NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

## FACULTY OF HEALTH AND APPLIED SCIENCES

### DEPARTMENT OF MATHEMATICS AND STATISTICS

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| **QUALIFICATION:** Bachelor of science ; Bachelor of science in Applied Mathematics and Statistics | |
| **QUALIFICATION CODE:** 07BSOC; 07BAMS | **LEVEL: 6** |
| **COURSE CODE:** CLS601S | **COURSE NAME:** CALCULUS 2 |
| **SESSION:** JUNE 2019 | **PAPER:** THEORY |
| **DURATION:** 3 HOURS | **MARKS: 100** |

| FIRST OPPORTUNITY EXAMINATION QUESTION PAPER | |
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| **EXAMINER** | Dr V. KATOMA |
| **MODERATOR:** | Dr S. NEOSSI NGUETCHUE |

| INSTRUCTIONS |
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| 1. Answer ALL the questions in the booklet provided.<br>2. Show clearly all the steps used in the calculations.<br>3. All written work must be done in blue or black ink 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 [25 Marks]

**1.1** Evaluate the integral $\int_0^{\pi/3} \sqrt{1+x^3}\, dx$ by Simpson's rule, using 6 intervals [10]

**1.2** Evaluate $\int cos^4(2t)dt$ [8]

**1.3** Solve $\int \frac{dz}{z^2-A^2}$ [7]

## Question 2 [25 Marks]

**2.1** Find the equation of the tangent line(s) to the following set of parametric equations at the given point. $x = 2\cos(3t) - 4\sin(3t)$, $y = 3\tan(6t)$ $at\ t = \frac{\pi}{2}$ [8]

**2.2** Find the Taylor series of $f(x) = \cos(x)\ at\ x = 0$ [6]

**2.3** Determine the Taylor Series of $f(x) = 7x^2 - 6x + 1$ $about\ x = 2$. [11]

## Question 3 [25 Marks]

**3.1** Sketch the parametric curve for the following set of parametric equations.
$x = 5cost,\quad y = 2sint\quad 0 \le t \le 2\pi$ Clearly indicate direction of motion. [8]

**3.2** For the following power series, determine the interval and radius of convergence.
$\sum_{n=0}^{\infty} \frac{1}{(-3)^{2+n}(n^2+1)}(4x - 12)^n$ [12]

**3.3** The polar coordinates of a point are$(-5,0.23)$. Determine the Cartesian coordinates for this point. [5]

**Question 4 [25 Marks]**

**4.1** Let $y = (x+2)^{\frac{1}{2}}$, set up but do not evaluate the integral for the arc length. [5]

**4.2** Determine the surface area of the solid obtained by rotating $y = \sqrt{9-x^2}$, $-2 \leq x \leq 2$ about the *x*-axis. [10]

**4.3** Determine the surface area of the solid obtained by rotating $y = \sqrt[3]{x}$, $1 \leq y \leq 2$ [10]

**END OF EXAM**