant input prices of R16 per unit of capital and R8 per unit of labour, respectively.

    i) Which type of returns to scale is present in ACME's roadrunner trap production? Justify your answer. **(7)**

    ii) For ACME's production function, derive each of the following in terms of K and L – Average Product of Capital AP_K, Average Product of Labour AP_L, Marginal Product of Capital MP_K, and Marginal Product of Labour MP_K. **(6)**

    iii) If ACME wishes to maximize its current profit, what are the optimal quantities of K and L that ACME should employ? **(6)**