Scott Christian UNIVERSITY

A Dynamic Centre of Academic Excellence

SCHOOL OF EDUCATION AND BUSINESS STUDIES
DIPLOMA/CERTIFICATE IN ICT
UNIT CODE/TITLE DCT 025: BUSINESS MATHEMATICS
JAN-APRIL 2025/2026 END OF SEMESTER 1 EXAMINATION

TIME: 2 HRS

INSTRUCTIONS: Answer QUESTION ONE and ANY OTHER TWO QUESTIONS

QUESTION 1(Compulsory)

a)Define a set and give two examples of sets. (3mks)

b)Solve the following systems of linear equations:

a) $\begin{aligned} 0.2x + 0.5y &= 3.5 \\ 7x - 6y &= 5 \end{aligned}$ (4mks)

b) $\begin{aligned} x - y &= 11 \\ 2x + y &= 19 \end{aligned}$ (4mks)

b)Musa spent sh. 207 to buy seven exercise books and four pens, while Allan spent sh. 165 to buy five exercise books and five pens of the same type.

(i) Form a system of linear equations to represent the situation, letting b be the cost of a book and p be the cost of a pen. (2 Marks)

(ii) Solve the system of equations to find the cost of one book and one pen. (5Marks)

c)Investment = 300,000, PV of inflows = 330,000.Find the **Profitability Index**.

(4Marks)

d)How much interest is earned on K Sh 6,000 after 3 years at 6% compounded semi-annually? (5Marks)

e)Distinguish between a non-linear and linear function. (3Marks)

QUESTION 2(15MARKS)

a)(i)State with a reason whether the sets below are equal:A={1,2,3}, B={3,2,1}

(2marks)

ii)If A={a,b,c} and B={a,b,c,d} state whether A is a subset of B.

(2marks)

iii)Let A={1,2,3,4}A and B={3,4,5,6} Find

a)$A \cup B$ (2marks)

b)$A \cap B$ (2marks)

c)$A - BA$ (2marks)

d) $B - AB$ (2marks)

iv)In a class of 20 students, 12 like Mathematics and 8 like English.5 students like both subjects.How many students like only Mathematics? (3marks)

QUESTION 3(15MARKS)

a) A project requires **KSh 250,000**. Cash inflows:Year 1 = 80,000, Year 2 = 90,000, Year 3 = 100,000, Year 4 = 70,000.Find the **payback period**. (5Marks)

b) A project costs **KSh 300,000**. Expected inflows:Year 1 = 100,000, Year 2 = 120,000, Year 3 = 140,000.Discount rate = 12%. Calculate **NPV**. (5Marks)

c)A rectangular garden is 4 m longer than it is width. If $60M^2$ are needed for the plants in the bed, what should the dimensions of the rectangular bed be? (5Marks)

QUESTION 4(15MARKS)

a)A student saves KSh 5,000 in a bank at a rate of 6% per year for 2 years. Find the simple interest earned. (3Marks)

b)How long will it take for KSh 6,000 to earn KSh 1,200 at a rate of 8% per year?

(5Marks)

c)At what rate per year will KSh 10,000 earn KSh 2,000 in 4 years?

(5Marks)

D)What do you understand by the term annuity (2marks)

QUESTION 5(15MARKS)

A train traveled 240 km at a certain speed. When the engine was replaced by an improved model, the speed was increased by 20 km/hr and the travel time for the trip was decreased by 1 hr. What was the original average speed of the engine?

(a) Form a quadratic equation to represent the relationship between speed, time, and distance. (2 Marks)

(b) Solve the equation to find the original speed of the train engine. (5 Marks)

c)A project requires **KSh 500,000**. Average annual accounting profit = 85,000.Find the **ARR** as a percentage. (5marks)

d)What is a Venn diagram ,cite two cases when we make use of it (3Marks)