Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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|  |  |  |  |
| **Code :** | **18MA1009** | **Duration :** | **3hrs** |
| **Sub. Name :** | **TRANSFORMS AND DIFFERENTIAL EQUATIONS** | **Max. Marks :** | **100** |

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| --- | --- | --- | --- |
| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART – A (10X1 = 10 MARKS)** | | | |
| 1. | The Fourier series for the function  in the interval  is \_\_\_\_\_\_\_. | CO1 | 1 |
| 2. | The Fourier cosine series for the function  in the interval  is \_\_\_\_\_\_. | CO1 | 1 |
| 3. |  | CO2 | 1 |
| 4. | . | CO2 | 1 |
| 5. | . | CO3 | 1 |
| 6. | . | CO3 | 1 |
| 7. | Find the complementary function of | CO4 | 1 |
| 8. | Solve | CO4 | 1 |
| 9. | Solve . | CO5 | 1 |
| 10. | Obtain the complete solution of | CO5 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Express  as a half range cosine series in | CO1 | 3 |
| 12. | Find the Laplace transform of . | CO2 | 3 |
| 13. | Write the formula for Fourier sine transform and its inverse. | CO3 | 3 |
| 14. | Solve . | CO4 | 3 |
| 15. | Solve | CO5 | 3 |
| 16. | Write the three possible solutions of the one-dimensional heat equation. | CO6 | 3 |

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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | | | | |
| 17. |  | | | The displacement of a part of a mechanism is tabulated with corresponding angular movement of the crank. Express as a Fourier series neglecting the harmonic above the third:   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | |  | 1.80 | 1.10 | 0.30 | 0.16 | 1.50 | 1.30 | 2.16 | 1.25 | 1.30 | 1.52 | 1.76 | 2.00 | | | CO1 | 12 |
|  |  | | |  | |  |  |
| 18. | a. | | | Evaluate | | CO2 | 6 |
| b. | | | Find the inverse Laplace transform of | | CO2 | 6 |
|  |  | | |  | |  |  |
| 19. |  | | | Find the Fourier sine transform of . Hence show that | | CO3 | 12 |
|  |  | | |  | |  |  |
| 20. |  | | | Using method of variation of parameter, solve | | CO4 | 12 |
|  |  | | |  | |  |  |
| 21. |  | | | Find the complete solution of | | CO4 | 12 |
|  |  | | |  | |  |  |
| 22. | a. | | | Solve | | CO5 | 6 |
| b. | | | Solve | | CO5 | 6 |
|  |  | | |  | |  |  |
| 23. | a. | | | Evaluate | | CO2 | 6 |
| b. | | | Find the inverse Laplace transform of | | CO2 | 6 |
|  |  | | |  | |  |  |
| **Compulsory:** | | | | | | |  |
| 24. | |  | An insulated rod of length  has its ends A and B maintained at and  respectively until steady state condition prevail. If B is suddenly reduced to and maintained at , find the temperature at a distance from A at time . | | CO6 | | 12 |