RIARA SCHOOL OF BUSINESS

NURTURING INNOVATORS

JANUARY –APRIL 2024 TRIMESTER

EXAMINATION FOR DIPLOMA IN BUSINESS MANAGEMENT

DAY PROGRAMME

RBM 012: INTRODUCTION TO BUSINESS MATHEMATICS

DATE: 9TH APRIL 2024 **TIME: 2 HOURS**

GENERAL INSTRUCTIONS:

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

ii. 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. PLEASE start the answer to EACH question on a NEW PAGE.
5. For the questions, write the number of the question on the answer booklet(s) in the order you answered.
6. Write on both sides of each leaf and indicate number of each question at the top of each page.
7. Write the answers in a paragraph form unless stated otherwise.
8. Marks allocated to each question are shown at the end of the question.
9. All rough work must be done on the answer booklet and crossed through!
10. Use supplementary pages only when you have exhausted those in this book.
11. Fasten the supplementary pages to the inside back cover of this booklet

QUESTION ONE (COMPULSORY – (30 MARKS)

(a) Solve for the unknowns x and y when **(5 marks)**

$$24x + 2y = 86$$
$$15x + y = 52$$

(b) A firm needs to choose between two projects, A and B. Project A involves an initial outlay of Shs.135, 000 and yields Shs.180, 000 in 3 years' time. Project B requires an outlay of Shs.90, 000 and yields Shs130, 000 after 3 years.

i) Using Net Present Value investment appraisal method which of these projects would you advise the firm to invest in if the annual market rate of Interest is 7%. **(5 marks)**

ii) Using Net Present Value investment appraisal method which of these projects would you advise the firm to invest in if the annual market rate of interest is 14%. **(5 marks)**

(c) Solve for X, Y and Z using elimination method when **(12 marks)**

$$2x + 4y - z = 15$$
$$3x + 8y + z = 44$$
$$x + 2y + 2z = 15$$

(d) Solve the quadratic equations below using factorization method (**3 marks)**

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

QUESTION TWO

(a) A firm produces the two goods A and B using inputs G and H. Each unit of A requires 2 units of G plus 6 units of H. Each unit of B requires 3 units of G plus 4 units of H. The amounts of G and H available are 60 and 90, respectively. What output levels of A and B will use up all the available G and H. (**5 marks)**

(b) A parent invests Shs. 60,000 for a 7-year-old child in a fixed interest scheme which guarantees 8% interest. How much will the child have at the age of 21. **(5 marks)**

(c) Distribute Shs 3,000,000 among A, B, C, D and E in the ratio 2: 3: 5:1:4. **(5 marks)**

(d) 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) A firm faces the demand function $p = 190 - 0.6q$ and total cost function TC = $40 + 30q + 0.4q2$

i) What output will maximize profit. **(5 marks)**

ii) What output will maximize total revenue. **(3 marks)**

iii) What will the output be if the firm makes a profit of Shs. 4,760 (**Hint: use quadratic formula**) **(7 marks)**

(b) Solve for the unknowns x and y when **(5 marks)**

$$2x + y = 8$$
$$3x - 2y = -2$$

QUESTION FOUR

a) A manufacturer knows that if x (thousand) products are demanded in a certain month. The total cost function in (Ksh. 000) is $14 + 3x$ and the total revenue function in (Ksh.000) is $19x - 2x^2$. Calculate the level of demand that maximizes profit (the maximum profit) and the amount of profit obtained. **(10 marks)**

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

P	30	40	50
Q	500	3600	6300

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)**