RIARA SCHOOL OF BUSINESS

NURTURING INNOVATORS

JANUARY –APRIL 2023 TRIMESTER

EXAMINATION FOR DIPLOMA IN BUSINESS MANAGEMENT

DAY PROGRAMME

RBM 012: INTRODUCTION TO BUSINESS MATHEMATICS

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) Each of 25 students is enrolled in history, mathematics, or both. If 20 are enrolled in history and 18 are enrolled in mathematics, how many are enrolled in both history and mathematics (**Hint: use a Venn diagram**) **(5 marks)**

(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 120 and 180, 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)**

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

QUESTION FOUR

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

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)**