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



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

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| **Code :** | **17PH2001** | **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. Describe the Newton’s equations from Kepler’s laws. | CO1 | 16 |
| b. | At what position in its elliptical orbit is the speed of a planet is maximum?  At what position is the speed is minimum? | CO3 | 4 |
| **(OR)** | | | | |
| 2. | a. | Cavendish Experiment is used to measure the Gravitational Constant. Describe its background, theory and method to measure the Gravitational Constant. | CO2 | 16 |
| b. | State law of motion. | CO2 | 4 |
|  |  |  |  |  |
| 3. | a. | Explain the dimensions of a projectile, such as range on an inclined plane, maximum height and trajectory. | CO1 | 16 |
| b. | An object is launched at a velocity of 20 m/s in a direction making an angle of 25° upward with the horizontal. What is the maximum height reached by the object? | CO2 | 4 |
| **(OR)** | | | | |
| 4. |  | Explain the collision between two bodies and derive the loss in kinetic energy. | CO1 | 20 |
|  |  |  |  |  |
| 5. | a. | Deduce the relationship between the elastic constants, (i.e) rigidity modulus, Bulk modulus and Young’s modulus. | CO4 | 16 |
| b. | A nylon string has a diameter of 2 mm, pulled by a force of 100 N. Determine the stress. | CO5 | 4 |
| **(OR)** | | | | |
| 6. |  | What is torsional pendulum? Derive the expression for time period of the same. Also obtain the formula for finding the rigidity modulus of the wire. | CO6 | 20 |
|  |  |  |  |  |
| 7. |  | Deduce an expression for depression of a horizontal beam suspended in a Non-Uniform manner. | CO5 | 20 |
| **(OR)** | | | | |
| 8. |  | Obtain an expression for the bending moment of a cantilever neglecting the weight of the beam. | CO5 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Derive the Poiseuille’s formula for determining the coefficient of viscosity of a water. | CO6 | 20 |