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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2016/2017 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(BUSINESS ADMINISTRATION)

Date:
Time: 9.00am –

KBA 106 - BUSINESS MATHEMATICS

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) i) Define demand and supply.

(2 Marks)

ii) Suppose that the supply curve of a particular brand of MP3 player is $p = \frac{q}{25}$ while the demand curve is $p = 400 - \frac{q}{1000}$. Find the quantity and price that balance supply and demand.

(4 Marks)

b) Find the values of x which satisfy the inequality $7 < 5x + 3 \leq 23$

(3 Marks)

c) Jane deposited sh 50 000 in a savings account which paid compound interest at the rate of 15% per annum. Calculate to the nearest year the time she would have to wait for her money to double.

(4 Marks)

d) Let $U = \{1,2,3,4,5,6,78,9,10\}$. Further let A={1,2, 5, 7} , B={1,3, 6 , 7} and C={9,10,11,12,13,14,15} be subsets of U.

Find;

i) A^c

(1 Mark)

ii) B^C

(1 Mark)

iii) $(A \cap B)^c$

(2 Marks)

iv) $A^c \cup B^c$

(2 Marks)

What is the relationship between (iii) and (iv).

(2 Marks)

e) Find the intersection of y=2x+2 and y=-x+4

(3 Marks)

f) Find the maximum and minimum of f(x, y) =5x-3y subject to $x^2+y^2=136$

(6 Marks)

QUESTION TWO (20 MARKS)

a) Bank XYZ has 300 customers. 200 of the customers have taken car loans; 155 of them have mortgage loans, and 108 of them have school fees loans . Of these, 65 have taken both school fees and mortgage loans, 48 have taken both school fees and car loans and 90 customers have taken both car and mortgage loans. 20 customers have taken all the three loans.

i) Draw a venn diagrams to illustrate the above information.

(3 Marks)

ii) How many customers have not taken any loan from the bank?

(3 Marks)

iii) How many customers have exactly one loan from the bank

(2 Marks)

iv) How many customers have exactly two loans from the bank

(2 Marks)

b) Supposed that the supply curve of a particular brand of inexpensive cell phones is p=10+$^{q}/_{50}$ while the demand curve is p=200-$^{q}/_{40}$. Find the quantity and price that balance supply and demand using graphical method.

(5 Marks)

c) Investigate continuity of $f(x,y) = \begin{cases} x^2 + 2y & if \quad (x,y) \neq (1,1) \\ 3 & if\ (x,y) = (1,1) \end{cases}$

(5 Marks)

QUESTION THREE (20 MARKS)

a) The cobb-Douglas production function for a particular manufacturer is given by; $f(x,y) = 100x^{\frac{3}{4}}y^{\frac{1}{4}}$ where x represents the units of labour (at sh.150 per unit) and y represents the units of capital (at sh.250 per unit). The total cost of production is limited to sh.50,000. Find maximum production for this manufacturer.

(10 Marks)

b) Test the following function for extremum $z = (x-1)^2 + 2y^2$

(10 Marks)

QUESTION FOUR (20 MARKS)

a) Evaluate;

i) $\int_0^2 (x^4 + 5)dx$

(2 Marks)

ii) $\int_{-2}^1 (x - 4)\,dx$

(2 Marks)

iii) $\int_0^1 (7x^2 + 2x + 4)dx$

(2 Marks)

b) The cost of one text book is t shillings and the cost of one pen is sh. p. John spent sh 970 to buy 3 text books and 5 pens while Peter spent sh 880 to buy 2 textbooks and 8 pens. Using matrix method, find the cost of each item.

(7 Marks)

c) Find the area between the line $y = 8 - 2x$ and the curve $y = x^2 + 5$.

(7 Marks)

QUESTION FIVE (20 MARKS)

a) Define the following terms;

i) Simple interest

(2 Marks)

ii) Compound interest

(2 Marks)

b) For the last 5 years the value of a car has been depreciating at a coonstant rate of 12% per annum. The present value of the car is sh 316 640. Calculate the value of the car at the beginning of the 5 year period.

(5 Marks)

c) Find the point of extremum of the function $f(x, y) = x^3 + y^3 - 3xy$

(5 Marks)

d) If the profit in thousand of dollars, based on both cost and potential sales for manufacturing military helicopters is given by the formula $p(n) = 360 + 174n - 3n^2$. Find the number of helicopters that maximize the profit by completing the square

(6 Marks)