



THE COUNCIL OF COMMUNITY COLLEGES OF JAMAICA
BACHELOR OF SCIENCE EXAMINATION
SEMESTER III – 2017 AUGUST

PROGRAMME: MANAGEMENT INFORMATION SYSTEMS
COURSE NAME: CALCULUS II
CODE: MATH 4702
YEAR GROUP: THREE
DATE: THURSDAY, 2017 AUGUST 10
TIME: 9:00 A.M. – 12:00 NOON
DURATION: 3 HOURS
EXAMINATION TYPE: FINAL

This Examinations paper has 10 pages

INSTRUCTIONS:

1. THIS EXAMINATION PAPER CONSISTS OF TWO (2) SECTIONS: (A) AND (B)
2. ANSWER ALL QUESTIONS FROM SECTION A
3. SECTION B CONSISTS OF FIVE (5) QUESTIONS. CHOOSE ANY THREE (3)

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SECTION B

*Instructions: Answer any **THREE (3)** questions from this section.*

Question 1

- A. Use Maclaurin's Theorem to find series expansions for $(1-x)^{-1}$ up to the term x^4 .
(6 marks)
- B. Taking 2 as the first approximation, use the Newton-Raphson method twice to find the approximated root of $3x^3 - 5x^2 - 1 = 0$ to **2 decimal places**.
(5 marks)
- C. Differentiate the following functions:
- i. $f(x) = \frac{e^{-6x}}{1-6x}$ (5 marks)
- ii. $f(x) = 6x^3 e^{4x}$ (4 marks)
- D. Find an approximate for $\sqrt[3]{353}$ using method of small increments to **2 decimal places**.
(5 marks)

(Total 25 marks)

Question 2

- A. Find the volume of the solid formed when the region bounded by the curve $y = \frac{2}{3x+1}$ the lines $x=0$ and $x=1$ and the x -axis rotated 135° about the x -axis.
(10 marks)
- B. Use the trapezium rule with eight intervals of equal width, to find an approximate value for $\int_0^2 x\sqrt{x^2+1} dx$.
(15 marks)

(Total 25 marks)

Question 4

A. Given the $f(x) = \frac{x+6}{2x-6}$

Determine:

- i. x – intercept **(2 marks)**
 - ii. y – intercept **(2 marks)**
 - iii. Vertical asymptote **(2 marks)**
 - iv. Horizontal asymptote **(2 marks)**
 - v. Sketch the curve **(5 marks)**
- B. Estimate the root of $y = \sqrt{133}$ using differentials. **(7 marks)**
- C. The variables x, y and z are related by the equation $z = x\sqrt{y}$. If x increases by 2% and y increases by 3%, find $\frac{dz}{z}$. **(5 marks)**

(Total 25 marks)

Question 5

A. Solve the following differential equations:

- i. $\frac{dy}{dx} = \frac{(4x+2)^2}{y}$ **(5 marks)**
 - ii. $\frac{dy}{dx} = 2y + e^x$ **(5 marks)**
 - iii. $x^2 \frac{dy}{dx} = 4 - x^4$ when $x = 1$ and $y = 2$ **(5 marks)**
- B. Use Lagrange Multipliers to maximize the function to the given constraint $f(x, y) = 6x^2 - 8xy + 10y^2$, subject to $x + y = 30$ **(10 marks)**

(Total 25 marks)

END OF EXAMINATION