



RIARA SCHOOL OF BUSINESS

NURTURING INNOVATORS

JANUARY –APRIL 2023 TRIMESTER

EXAMINATION FOR BACHELOR OF BUSINESS ADMINISTRATION

EVENING PROGRAMME

RFN 103: QUANTITATIVE METHODS IN BUSINESS DECISION MAKING

DATE: APRIL 2023

TIME: 2 HOURS

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during reading time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

- 1 Write your REGISTRATION NO. Clearly on the answer booklet(s).
- 2 Answer Question ONE and ANY other TWO questions.
- 3 Questions in all sections should be answered in answer booklet(s).
- 4 Marks allocated to each question are shown at the end of the question.
- 5 PLEASE start the answer to EACH question on a NEW PAGE.
- 6 For the questions, write the number of the question on the answer booklet(s) in the order you answered them.
- 7 Write your answers in paragraph form unless stated otherwise.
- 8 Keep your phone(s) SWITCHED OFF at the front of the examination room.
- 9 Keep ALL bags and caps at the front of the examination room and do not refer to any unauthorized material before or during the course of the examination.
- 10 You are only allowed to leave the examination room 30minutes to the end of the Examination.

QUESTION ONE (COMPULSORY – (30 MARKS))

(a) Solve the quadratic equations below using factorization method **(6 Marks)**

i. $8 = x^2 + 2x.$

ii. $21 = x^2 + 21x.$

(a) A monopoly faces the following TR and TC schedules:

$$TR = 300q - 2q^2$$

$$TC = 12q^3 - 44q^2 + 60q + 30$$

i) What output should it sell to maximize profit **(8 marks)**

ii) Calculate actual profit at the output determined in (i) above **(3 marks)**

iii) What output will maximize total revenue **(3 marks)**

(c) Solve for X, Y and Z using elimination method when **(10 marks)**

$$6x + 8y - 2z = 750$$

$$8x - 2y + 4z = 1100$$

$$4x - 4y + 2z = 100$$

QUESTION TWO

(a) Given the quadratic supply and demand functions

$$P = Q_s^2 + 2Q_s + 12$$

$$P = -Q_d^2 - 4Q_d + 68$$

Determine the equilibrium price and quantity. **(10 marks)**

(b) Find the fourth derivative of the function $y = 3x^6 - 2x^2 + 4x^2 + 5x$ **(5 marks)**

(c) Given the demand schedule $p = 120 - 3q$

i) derive a function for MR and **(3 marks)**

- ii) find the output at which TR is a maximum (2 marks)

QUESTION THREE

- a) Solve the simultaneous equation following by substitution method (4 marks)

$$2x + y = 8$$

$$3x - 2y = -2$$

- b) A company manufactures a product that has a unit selling price of Ksh.20 and a unit cost of Ksh.15. If fixed costs are Ksh.600,000, determine the least number of units that must be sold for the company to have a profit. (6 marks)

- c) The supply function of a commodity is quadratic and passes through the points shown below

Determine the supply function in the form $q = a + b_1p + b_2p^2$. (Hint: Generate a simultaneous equation for three unknowns and solve) (10 marks)

P	30	40	50
Q	500	3600	6300

QUESTION FOUR

- (a) The equilibrium prices P1 and P2 for two goods satisfy the equations

$$9P_1 + P_2 = 43$$

$$2P_1 + 7P_2 = 57$$

- Find the values of P1 and P2. (5 marks)

- (b) Given revenue function is $R = 28q - q^2$, Variable cost per unit is $V = q - 8$ and Fixed cost is sh 64

Determine the following:

- (i) Total cost function (3 marks)
- (ii) Profit function (3 marks)
- (iii) Output and price for a maximum profit (4 marks)
- (iv) Break- even point (5 marks)