



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2024/2025

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF  
SCIENCE IN ECONOMICS

### BEC 3301: ADVANCED MICROECONOMICS THEORY

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: *Answer Question ONE and any other TWO Questions.*

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#### QUESTION ONE – (30 MARKS)

- a) Suppose a competitive industry consists of  $m$  identical firms, each with a cost function;

$C(y) = y^2 + 1$ . Suppose also that market demand is given by  $P = 100 - Y$ . Calculate the equilibrium number of firms in the market. (10 Marks)

- b) Given the following production function:

$Q = AL^{\frac{1}{3}}K^{\frac{2}{3}}$  Where Q is output, A is an efficiency parameter, L and K are labour and capital inputs respectively.

Required

Determine the marginal rate of technical substitution (MRTS) and the elasticity of substitution for the above function. (8 Marks)

Prove that 1/3 and 2/3 are indeed input elasticities of output. (4 Marks)

- c) Discuss the properties of profit function. (8 Marks)

**QUESTION TWO – (20 MARKS)**

- a) Given the following profit function

$\pi(p,w)=6P^4(W_1^2 W_2^2)^{-1}$  Where  $\pi$  is profit, P is output price,  $W_1$  and  $W_2$  are input prices respectively.

Derive the firm's supply function and the unconditional factor demands. (12 Marks)

- b) Explain the properties of indirect utility functions. (8 Marks)

**QUESTION THREE – (20 MARKS)**

- a) Suppose that a consumer's utility is given by:  $U = 2X_1^{0.75} X_2^{0.25}$  where  $X_1$  and  $X_2$  are goods 1 and 2 and the price of the two goods are Ksh 25 and 5 respectively and consumer's income is Ksh 200. Find the ordinary demand functions and the corresponding indirect functions.

(10 Marks)

- b) State and explain the sources of monopoly power the two major constraints faced by a monopoly

(10 Marks)

**QUESTION FOUR - (20 MARKS)**

- a) Given the following expenditure function  $E(P, U) = 2\sqrt{UP_1P_2}$

Use Shepherd's lemma to recover the compensated demand functions (7 Marks)

- b) Outline the properties of a production function (8 Marks)

- c) Define game theory and outline the elements of a game (5Marks)

**QUESTION FIVE – (20 MARKS)**

- a) Assume the cost function is given  $C = kyw^a r^{1-a}$ . Determine the underlying production function. (10 Marks).

- b) Distinguish between the following terms: (10 Marks).

- i. Compensated and uncompensated demands
- ii. Interior solution and corner solution
- iii. Shepherd's lemma and First Hotellings lemma
- iv. Optimization and Equilibrium analysis