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**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **CLASSICAL MECHANICS** | **Duration :** | **3hrs** |
| **Sub. Name :** | **15MA3003** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Derive De’Alemberts principle. | CO1 | 10 |
| b. | Obtain the equation of motion for a harmonic oscillator. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Obtain Lagrange’s equations in terms of Ruthian function. | CO1 | 12 |
| b. | Derive the Legendre transformation. | CO1 | 8 |
| 3. | a. | Derive Hamilton’s canonical equations of motion. | CO2 | 14 |
|  | b. | Discuss the Raleigh Dissipation function. | CO2 | 6 |
| (OR) | | | | |
| 4. | a. | Discuss the stable and unstable equilibrium. | CO2 | 10 |
|  | b. | The kinetic energy of a system is  and then potential energy is  .Find the eigen frequencies. | CO2 | 10 |
| 5. |  | Derive Lagrange’s equation in equilibrium state. | CO3 | 20 |
| (OR) | | | | |
| 6. | a. | Discuss the normal coordinates. | CO3 | 10 |
|  | b. | The potential energy function between two atoms of a diatomic molecule is given by | CO3 | 10 |
| 7. | a. | Derive Hamilton’s principle. | CO3 | 10 |
|  | b. | Show that the curve of minimum length joining a pair of points in the plane is a straight line. | CO3 | 10 |
| (OR) | | | | |
| 8. |  | Derive the Eulerian angles. | CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Define virtual displacement and virtual velocity. | CO1 | 4 |
|  | b. | Derive Lagrangian Equation for a system of N particles. | CO1 | 16 |

ALL THE BEST