



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

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: JULY 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	Dr S. NEOSSI NGUETCHUE

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer 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 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 2 PAGES (Including this front page)

Question 1 [25 Marks]

1.1 Determine the length of the parametric curve given by the following set of parametric equations. $x = 8t^{\frac{3}{2}}$ $y = 3 + (8 - t)^{\frac{3}{2}}$ $0 \leq t \leq 4$ [9]

1.2 Evaluate the integral $\int_1^2 (4 + \sin(t)) \{ (3\cos^2(t) \sin(t)) \} dt$ [8]

1.3 Determine the surface area of the solid obtained by rotating $y = \sqrt[3]{x}$, $1 \leq y \leq 2$ [8]

Question 2 [25 Marks]

2.1 Let $y = (x + 2)^{\frac{1}{2}}$, set up the integral for the arc length given by

$$ds = \sqrt{1 + \left[\frac{dx}{dy} \right]^2} dy \quad [6]$$

2.2 determine the Taylor series $f(x) = \sin^2 x$ at $x = 0$. [9]

2.3 Determine if the following series converges or diverges. $\sum_{n=1}^{\infty} \frac{3^{1-2n}}{n^2+1}$ [10]

Question 3 [25 marks]

3.1 Sketch the parametric curve for the following set of parametric equations. Clearly indicate direction of motion. $x = 5 \cos(3t)$ $y = 2 \sin(3t)$ $0 \leq t \leq 2\pi$ [9]

3.2 Evaluate the integral $\int \frac{1}{2x^2 - 3x + 2} dx$ [10]

3.3 Find $\int x\sqrt{x+1} dx$ [6]

Question 4 [25 Marks]

4.1 For the following power series, determine the convergence and show the radius and region of convergence: $\sum_{n=0}^{\infty} \left(\frac{1}{(-3)^{2+n}(n^2+1)} \right) (4x - 12)^n$ [9]

4.2 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 $t = \frac{\pi}{2}$ [10]

4.3 Evaluate $\int x e^{6x} dx$ [6]

END of EXAM