**20EE206**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | |
| **September, 2021** | **Electrical and Electronics Engineering** | |
| **Second Semester** | **Engineering Mechanics** | |
| **Time:** Three Hours | **Maximum: 7**0 Marks | |
| Answer Question No. 1 compulsory. | | (1 x 14 = 14 Marks) |
| Answer ONE Question from each unit. | | (4 x 14 = 56 Marks) |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | a) | What are the specifications of a force? |  |
|  | b) | Write the equations of equilibrium for concurrent forces in a plane. |  |
|  | c) | State Varignon’s theorem. |  |
|  | d) | Differentiate between the moment of a force and couple. |  |
|  | e) | Define centroid. |  |
|  | f) | Define moment of inertia. |  |
|  | g) | State parallel axis theorem. |  |
|  | h) | State the laws of friction. |  |
|  | i) | Distinguish between kinematics and kinetics. |  |
|  | j) | State D-Alembert’s principle. |  |
|  | k) | Define curvilinear motion with examples. |  |
|  | l) | Write the equation for mass moment of inertia of circular disc of mass ‘m’ and radius ‘R’ about the axis passing through its centre and perpendicular to the plane of disc. |  |
|  | m) | What is the equation of motion of a rigid body rotating about fixed axis? |  |
|  | n) | A wheel 200 mm diameter comes to rest from a speed of 800 rpm in 600 sec. Determine the angular acceleration. |  |
|  |  | UNIT-I |  |
| 2. | a) | A system of four forces acting on a body is as shown in figure. Determine the magnitude and direction of resultant. | 7M |
|  | b) | Two identical rollers, each of weight Q = 1000 N are supported by an inclined plane and a vertical wall as shown in figure. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C.  F79B7F7A | 7M |
|  |  | (OR) |  |
| **P.T.O.**  **20EE206** | | | |
| 3. |  |  |  |
|  |  | Determine the coordinates of the centroid for the shaded area. As show in fig | 14M |
|  |  | UNIT-II |  |
| 4. |  | Determine the moment of inertia of section shown in figure about its centroidal axes.  scan0010.bmp | 14M |
|  |  | (OR) |  |
| 5. |  | A block of weight W1 = 1000N rests on a horizontal surface and supports on its top another block of weight W2 = 250N as shown in figure. The weight W2 is attached by an inclined string AB to the vertical Wall. Find the magnitude of the horizontal force P applied to the lower block to cause slipping to impend. The coefficient of friction for all contacting surfaces may be assumed to µ = 0.3.  scan0009.bmp | 14M |
| **P.T.O.**  **20EE206** | | | |
|  |  | UNIT-III |  |
| 6. |  | Three blocks A, B and C are connected as shown in figure. Find the acceleration of masses and tension T1 and T2 in the strings. Given μ1 = 0.2 and μ2 = 0.25. | 14M |
|  |  | (OR) |  |
| 7. | a) | 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 | 7M |
|  | b) | Determine the tension in the string and acceleration of block A and B weighing 1500N and 500 N connected by an inextensible string as shown in fig .Assume pulleys as frictionless and weightless.  C:\Users\exam\Desktop\1111.png | 7M |
|  |  | UNIT-IV |  |
| 8. |  | Determine the moment of inertia of a solid Cylinder of mass ‘m’ and radius ‘R’ about its diametral axis. | 14M |
|  |  | (OR) |  |
| 9. | a) | A grinding wheel is attached to the shaft of an electric motor of rated speed 1800 rpm. When the power is switched on, the unit attains the rated speed in 5 seconds and when the power is switched off, the unit comes to rest in 90 seconds. Assuming uniformly accelerated motion, determine the number of revolutions the unit turns (i) to attain the rated speed (ii) to come to rest. | 7M |
|  | b) | A flywheel weighing 50 kN and having a radius of gyration of 1 m, loses its speed from 400 rpm to 280 rpm in 2 minutes. What is the rotating torque acting on the flywheel. | 7M |

****