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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14PH2006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MECHANICS AND PROPERTIES OF MATTER** | **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. | State the Universal law of gravitation. | CO1 | 4 |
| b. | With neat diagram determine the gravitational constant G using Cavendish method and deduce the equation. | CO1 | 16 |
| (OR) | | | | |
| 2. | a. | State and prove Kepler’s laws of planetary motion. | CO1 | 4 |
| b. | Derive the Newton’s deductions from Kepler’s laws. | CO1 | 16 |
|  |  |  |  |  |
| 3. | a. | Define angular velocity and angular acceleration. | CO1 | 4 |
| b. | Calculate the general equation for the motion of a projectile in a non-resisting medium. Derive the expressions for (i) Angle of projection for Maximum range. (ii) maximum height and (iii) maximum range. | CO1 | 16 |
| (OR) | | | | |
| 4. | a. | Distinguish between elastic and inelastic collisions. | CO1 | 4 |
| b. | Explain the experimental determination of coefficient of restitution. | CO1 | 16 |
|  |  |  |  |  |
| 5. |  | Define Young’s modulus, Bulk modulus and modulus of rigidity. If E, K and n represent these moduli respectively, prove the relation E = 9nK/3K+n. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | What is Poisson’s ratio? | CO1 | 4 |
| b. | Find an expression for the bending moment of a horizontal beam clamped at one end and loaded at the other. | CO3 | 16 |
|  |  |  |  |  |
| 7. |  | Deduce the expression for the rate of steady flow of a liquid through a capillary tube of circular section. | CO3 | 20 |
| (OR) | | | | |
| 8. | a. | Define surface tension. | CO2 | 4 |
| b. | Define surface tension and describe how you would determine its value of water, using a capillary tube. | CO3 | 16 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain the rotating cylinder method of determining the coefficient of viscosity of a liquid and give its theory. | CO3 | 20 |