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| **University of Kerala** | | |
| Discipline: **Mathematics** |  | Time: 2 hours (120 Mins.) |
| Course Code: UK1DSCMAT103 |  | Total Marks:56 |
| Course Title: |  | Differentiation and Linear System of Equations |
| 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)

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| --- | --- | --- | --- |
| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course**  **Outcome (CO)** |
| 1. | Define asymptote of a curve *y* = *f*(*x*) | Understand | CO2 |
| 2. | Find the slope of the tangent line to  at *x* = 9 | Remember | CO1 |
| 3. | Find | Remember | CO1 |
| 4. | Define the rank of a matrix. | Remember | CO3 |
| 5. | Define eigenvalue of a matrix | Remember | CO4 |
| 6. | Find the rank of the matrix . | Understand | CO3 |

**Part B. 8 Marks**. Time: 24 Minutes

Short Answer. 2 Marks Each. Answer All Questions

(Cognitive Level: Understand/Apply)

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| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course**  **Outcome (CO)** |
| 7. | Find | Remember | CO2 |
| 8. | Find | Understand | CO1 |
| 9. | Find the values of x if any, at which is discontinuous and determine whether each such value is a removable discontinuity. | Apply | CO2 |
| 10. | Find the rank of the matrix | Understand | CO3 |
| 11. | Find the determinant of the matrix | Remember | CO3 |

**Part C. 28 Marks**.

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

(Cognitive Level: Apply/Analyse/Evaluate/ Create)

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| Qn.  No. | Question | Cognitive  Level | Course  Outcome (CO) |
| 12. | A. Find the interval on which is continuous.  OR  B. Find the value of k such that the function  is continuous. | Understand | CO2 |
| 13. | A. Find  OR  B. Find if | Analyse | CO1 |
| 14. | A. Find the eigenvalue and eigenvectors of the matrix  OR  B. Diagonalize the matrix | Understand | CO4 |
| 15. | A. Solve the system of equations  B. Find rank of the matrix | Apply | CO3 |

**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/Analyse/ Apply)

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| --- | --- | --- | --- |
| Qn.  No. | Question | Cognitive  Level | Course  Outcome (CO) |
| 16. | 1. Solve by Cramer’s rule.   **OR**   1. Solve the system | Understand | CO3 |
| 17. | A) Diagonalize the matrix    OR   1. Find the determinant of the matrix | Understand | CO4 | . |
| 18. | A) Find the derivative of  OR  B)   1. Use implicit differentiation to find the derivative of the Folium of Descartes 2. Find an equation for the tangent line to the Folium of Descartes at the point (3*/*2*,*3*/*2) | Analyse | CO2 |
| 19. | A)   1. Find 2. Find   **OR**  B)Find | Apply | CO1 |

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| **Cognitive Level** | **Marks** | **Percentage** |  | **Course Outcomes** | **Marks** | **Percentage** |
| Remember | 10 | 18 |  | CO1 | 14 | 25 |
| Understand | 24 | 43 |  | CO2 | 15 | 27 |
| Apply | 12 | 21 |  | CO3 | 16 | 28 |
| Analyse | 10 | 18 |  | CO4 | 11 | 20 |
| **TOTAL** | **56** | **100** |  | **TOTAL** | **56** | **100** |