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| **Question Number** | **I** | **II** | **III** | **IV** | **V** | **VI** | **BONUS** | **Total** |
| **Mark** |  |  |  |  |  |  |  |  |

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| ***Question I:* [4 Marks]**  **A. Describe the domain of and find the value of** |
| **B. Let be a differentiable function, and Prove that**  **Question II: [6 Marks]**   1. **Find the following limits if they exist**   **(i)** |
| **(ii)**  **(iii)**  **B. Discuss the continuity of at**  **Question III: [5 Marks]**  **If**  **A. Find and**  **B. Find at**  **C. Find expressions for that satisfy at**  **D. Is differentiable at ? Justify your answer**  **Question IV: [5 Marks]**   1. **Find the local extrema and saddle points of** 2. **Use Lagarange Multipliers to find the extrema of subject to the constraint**   **Question V: [7 Marks]**   1. **Evaluate** 2. **Use double integral to represent the volume of the solid in the first octant bounded by the coordinate planes, the equations and** 3. **Use triple integral to find the volume of the region bounded by the graphs of**   **and**  **D. Use the polar coordinates to evaluate** |
| **Question VI: [13 Marks]**   1. **Determine whether the following series is absolutely convergent, conditionally convergent, or divergent:** |
| 1. **Use the Integral Test to determine whether the series converges or diverges.** 2. **Find the interval and the radius of convergence for** 3. **Find the Taylor series of about** 4. **Approximate to two decimal places**   **Bonus: [4 Marks]**  **Determine whether the following sequences converge or diverge**  **(i)**  **(ii)**  **(iii)** |

Good Luck ☺