Autonomous

UES020526CC-1

Reg No.: _____ Name: _____

Jyothi Engineering College(Autonomous)

B. Tech Degree S2 (R) Examination, May 2026(2025 Scheme)

25EST203 - ENGINEERING MECHANICS

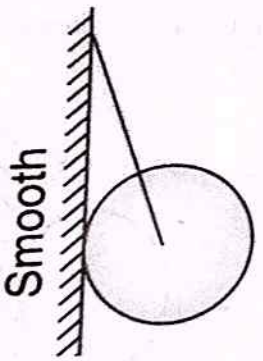
Total Mark: 60 **Total Time: 2hrs 30 min**

CO MARK

PART A

(Answer All Questions. Each question carries 3 marks)

1. Draw the Free Body Diagram of the given figure. CO1 (3)



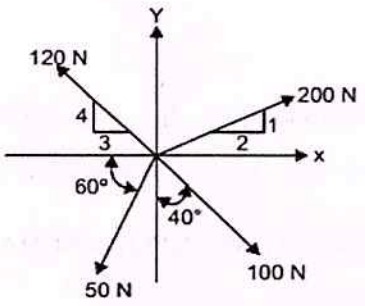
2. With neat sketches, explain any four types of loads acting on a beam. CO1 (3)
3. State and explain the parallel axis theorem. CO2 (3)
4. A body of weight 500 N is pulled up an inclined plane by a force of 350 N. The inclination of the plane is 30° to the horizontal, and force is applied parallel to the plane. Draw the free body diagram of the body. CO2 (3)
5. A 25 kg body rests on a horizontal surface for which coefficient of kinetic friction is μ=0.3. If the body is subjected to a 200 N force is acting in the direction of motion, determine the acceleration of the body. CO4 (3)
6. A constant retarding force of 50 N is applied to a body of mass 20 kg moving initially with a velocity of 15 m/s. How long the body will take to stop? CO4 (3)
7. Define Simple Harmonic Motion (SHM) and give any two suitable examples. CO5 (3)
8. Two springs of stiffness 200 N/m and 300 N/m are connected (a) in series and (b) in parallel. Determine the equivalent stiffness of the system in each case. CO5 (3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

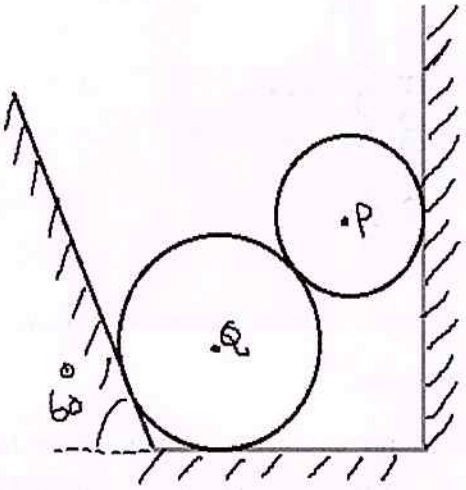
Module - 1

9. A system of four forces acting at a point on a body is as shown in figure.Determine the resulatant and direction. CO1 (9)



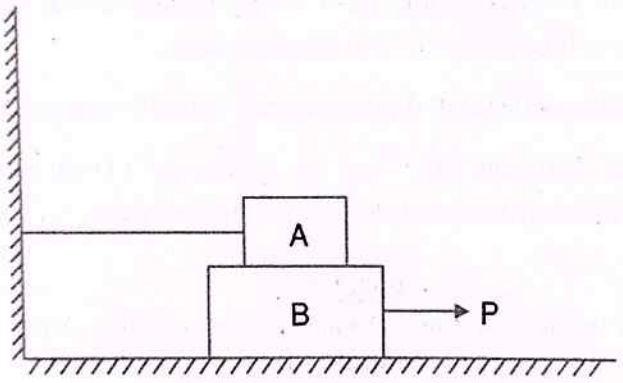
OR

10. Two cylinders P and Q rest in a channel as shown in figure. The cylinder P has diameter of 100 mm and weighs 200 N, whereas the cylinder Q has diameter of 180 mm and weighs 500 N. If the bottom width of the box is 180 mm, with one side vertical and the other inclined at 60°, Determine the pressures at all the four points of contact. CO1 (9)



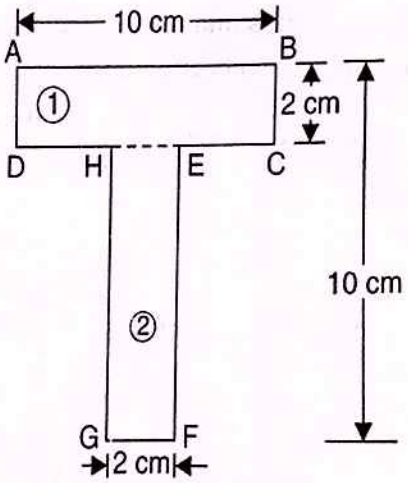
Module - 2

11. Block A weighing 1000 N rests over block B which weighs 2000 N as shown in the figure. Block A tied to wall with a horizontal string. If the co-efficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block B if P is horizontal. CO2 (9)



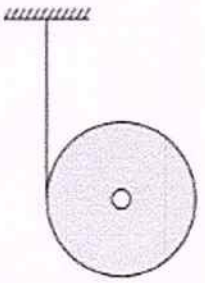
OR

12. Determine the moment of inertia of the section about the horizontal and vertical axes, passing through the centre of gravity of the section. CO2 (9)



Module - 3

13. A string is wound several times around a solid cylinder of 2 kg mass. The free end of the string is fixed to the ceiling and the cylinder is released from rest. Determine its velocity after it has fallen through a height of 2 m. In addition, determine the tension in the string. CO4 (9)

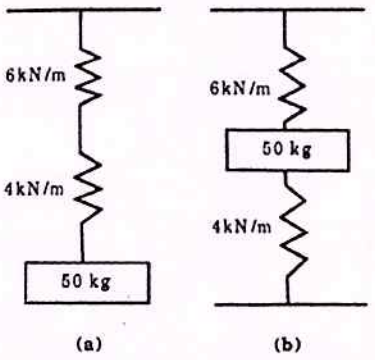


OR

14. A motor car takes 10 seconds to cover 30 meters and 12 seconds to cover 42 meters. Find the uniform acceleration of the car and its velocity at the end of 15 seconds. CO4 (9)

Module - 4

15. A body of mass 50 kg is suspended by two springs of stiffness 4 kN/m and 6 kN/m as shown in figure (a) and (b).The body is pulled 50 mm down from its equilibrium position and released. Calculate (a) Frequency of oscillation (b) Maximum velocity (c) Maximum acceleration CO5 (9)



OR

16. A body moving with SHM has velocities 10 m/s and 4 m/s at 2 and 4 m distance from the mean position. Find the amplitude and time period of the body. CO5 (9)

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