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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14MA3004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED CALCULUS AND NUMERICAL METHODS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | Marks |
| 1. |  | A tightly stretched string with fixed end points x=0 andis initially at rest in its equilibrium position. If it is set vibrating giving each point a velocity  then find the displacement of any point x of the string at any time t. | CO1 | 20 |
| (OR) | | | | |
| 2. |  | A metal bar 10 cm. long, with insulated sides has its ends A and B kept at C and C respectively until steady state conditions prevail. The temperature at each end is then suddenly reduced to 0o C and kept so. Find the subsequent temperature distribution u(x, t) in the rod. | CO1 | 20 |
| 3. |  | A rectangular plate with insulated surface is 20 cm wide and so long compared to its width that it may be considered infinite in length without introducing an appreciable error. If the temperature of the short edge x=0 is given by      and the two long edges as well as the other short edge are kept at C. Find the steady state temperature distribution in the plate. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | A semi circular plate of radius cm has insulated faces and heat flows in plane curves. The bounding diameter is kept at 0°C and the semi circumference is maintained at 100°C. Find the steady state temperature at any point of the plate. | CO1 | 20 |
| 5. | a. | Find the shortest smooth plane curve joining two distinct points in the plane. | CO2 | 10 |
|  | b. | Find the curve *c* passing through two given points  and  such that the rotation of the curve *c* about x-axis generates a surface of revolution having minimum surface area. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Determine the equation of the geodesics on a right circular cylinder of radius ‘*a*’. | CO2 | 10 |
|  | b. | Find a complete solution of the Euler-Lagrange equation for | CO2 | 10 |
| 7. | a. | Evaluate  using (i) Trapezoidal rule (ii) Simpson rules (both). | CO2 | 10 |
|  | b. | Evaluate  using Romberg’s method. | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Using power method find all the Eigen values of | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Find the Eigen values and Eigen vectors of  by Jacobi method. | CO2 | 20 |

ALL THE BEST