

BBM 113



**ALUPE UNIVERSITY  
COLLEGE**  
*... Bastion of Knowledge ...*

P. O. Box 845-50400 Busia(K)  
[principal@auc.ac.ke](mailto:principal@auc.ac.ke)  
Tel: +254 741 217 185  
+254 736 044 469  
off Busia- Malaba road

OFFICE OF THE DEPUTY PRINCIPAL

ACADEMICS, RESEARCH AND STUDENTS' AFFAIRS

---

## UNIVERSITY EXAMINATIONS

### 2021 /2022 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER REGULAR EXAMINATION

### BACHELOR OF EDUCATION (ARTS)

**COURSE CODE: BBM 113**

**COURSE TITLE: BUSINESS MATHEMATICS 1**

**DATE: 18/01/22**

**TIME:8.00-11.00 AM**

---

#### INSTRUCTION TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF 4 PRINTED PAGES

PLEASE TURN OVER

# BBM 113

## INSTRUCTIONS TO CANDIDATES

- Answer Question ONE and any other TWO questions.
- Maps and diagrams should be used whenever they serve to illustrate the answer.
- Do not write on the question paper.

### QUESTION ONE

- Solve the following equation  $6x^2 = 18x$  (5 marks)
- Explain the assumptions of linear programming (10 marks)
- XYZ chemical company is producing two products A and B. The processing times are 3 hours and 4 hours per unit for A on operations one and two respectively and 4 hours and 5 hours per unit for B on operations on one and two respectively. The available time is 18 hours and 21 hours for operation one and two respectively. The product A can be sold at sh. 3 profit per unit and B at sh. 8 profit per unit.

Formulate the problem and solve for maximum profit using the graphical method (15 marks)

*Linearity - It is any physical property which forms the basis of the problem and is the direct properties*  
*Divisibility - Quantities revenue and cost are infinitely divisible*  
*Certainty - It is the technique that makes no allowance for uncertainties or destination made*

250 members of a certain society have voted to elect a new chairman. Each member may vote for either one or two candidates. The candidate elected is the one who polls most votes

Three candidates x, y, z stood for election and when the votes were counted, it was found that

- 59 voted for y only, 37 voted for z only
- 12 voted for x and y, 14 voted for x and z
- 147 voted for either x or y or both x and y but not for z
- 102 voted for y or z or both but not for x

### Required

- write the above information in set notation (3 marks)
- present the above information in venn diagram (3 marks)
- How many voters did not vote (3 marks)
- How many voters voted for x only (3 marks)
- How many voters voted for y and z only (3 marks)
- How many voters voted for one candidate only (3 marks)
- Who won the elections (2 marks)

$$\begin{aligned}x &= 29 \\y &= 71 \\z &= 51\end{aligned}$$

$$147 (29+71) \quad 136 \quad 29+71$$
$$100 + 47 = 147$$

$$\begin{array}{r}59 \\112 \\ \hline 171 \\ \hline 37 \\114 \\ \hline 151\end{array}$$

## BBM 113

### QUESTION THREE

Solve the following systems of linear simultaneous equations by matrices method:

i)  $x_1 + 2x_2 + 4x_3 = 4$

$$2x_1 + x_3 = 3$$

$$3x_2 + x_3 = 2$$

(15 marks)

ii) Discuss the importance of set theory in the modern business environment (5 marks)

### QUESTION FOUR

a) Discuss the industrial application of linear programming (5 marks)

b) Solve the following lp problem using simplex method (15 marks)

$$\text{Maximize } Z = 10X_1 + 15X_2 + 20X_3$$

Subject to,

$$2X_1 + 4X_2 + 6X_3 \leq 24$$

$$3X_1 + 9X_2 + 6X_3 \leq 30$$

$$X_1, X_2 \text{ and } X_3 \geq 0$$

### QUESTION FIVE

a) Discuss the uses of matrices in the modern society (5 marks)

b) Solve the following by substitution method

$$2x + y = 8$$

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

(7 marks)

c) Solve the following equation by factorization

$$15x^2 + 16x = 15$$

(8 marks)