



SCHOOL OF PROFESSIONAL STUDIES
BACHELOR OF BUSINESS INFORMATION TECHNOLOGY/
BACHELOR OF BUSINESS ADMINISTRATION

UNIT CODE/NAME: BBIT 115/BBA 104: BUSINESS MATHEMATICS

January – April 2018/2019 End Semester Exam

- Time: 2 Hours

Instructions: Answer Question ONE (Compulsory) and any other TWO questions.

QUESTION ONE

- a) Highlight some real-life applications of the knowledge of Business Mathematics in business and industry. (3 marks)
- b) Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ be the universal set, $A = \{1, 3, 5, 7\}$, $B = \{1, 2, 4, 7, 8\}$ and $C = \{1, 6, 9\}$. Find:
- i. $A \cup B \cup C$ ii. $A \cap B \cap C$ iii. $A' \cup B'$ iv. The power set of C . (8 marks)
- c) Solve the following simultaneous equations by Cramer's rule:
 $2x + 4y = 15$
 $3x - 7y = -18$ (4 marks)
- d) Solve the quadratic equation:
 $8x^2 - 11x - 10 = 0$ (4 marks)
- e) Solve the inequality: $3x - 7 < 5 - x \leq 12 + 6x$ (4 marks)
- f) The first term of an arithmetic progression is 5. If the 12th term exceeds the 7th term by 35, find the common difference and the sum of the first twenty terms. (4 marks)
- g) The fourth term of a geometric progression is 9. If the second term is 81, find the first term and the common ratio. (3 marks)

QUESTION TWO

- a) Define the following terms as used in matrix algebra:

- i. Unit matrix
ii. Singular matrix
iii. Square matrix
iv. Row matrix

(4 marks)

- b) Given that:

$$X = \begin{bmatrix} 3 & 11 & 6 \\ 9 & -3 & 8 \\ 5 & 0 & 9 \end{bmatrix} \quad Y = \begin{bmatrix} 1 & 2 & 0 \\ 0 & -4 & 5 \\ 5 & -8 & 7 \end{bmatrix} \quad \text{Find:}$$

- i. $X + Y$

(2marks)

iii. XY

(3marks)

iv. YX

(3marks)

v. Make a general Comment from part (iii) and (iv)

(1marks)

QUESTION THREE

- a) Describe briefly each of the following terms:
- i. Compound Interest (1marks)
 - ii. Depreciation and appreciation (2marks)
- b) A plot of land in XYZ city is valued at Kshs 6,700,000. If land appreciates at the rate of 18% p.a, find its value in 6 years time. (3marks)
- c) A shuttle valued at \$ 8249 depreciates due to wear and tear at a rate of 12% p.a. Find the value of the matatu in 10 years time.
- i) Using the straight line method. (3marks)
 - ii) Using the balance method (3marks)
- j) Use appropriate method to solve the equation :
 $9x^2 - 31x + 12 = 0$ (3marks)

QUESTION FOUR

- a) Describe each of the following terms as used in set theory giving an example in each case.
- i. Finite set. (2marks)
 - ii. Null set. (2marks)
 - iii. Complement of a set. (2marks)
- b) A survey on a sample of 25 new cars being sold at a local auto dealer was conducted to see which of three popular options, air-conditioning (A), Radio (R) and power windows (W), were already installed:
The survey found that:
15 had air-conditioning (A)
12 had radio (R)
11 had power windows (W)
5 had (A) and (W)
9 had (A) and (R)
4 had (R) and (W)
3 had all three options.

Required: Using an annotated Venn diagram (well labeled Venn diagram) find the number of cars that had:

- i) Only (W) . (2marks)
- ii) Only (A) . (2marks)
- iii) Only (R) . (2marks)
- iv) Only one of the options. (2marks)
- v) None of the options. (1marks)

QUESTION FIVE

- a) A land lady wants to raise Shs.3,058,000 in 5 years' time to buy a house. If money earns compound interest at EAZZYLOAN bank at the rate of 15% p.a, how much should she deposit in her account now in order to hit her target. (5marks)
- b) Kshs. 80,750 is deposited in an account paying 18% p.a simple interest. How long will it take for the money to double? (5marks)
- c) A man deposits Kshs. 6725 in a bank at the beginning of every year. If the money earns compound interest at the rate of 15% p.a. How much money does he have at the bank at the end of the third year? (5marks)