NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

QUALIFICATION: Bachelor of Science; Bachelor of Science in Applied Mathematics and Statistics			
QUALIFICATION CODE:	07BOSC; 07BSAM	**LEVEL:**	6
COURSE CODE:	CLS601S	**COURSE CODE:**	CALCULUS 2
SESSION:	JANUARY 2023	**PAPER:**	THEORY
DURATION:	3 HOURS	**MARKS:**	100

SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER:	DR. DSI IIYAMBO
MODERATOR:	DR. N CHERE

INSTRUCTIONS

1. Attempt all the questions in the booklet provided.
2. Show clearly all the steps used in the calculations.
3. All written work must be done in black or blue inked, and sketches must be done in pencil.

PERMISSIBLE MATERIALS

1. Non-programmable calculator without a cover.

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

Question 1.

Consider the function $f(x) = 3^x$, on the interval $[0, 10]$. Using the left-hand end point of each subinterval and $n = 10$, calculate the Riemann sum of f [8]

Question 2.

Evaluate each of the following integrals

a) $\int \left(1 - \frac{1}{x}\right) \cos(x - \ln x)\, dx$ [7]

b) $\int_0^3 \frac{1}{\sqrt{3-x}}\, dx$ [9]

c) $\int \sqrt{4 - x^2}\, dx$ [12]

d) $\int_0^{\frac{\pi}{2}} e^{\cos x} \sin(2x)\, dx.$ [13]

Question 3.

Approximate the following integral using the *Trapezoid Rule* with $n = 4$.

$$\int_0^{2\pi} \sin 2x\, dx$$

[9]

Question 4.

Determine the volume of the solid obtained by rotating the portion of the region bounded by $y = \sqrt[3]{x}$ and $y = \frac{x}{4}$ that lies in the first quadrant, about the $y-$axis, using the disk method. [9]

Question 5.

Use the *Simpson's rule* with $n = 4$ to approximate the arclength of the graph of $y = x^2 + x + 3$ from $A(-2, 5)$ to $B(2, 9)$. [12]

Question 6.

Find the nth partial sum of the following series, and hence determine the sum of the series, if it converges.

$$\sum_{i=1}^{\infty} \left(\frac{1}{3^i} - \frac{1}{3^{i+1}}\right)$$

[9]

Question 7.

Find the radius and interval of convergence of the following power series.

$$\sum_{n=1}^{\infty} \frac{x^n}{4^n \sqrt{n}}$$

[12]

END OF EXAMINATION QUESTION PAPER
