

BBM 113



ALUPE UNIVERSITY
COLLEGE

... Bastion of Knowledge ...

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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

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INSTRUCTIONS TO CANDIDATES

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

QUESTION ONE

- a) Solve the following equation $6x^2 = 18x$ (5 marks)
- b) Explain the assumptions of linear programming (10 marks)
- c) 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)

QUESTION TWO

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

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

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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)