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| **20CE203**  **Hall Ticket Number:**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |      |  |  |  | | --- | --- | --- | | **I/IV B.Tech( Regular/Supplementary) DEGREE EXAMINATION** | | | | **September,2022** | **Civil Engineering** | | | **Second Semester** | **Engineering Mechanics** | | | **Time: Three Hours** | | **Maximum:70 Marks** | |  |
| |  |  | | --- | --- | | ***Answer question 1 compulsory.*** | **(14X1 = 14 Marks)** | | ***Answer one question from each unit.*** | **(4X14=56 Marks)** | |  |

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| 1. | Answer all questions | |  |  |
|  | a) | What do you mean by coplanar concurrent force system? | CO1 |  |
|  | b) | Define couple | CO1 |  |
|  | c) | List out types of loads | CO1 |  |
|  | d) | Define mass moment of inertia. | CO5 |  |
|  | e) | Define angle of repose | CO3 |  |
|  | f) | Write equation of motion of a rigid body rotating about fixed axis. | CO5 |  |
|  | g) | State D-Alembert’s principle. | CO4 |  |
|  | h) | What is Imperfect truss? | CO4 |  |
|  | i) | State Parallel axis theorem | CO2 |  |
|  | j) | Distinguish between translation and rotational motion. | CO4 |  |
|  | k) | Define cone of friction. | CO3 |  |
|  | l) | Define angular velocity. | CO5 |  |
|  | m) | Distinguish between statically determinate and indeterminate structure. | CO4 |  |
|  | n) | State law of transmissibility of forces. | CO1 |  |
| **UNIT-I** | | | | |
| 2. | a) | Two forces equal to 2P and P respectively act on a particle. If first be doubled and the second increased by 12N the direction of the resultant is unaltered, find the value of ‘P’? | CO1 | 6M |
|  | b) | State and prove Parallelogram law of forces. | CO1 | 8M |
|  |  | **(OR)** |  |  |
| 3. | a) | Determine the centroid of triangle of base ‘b’ and height ‘h’. | CO2 | 6M |
|  | b) | A beam AB is supported and loaded as shown in Figure 1. Find the reactions at A and B.  https://lh5.googleusercontent.com/Aw2aUYrYI2vUrEM59LQnhAjnzb8zeMaG8jZRM8mb15-IX2NuDs3_JplsDRV1cEZEnFgHQO7ieNbnjepPCuDgSMvdKI9lJNBST6fP9IZlrLdu92C_-Jq04emNbxRztuP22qIL8OM=s0 | CO2 | 8M |
|  |  | **UNIT-II** |  |  |
| 4. | a) | Derive an equation for moment of inertia of a Circle. | CO2 | 7M |
|  | b) | State and prove parallel axis theorem. | CO2 | 7M |
|  |  | **(OR)** |  |  |
| 5. |  | The 8 kg block is acted upon by a 100N force as shown in figure.If the coefficient of sliding friction is 0.30, determine the workdone by all forces as the block moves 4m to the right. | CO3 | 14M |
| **P.T.O**  **20CE203**  **UNIT-III** | | | | |
| 6. |  | Determine the forces in the members of the truss shown in figure. | CO4 | 14M |
|  |  | **(OR)** |  |  |
| 7. | a) | The acceleration of a particle moving along a straight line is defined by a=8-x.The particle starts from rest at t=0 and origin x=0.Determine (i) velocity of the particle when x=10m (ii) the position of the particle when velocity becomes zero (iii) velocity of a particle when acceleration becomes zero. | CO4 | 7M |
|  | b) | A stone dropped into well is heard to strike water after 4 sec. Find the depth of the well. The velocity of the sound is 350m/s. | CO4 | 7M |
|  |  | **UNIT-IV** |  |  |
| 8. |  | Determine the mass moment of inertia of a solid cylindrical body of radius ‘r’ and height ‘h’ about its centroidal axes. | CO5 | 14M |
|  |  | **(OR)** |  |  |
| 9. |  | A grinding wheel has a rated speed of 1500r.p.m and can be assumed to be a disc of 0.5m radius and of uniform thickness .It weights 300N.It is made to turn at 1500 r.p.m and then allowed to decelerate uniformly due to bearing friction. It was observed to come to rest in 120 seconds. Determine (a) the number of revolutions that it shall execute before coming to rest (b) the frictional torque. | CO5 | 14M |

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