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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
THIRD YEAR, SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF BUSINESS AND INFORMATION
TECHNOLOGY

Date: 9th December, 2022
Time: 8.30am –10.30am

KMA 2313 - MANAGEMENT MATHEMATICS

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) If $A = \{2, 3, 4, 5, 6, 7\}$ and $B = \{3, 5, 7, 9, 11, 13\}$ find
- i) $A - B$ (1 mk)
 - ii) A^c and B^c (2mks)
- b) Evaluate the following integrals
- i) $\int \sin^2 x \cos^2 x \, dx$ (4mks)
 - ii) $\int \frac{3x+11}{x^2-x-6} \, dx$ (4mks)
- c) Find the derivative of the following functions
- i) $f(x) = \frac{2x^2+1}{x^2+1}$ (4mks)
 - ii) $y = \sin^{-1} x$ (4mks)
- d) Solve the following simultaneous linear equations
- $$\begin{aligned} 5x + 2y &= 14 \\ 3x - 4y &= 24 \end{aligned}$$
- (4mks)
- e) Write down the 8th term in the geometric progression 1, 3, 9 ... (3mks)
- f) If $\ln(2x - 1) = 2\ln x$ solve for x (4mks)

QUESTION TWO (20 MARKS)

- a) For the following problem find the points where given function is not defined and therefore not continuous. For each such point a, tell whether the discontinuity is removable $f(x) = \frac{x-2}{x^2-3x+2}$ (5mks)
- b) Find the derivative of $f(x) = \sin x$ using the first principle (6mks)
- c) Find the integral of $\int x^2 e^x dx$ (9mks)

QUESTION THREE (20 MARKS)

- a) Solve for $x = \sqrt{19 - 2x} + 2$ (6mks)
- b) Show that the equation of the tangent to $x^2 + xy + y = 0$ at the point (x_1, y_1) is $(2x_1 + y_1)x + (x_1 + 1)y + y_1 = 0$ (10mks)
- c) If $A = \{3, 4, 5, 6\}$ and $B = \{1, 2, 4, 5\}$ use the Venn diagram to represent
- i) $A \cap B$ (2mks)
- ii) $A - B$ (2mks)

QUESTION FOUR (20 MARKS)

- a) Evaluate $\int \sin^3 x dx$ (5mks)
- b) Solve $\log_4 x + \log_4(x - 12) = 3$ (5mks)
- c) Find the maximum and minimum ordinates of the curve $y = x^2(x + 1)$ (6mks)
- d) Add up the first 10 terms of the arithmetic series $\{1, 4, 7, 10, 13, \dots\}$ (4mks)

QUESTION FIVE (20 MARKS)

- a) Find $\frac{dy}{dx}$ if $y = \sqrt{\frac{1+x}{1-x}}$ (6mks)
- b) Find the integral of $\int \frac{1}{\sqrt{2x+1}} dx$ (5mks)
- c) Solve $\log_6(x + 4) + \log_6(x - 2) = \log_4 4x$ (6mks)
- d) Let $A = \{y, z\}$ and $B = \{x, y, z\}$ find
- i) $A \cap B$ (1mk)
- ii) $A \cup B$ (1mk)
- iii) A^c (1mk)