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| **University of Kerala** | | |
| Discipline: **Mathematics** |  | Time: 2 Hours (120 Mins.) |
| Course Code: UK1DSCMAT102 |  | Total Marks: 56 |
| Course Title: Differentiation, Sequences and Series |  |  |
| Type of Course: DSC |  |  |
| Semester: 1 |  |  |
| Academic Level: 100-199 |  |  |
| Total Credit: 4, Theory: 4 Credit, Practical: 0 Credit |  |  |

**Part A. 6 Marks**. Time: 5 Minutes

Objective Type. 1 Mark Each. Answer All Questions

(Cognitive Level: Remember/Understand)

|  |  |  |  |
| --- | --- | --- | --- |
| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course**  **Outcome (CO)** |
| 1. | Define Monotone Sequence. | Remember | CO 3 |
| 2. | State Ratio Test for the convergence of a series | Remember | CO 3 |
| 3. | Evaluate | Understand | CO 2 |
| 4. | Find if | Understand | CO1 |
| 5. | Determine whether the sequence converges or not. | Understand | CO 3 |
| 6. | Find the sum | Understand | CO 3 |

**Part B. 10 Marks**. Time: 20 Minutes

Two-Three sentences. 2 Marks Each. Answer All Questions

(Cognitive Level: Remember/Understand/Apply)

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| --- | --- | --- | --- |
| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course**  **Outcome (CO)** |
| 7. | Find the slope of the tangent line to the curve at | Understand | CO 2 |
| 8. | Find the value of the constant that will make the function | Understand | CO 1 |
| 9. | Find | Apply | CO 1 |
| 10. | Determine whether the series converge or diverge | Apply | CO 3 |
| 11. | Find the Taylor series of about . | Apply | CO 3 |

**Part C. 16 Marks**. Time: 35 Minutes

Short Answer. 4 Marks Each. Answer all 4 questions, choosing among options within each question.

(Cognitive Level: Remember/Understand/Apply/Analyse)

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| --- | --- | --- | --- |
| Qn.  No. | Question | Cognitive  Level | Course  Outcome (CO) |
| 12. | 1. Find if   OR   1. Find by implicit differentiation | Apply | CO 2 |
| 13. | 1. Find the derivative of   OR   1. Find if | Apply | CO 1 |
| 14. | 1. Find   OR   1. Find | Analyse | CO2 |
| 15. | 1. Determine whether the seriesconverges and if so find the sum   OR   1. Check whether the seriesconverges or not. | Analyse |  |

**Part D. 24 Marks**. **Time : 60 minutes**

Long Answer. 6 Marks Each. Answer all 4 questions, **choosing among options within each question**. (Cognitive Level: Understand/Apply/Analyse/Evaluate/Create)

| **Qn. No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| --- | --- | --- | --- |
|  | 1. Find :   OR   1. Find the average rate of change of w.r.t over the interval 2. Find the instantaneous rate of change of at | Analyse | CO1 |
| 17. | 1. Find if :   OR   1. Use implicit differentiation to if | Evaluate | CO 2 |
| 18. | 1. State limit comparison test and use it to determine whether the series converge or diverge   OR   1. State Root Test and use it to determine whether the series converges. | Evaluate | CO 3 |
| 19. | 1. Use Alternating series test to show that the series converge 2. Determine whether this series converges absolutely or converges conditionally   OR   1. Find the Maclaurin series for 2. Find the Taylor series for about | Create | CO 3 |

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| **Cognitive Level** | **Marks** | **Percentage** |  | **Course Outcomes** | **Marks** | **Percentage** |
| Remember | 2 | 3.6 |  | CO1 | 15 | 27 |
| Understand | 8 | 14.3 |  | CO2 | 17 | 30 |
| Apply | 14 | 25.0 |  | CO3 | 24 | 43 |
| Analyse | 14 | 25.0 |  |  |  |  |
| Evaluate | 12 | 21.4 |  |  |  |  |
| Create | 6 | 10.7 |  |  |  |  |
| **TOTAL** | **56** | **100** |  | **TOTAL** | **56** | **100** |