**20ME204**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular/supplementary) DEGREE EXAMINATION** | | | |
| **August, 2023**  **Second Semester** | **Mechanical Engineering**  **Engineering Mechanics - II** | | |
|  |  | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | | M |
| 1 | a) | Define dynamics | CO1 | L1 | | 1 |
|  | b) | Specify the difference between rectilinear and curvilinear motion. | CO1 | L1 | | 1 |
|  | c) | Specify the variable terms in kinematics. | CO1 | L1 | | 1 |
|  | d) | Define acceleration. | CO2 | L1 | | 1 |
|  | e) | State D’Alembert’s principle. | CO2 | L1 | | 1 |
|  | f) | Write the equations of rectilinear motion. | CO2 | L1 | | 1 |
|  | g) | Differences between the potential and kinetic energy. | CO2 | L1 | | 1 |
|  | h) | Explain the principle of conservative force. | CO3 | L1 | | 1 |
|  | i) | State the principle of Impulse momentum. | CO3 | L1 | | 1 |
|  | j) | Explain the types of impact. | CO3 | L1 | | 1 |
|  | k) | What is the MI of s sphere of mass m and radius r with respect to its diametric axis? | CO3 | L1 | | 1 |
|  | l) | If a body is rotating about a fixed axis with angular velocity ω, what is the velocity of a point located at a distance r from axis of rotation? | CO4 | L1 | | 1 |
|  | m) | Explain instantaneous centre of a body with a suitable example? | CO4 | L1 | | 1 |
|  | n) | What is the relation between translatory and rotatory motion of a body? | CO4 | L1 | | 1 |
| **Unit-I** | | | | | | |
| 2 |  | The position of a particle which moves along a straight line is defined by the relation *x =3t3 - 2t2 +5t + 6*, where *x* is expressed in meters and *t* in seconds. Determine i) the time at which the velocity will be zero, ii) the position and distance travelled by the particle at that time, iii) the acceleration of the particle at that time, iv) the distance travelled by the particle from *t = 4s to t = 6s*. | CO1 | L2 | 14M | |
|  |  | **(OR)** |  |  |  | |
| 3 |  | A motorist travelling on a curved road of radius 250m at the speed of 60km/hr. The motorist suddenly applies the breaks the vehicle is slow down at a constant rate. Knowing that after 8sec the vehicle speed is reduced to 45km/hr. Determine the acceleration of vehicle immediately after breaks are applied. | CO1 | L2 | 14M | |
| **Unit-II** | | | | | | |
| 4 |  | A stone dropped into a well is heard to strike the water in 4 seconds. Find the depth of the well, assuming the velocity of sound to be 335 m/sec. | CO2 | L3 | 14M | |
| **(OR)** | | | | | | |
| 5 |  | The two blocks shown start from rest. The horizontal plane and the pulley are frictionless, and the pulley is assumed to be of negligible mass. Determine the acceleration of each block and the tension in the cord. | CO2 | L3 | 14M | |
| **P.T.O**  **20ME204**  **Unit-III** | | | | | | |
| 6 |  | A ball of mass 2 kg moving with a velocity of 2 m/s hits directly on a ball of mass 4 kg at rest. The first ball, after impinging, comes to rest. Find the velocity of the second ball after the impact and the coefficient of restitution. | CO3 | L2 | | 14M |
| **(OR)** | | | | | | |
| 7 |  | Calculate the moment of inertia of a uniform hollow cylinder of mass *m*, radius *r* and length *l* about its axis. | CO3 | L2 | | 14M |
| **Unit-IV** | | | | | | |
| 8 |  | Cable C has a constant acceleration of 225 mm/s2 and an initial velocity of 300 mm/s, both directed to the right. Determine (a) the number of revolutions of the pulley in 2 s, (b) the velocity and change in position of the load B after 2 s, and (c) the acceleration of the point D on the rim of the inner pulley at t = 0. | CO4 | L3 | 14M | |
| **(OR)** | | | | | | |
| 9 |  | The drum shown in figure has a mass of 60 kg and a radius of 0.4 m. A cord of negligible mass is wrapped around the periphery of the drum and attached to a block having a mass of 20 kg. If the block is released, determine the drum’s angular acceleration. | CO4 | L3 | 14M | |

