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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 ☺