Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
FIRST YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(HOSPITALITY MANAGEMENT)

Date: 5th December,2024
Time:11.30am –1.30pm

KBA 2100 - MANAGEMENT MATHEMATICS

INSTRUCTIONS TO CANDIDATES

ANSWER **QUESTION ONE (COMPULSORY)** AND **ANY OTHER TWO** QUESTIONS

QUESTION ONE (30 MARKS)

a) Evaluate $\lim_{x\to 1}\left(\frac{2x-1}{3+x}\right)$

(3 Marks)

b) How much should you invest now at 10% to have Ksh. 8000 toward the purchase of a car in 5 years if interest is compounded continuously.

(4 Marks)

c) Given A = {1, 2, 3}, B = {2, 3, 4} and U = {1, 2, 3, 4, 5, 6}, prepare a Venn diagram to represent this information (3 Marks)

d) How long will it take Ksh. 10,000 to grow to Ksh. 12,000 if it is invested at 9% compounded monthly? (4 Marks)

e) What is the value of an annuity at the end of 20 years if Ksh. 2000 is deposited each year into an account earning 8.5% compounded annually?

(4 Marks)

f) Write $\log_{10}\left(\frac{a^2b^3}{100\sqrt{c}}\right)$ in terms of $\log_{10} a$, $\log_{10} b$ and $\log_{10} c$

(4 Marks)

g) Solve the following system using elimination method

$3x - 2y = 8$

$2x + 5y = -1$

(4 Marks)

h) In a GP, the sum of the second and third terms is 6 and the sum of the third and fourth terms is -12. Find the sum of the first 10 terms.

(4 Marks)

QUESTION TWO (20 MARKS)

a) Let $A = \{1,2,3,4,5,6\}$ and $B = \{2,4,6,8\}$, find $A - B$, $A \cap B$ and $A \cup B$

(3Marks)

b) During a market day in Mwihoko, the KWUST chef finds out that the cost of 3 sheep and 2 goats is Ksh. 7200. If 4 sheep and a goat costs Ksh 7600. Find the cost of two goats and a sheep. (4 Marks)

c) Jane deposits Ksh. 2000 annually into an account that earns 6.85% compound annually. Due to a change in employment, these deposits stops after 10 years, but the account continuous to earn interest until Jane retires 25 years after the last deposit was made. How much is in the account when Jane retires?

(6 Marks)

d) Use factorization method to solve $2x^2 - 5x - 3 = 0$

(4 Marks)

e) Solve for x given that $\log_{10} 4 + 2\log_{10} x = 2$

(3 Marks)

QUESTION THREE (20 MARKS)

a) Given $f(x) = x^2 - 1$ g(x) = x − 1 and h(x) = $\sqrt{x}$. Find $(g \circ f \circ h)(x)$

(4 Marks)

b) Solve the following simultaneous equations using elimination method

$$6x + 5y = -6$$
$$18x + 7y = 6$$

(4 Marks)

c) What amount will an account have after 2 years if Ksh. 5,000 is invested at an annual rate of 8%

i) Compounded daily

(4 Marks)

ii) Compounded continuously (3 Marks)

d) Giving your answer to 2 decimal place, solve $2x^2 - 6x - 3 = 0$ using formula method

(5 Marks)

QUESTION FOUR (20 MARKS)

a) A company estimates that it will have to replace a piece of equipment at a cost of Ksh. 800,000 in 5 years. To have this money available in 5 years , a sinking fund is established by making equal monthly payments into an account paying 6.6% compounded monthly

i) How much should each payment be

(4 Marks)

ii) How much interest is earned during the last year

(6 Marks)

b) Solve the equation $x^2 - 8x + 11 = 0$ by completing square method

(4 Marks)

c) Assume you buy a T.V for Ksh. 800 and agree to pay for it in 18 equal monthly payments at 1.5% interest per month as the unpaid balance.

i) How much are your payments

(3Marks)

ii) How much interest will you pay?

(3Marks)

QUESTION FIVE(20 MARKS)

a) The population of a city is $P = 250{,}342e^{0.012t}$ where t = 0 represents the population in the year 2010.

i) Find the population of the city in the year 2020.

(3 Marks)

ii) Find the population of the city in the year 2025.

(3 Marks)

iii) Find when the population will be 320,000.

(4 Marks)

b) Safaricom (Kenya Ltd) surveyed 400 of its customers to determine the way they learned about new Kochokocho promotion. The survey shows that 180 learned about the promotion fromradio, 190 from television, 190 from newspapers, 80 from radio and television, 90 from radio and newspapers, 50 from television and newspapers, and 30 from all three forms of media. Draw a Venn diagram to represent this information. Hence, determine the number of customers who:

i) learned of the promotion from at least two of the three media.

(4 Marks)

ii) learned of the promotion from exactly one of the three media.

(3 Marks)

c) Solve for x if $2 \leq 3x - 7 \leq 14$

(3 Marks)