NATIONAL UNIVERSITY OF LESOTHO

B.A. SUPPLEMENTARY EXAMINATIONS

EC3301: MICROECONOMIC ANALYSIS

August 2023   **100 Marks**   **Time: 3 hours**

INSTRUCTION: Answer any FOUR questions

Question 1

a) Draw the budget constraint implied by the following information:

Consumer's income: M500 per week

Price of X: M1 per unit

Price of Y: M 2 per unit   **(3)**

b) Would the consumer be able to attain any of the following consumption patterns?

  i) 300 Y and 100 X per week   **(2)**

  ii) 200 Y and 1600 X per month   **(2)**

c)   How much would be left over per week from purchasing those bundles within reach?   **(2)**

Suppose that the budget constraint instead were given by:

Consumer's income: M 500 per week

Price of X: M 1 per unit for the first 150 per week, thereafter M2 per unit

Price of Y: M 2 per unit

  a)   How would this affect the budget line and your answers in **b) i)** and **ii)**?   **(6)**

d) Show graphically and clearly explain the substitution and the income effect by Hicks and Slutsky
for an increase in price of good X with indifference curve analysis.   `   **(10)**

Question 2

A consumer has compensated demand functions of the form

$$h_x(P_x, P_y, U) = \alpha \left(\frac{P_x}{P_y}\right)^{\alpha-1} U$$

$$h_y(P_x, P_y, U) = (1-\alpha) \left(\frac{P_x}{P_y}\right)^{\alpha} U$$

where P_x and P_y are the prices of goods Y and Y, U is the consumer's utility and $0 < \alpha < 1$.

a) Derive the expenditure function and the indirect utility function, $V(P_x, P_y, m)$, where m is income.

(10)

b) Using the indirect utility function, or otherwise, derive the ordinary demand for X, $X(P_x, P_y, m)$.

Hence, write down the utility function $U(x, y)$. **(9)**

c) Find $\dfrac{\partial h_x}{\partial P_x}$ using the Slutsky equation and your answer to **(b)**. **(6)**

Question 3

Sello lives in an economy where people live for two periods. In the current period she works and earns an income of R10, 000. In the future period, she is old and earns no income. There is no pension provision either from government or from Sello's employer.

a) Assuming that Sello can borrow or save money in the market at the same interest rate (r), write down the budget constraint she faces in solving for her optimal consumption choice. You can write period 1 consumption as C_1 and period 2 consumption as C_2. **(2)**

b) Suppose she can borrow and lend at an interest rate of $r = 10\%$. Further suppose that her utility function is $U = C_1^{0.5} C_2^{0.5}$. Write out her budget constraint, and solve for the optimal choice of C_1 and C_2. **(4)**

c) Suppose that interest rate in the market increases to $r = 20\%$ and Sello comes to know of this before she had made a consumption choice in period 1.

    i) Write out her new present value budget constraint. **(2)**

    ii) How has the effective price of C_2 changed for Sello compared to situation in part b)? **(3)**

    iii) Graph and label part **b)** and **part c)** budget constraints (i.e before and after the increase in r and the implied change in present value price of C_2) **(4)**

d) Solve for the new optimal choice of C_1 and C_2 at the new interest rate given in part c). Notice that the change in interest rate is equivalent here to a change in the present value price of C_2. Find the income and substitution effect of this change in price of C_2 (the change from part **b)** to **c)**). Show your work. **(6)**

e) Suppose the borrowing and lending interest rates were different. In particular, suppose borrowing interest rate was 15 % while lending rate was 10 %. How do you think it would change your answer to part **b)**? **(4)**

Question 4

a) A firm's technology is described by $f(L) = AL^\gamma$, where f is output, L is labor inputs and $\gamma > 0$. Let w be the given price for labor.

    i)   Derive the cost function associated with this technology. **(3)**

    ii)   What will be the Marginal and Average cost functions? **(4)**

b) Suppose that the homothetic production technology with decreasing returns to scale can be captured by the production function $x = 40l^{0.25}s^{0.25}$ where x is your exam grade, l is the number of hours spent studying and s is the number of hours spent sleeping. Assume further that you'd be willing to pay R5 to get back an hour of sleep and R20 to get back an hour of studying. If you value each exam point at p, what is your optimal "production plan" using two step grade point maximization using cost minimization? **(8)**

c) Suppose that the technology available a producer can be represented by the function

$f(l, k) = 20l^{2/5}k^{2/5}$, derive the output supply function. **(10)**

Question 5

Externalities arise because of ill-defined property rights. Therefore, all externalities can be eliminated if initial property rights are properly assigned.

Discuss fully this statement using appropriate examples. **(25)**