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



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

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| **Code :** | **14ME2001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENGINEERING MECHANICS** | **Max. Marks :** | **100** |

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

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| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Four forces act on bolt A as shown. Determine the resultant of the forces on the bolt.  C:\Users\Sharon Goldena\Pictures\Screenshots\Screenshot (71).png | CO1 | 20 |
| **(OR)** | | | | |
| 2. |  | The tension in the supporting cable AB is 10KN. Write the force which the cable exerts on the beam BC as a vector T. Determine the angles of vector T form with the positive x, y and z axis. | CO1 | 20 |
|  |  |  |  |  |
| 3. |  | A beam is subjected to forces as in figure, find the magnitude, direction and the position of the resultant force. (take , and )  C:\Users\HP\Downloads\New Doc 2018-09-26 16.53.13_1.jpg | CO2 | 20 |
| **(OR)** | | | | |
| 4. |  | Two smooth cylinders each of 15cm radius weighing 2000N each rest on a smooth horizontal floor. They are connected by a horizontal rope as in figure. These cylinders support a third cylinder of the same radius but of weight 400N. Determine;  (i) the reaction between a lower cylinder and the upper cylinder.  (ii) tension in the rope.  C:\Users\HP\Downloads\New Doc 2018-09-26 16.53.13_2.jpg | CO2 | 20 |
|  |  |  |  |  |
| 5. |  | Determine the moment of inertia of the unsymmetrical I section of top flange 60mm\*30mm, web as 60\*30mm and bottom flange 100\*30mm. | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Find the moment of inertia about the centroidal axes for the section shown in the figure. All dimensions are in mm.  . | CO3 | 20 |
|  |  |  |  |  |
| 7. |  | A ball is thrown from the top of a building with a velocity of 15 m/s directed vertically upward. If the height of the building is 10 m, find:  (i) the time when the ball reaches the highest elevation and the value of highest elevation.  (ii) the velocity of the ball when it reaches building top.  (iii) time when the ball hits the ground and the corresponding velocity. | CO4 | 20 |
| **(OR)** | | | | |
| 8. |  | The equation of motion of a particle moving in a straight line with variable acceleration is given by, s = 15t + 3t2 + t3 in which, ‘s’ is the distance measured in ‘m’ and the time ‘t’ is measured in seconds. Calculate;  (i) the velocity and acceleration at start.  (ii) the time taken, at which the particle attains its  maximum velocity.  (iii) the maximum velocity of the particle. | CO4 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | A body weighing 400N is resting on a rough inclined plane at 30° to horizontal. It is pulled up by a light flexible rope running to the plane and passes over a frictionless pulley at top as shown in the figure. The portion of the rope beyond hangs vertically and carries a weight of 300N at the end. If μ=0.2, find:  i) tension in the rope.  ii) acceleration.  iii) distance moved up by the body in 3 seconds starting  from rest. | CO5 | 20 |