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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2019/2020 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
BUSINESS ADMINISTRATION

Date: 4th December, 2019
Time: 11.00am – 1.00pm

KBA 106 - BUSINESS MATHEMATICS

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Differentiate the universal set from the null set (2 Marks)

b) Determine the type of mapping the following functions have on the values of the domain.

i) $y = \sqrt{x-2} \qquad 2 \le x \le 7$ (2 Marks)

ii) $y = x^2 \qquad -3 \le x \le 3$ (2 Marks)

c) Evaluate the following limit

$$\lim_{x \to 8} \frac{x^{2/3} + 3\sqrt{x}}{4 - \frac{16}{x}}$$

(3 Marks)

d) Differentiate the following function using product rule given that

$y = (x^3 + 6x - 7)(2 + x - 4x^3)$ (4 Marks)

e) Solve the following simultaneous equations using elimination method

$$x + 3y = 4$$
$$2x + 5y = 7$$

(3 Marks)

e) Consider the following two matrices P and Q given below

$$P=\begin{bmatrix}2 & 8\\ 3 & 6\\ 1 & 4\end{bmatrix} \quad \text{and} \quad Q=\begin{bmatrix}3 & 4\\ 2 & 7\\ 2 & 9\end{bmatrix}$$

Required

i) Find $5P-2Q$ (3 Marks)

iii) Compute $Q^T P$ (4 Marks)

f) Solve for x given the following linear function $\frac{x-2}{3}=\frac{2x}{7}-1$ (3 Marks)

g) Integrate the following functions

i) $\int\left(x^5+4x^3+x^2+6\right)dx$ (2 Marks)

ii) $\int_2^4 4y^2+y^{-2}+1dy$ (2 Marks)

QUESTION TWO (20 MARKS)

a) Solve the following quadratic equations using the stated method;

i) $3x^2-2x-1=0$ [completing squares] (5 Marks)

ii) $3x^2=2x+8$ [factorization] (3 Marks)

iii) $4x^2-12x+14=0$ [Quadratic equation] (2 Marks)

b) Let x, y and z denote the cost of having round, square and triangular bottom respectively, in a certain packing company in Mwihoko. Determine the cost of each shape given the following using matrix method;

$$7x+5y+3z=16$$
$$3x+2z-5y=-8$$
$$-7z+5x+3y=0$$

(10 Marks)

QUESTION THREE (20 MARKS)

a) Using the appropriate method, find the derivative of the following function (5 Marks)

$$y=\frac{4x^2}{x^3+3}$$

b) Integrate the following functions

i) $\int_1^2\left(\sqrt{x}+9\sqrt[3]{x^7}-\frac{2}{\sqrt[5]{x^2}}\right)dx$ (5 Marks)

ii) $\int\sqrt[3]{x^2}\left(2x-x^2\right)dx$ (3 Marks)

c) Given that the demand function of a certain firm in Mwihoko is given by $p(x)=100-x^2$ and the cost function is $C(x)=120+15x+3x^2$. Find;

i) Marginal revenue (3 Marks)

ii) Marginal profit (4 Marks)

QUEkSTION FOUR (20 MARKS)

a) Given the following sets,

$A = \{2,3,4\}$ $B = \{4,7,9,1\}$ $C = \{6,7,8,9,2\}$

Find;

i) $(A \cup B) \cap (A \cup C)$ (3 Marks)

ii) $(A \cap B)^c \cap C^c$ (4 Marks)

b) Jumbo Jet surveyed 125 potential customers and obtained the following information. 47 wished to travel to South Africa, 53 wished to travel to Las Vegas and 68 wished to travel to Hawaii. Furthermore, 18 wished to travel to all the three destinations, 34 wished to travel to Hawaii and Las Vegas, 26 wished to travel to Las Vegas and South Africa and 23 wished to travel to Hawaii and South Africa.

Required:

i) Represent this information in a Venn diagram. (6 Marks)

ii) Use the Venn diagram to determine;

i) How many wished to travel to South Africa and Las Vegas but not Hawaii? (2 Marks)

ii) How many wished to travel to at least one destination? (2 Marks)

iii) How many wished to travel to none of the stated destinations? (1 Marks)

iv) How many wished to only travel to exactly one of these destinations? (2 Marks)

QUESTION FIVE (20 MARKS)

a) State the properties of logarithm. (5 Marks)

b) A customer deposited sh. 43,000 in a savings account that yields 2% p.a. compounded semi-annually. How long will it take to amount to Ksh.47, 500? (4 Marks)

c) Solve the following simultaneous equations using the indicated method

i) $2x + y = 12$, $y - 3x = 2$ [graphically] (6 Marks)

ii) $4x + 2y = 14$, $2y + 5x = 16$ [substitution] (5 Marks)