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



**End Semester Examination – Nov/Dec– 2017**

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

(for civil only)

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | A particle is subjected to i. 250N towards North ii. 300 N towards North-west iii. 200 N inclined at 300 towards North of East iv. 350 N inclined at 400 towards South of West. Find the magnitude and direction of resultant force acting over the particle. | CO1 | 20 |
| (OR) | | | | |
| 2. |  | A string ABCD, attached to two fixed points A and D has equal weights of 1,000N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles of 30o and 60o respectively, to the vertical as shown in fig.2. Find the tensions in the portions AB, BC and CD of the string, if the inclination of the portion BC with the vertical is 120o. | CO1 | 20 |
| 3. |  | A tower guy wire is anchored by means of a bolt at A. The tension in the wire is 2,500N. Determine i. The components of Fx, Fy and Fz of the force acting on the bolt. ii. The angles ɵx, ɵy, ɵz defining the direction of the force. | CO1 | 12+8 |
| (OR) | | | | |
| 4. |  | The 3 cables are secured to a ring at B and the turn buckle at C as shown in fig.4 is tightened until it supports at tension of 1.6 kN.  Calculate the moment M, produced by the tension in the cable AB about the base of mast at D. | CO2 | 20 |
| 5. |  | Find the support reactions at the fixed end of a cantilever beam shown in fig. 5. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Determine the moments of inertia Ixx and Iyy of the shaded area shown in fig 6 with respect to centroidal axes respectively parallel and perpendicular to side AB. | CO2 | 20 |
| 7. |  | A particle moves along a straight line with an acceleration described by the equation, a = 3t2 – 6in which ‘*a*’ is the acceleration in m/s2 and ‘*t*’ is time in seconds. It is observed that distance travelled by the particle is 6 m at the end of 2 seconds and 10 m at the end of 3 seconds. Calculate: i. Velocity after 10 seconds; ii. Displacement after 8 seconds. | CO3 | 10+10 |
| (OR) | | | | |
| 8. |  | A projectile is aimed at a mark on the horizontal plane through the point of projection and falls 12 m short when the angle of projection is 15o. When it is tried again it overshoots the mark by 24 m when the angle of projection is 45o. Find the correct angle of projection to hit the mark. Velocity of projection is constant in all the cases. | CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | A car of mass 300 kgs is travelling at a speed of 36 km/hr on a level road. It is brought to rest, after travelling a distance of 5m. What is the average force of resistance acting on the car? | CO4 | 8 |
|  | b. | Two bodies one of mass 30 kg, moves with a velocity of 9 m/s strikes on another body of mass 15 kg, moving in the opposite direction with a velocity of 9 m/s centrally.  Find the velocity of each body after impact, if the coefficient of restitution is 0.8. | CO4 | 12 |

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