

I B. Tech II Semester Regular/Supplementary Examinations, July/August - 2023**ENGINEERING MECHANICS**

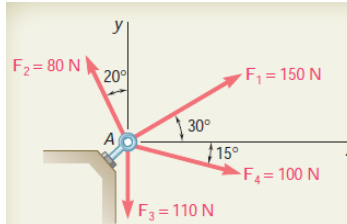
(Only for Civil Engineering)

Time: 3 hours

Max. Marks: 70

*Answer any five Questions one Question from Each Unit**All Questions Carry Equal Marks***UNIT- I**

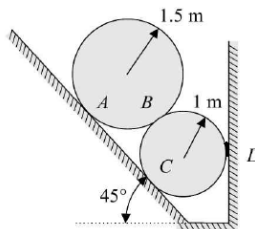
- 1 Four forces are acting on a bolt, determine the resultant of the forces on the bolt. [14M]

**(OR)**

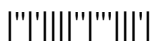
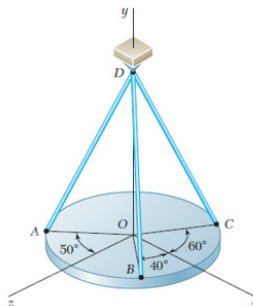
- 2 a) State and derive triangle law of force graphically. [7M]
b) Express the force of 100 N passing through the origin of A in vector form. [7M]

UNIT- II

- 3 Two smooth cylinders are placed in a channel as shown in figure. The weight of the smaller cylinder is 10 kN and of the larger cylinder is 30 kN. Determine contact forces at points A, B, C & D. [14M]

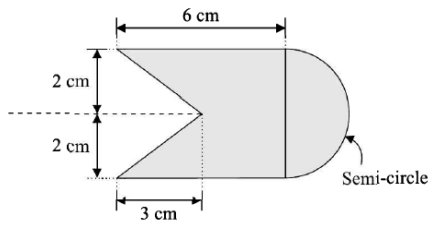
**(OR)**

- 4 A horizontal circular plate is suspended as shown from three wires that are attached to a support at D and form 30° angles with vertical. Knowing that the x component of the force exerted by wire AD on the plate is 110.3 N, determine the tension in wire AD. [14M]

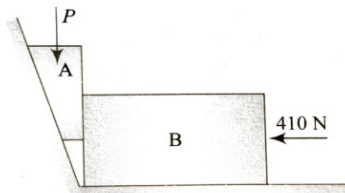


UNIT- III

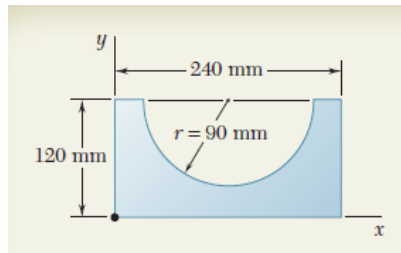
- 5 Find the centroid of the composite section [14M]

**(OR)**

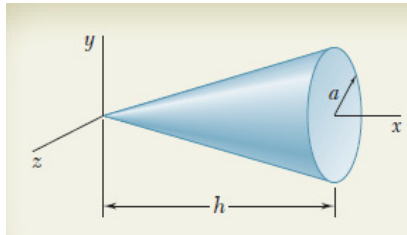
- 6 Compute the force P applied through wedge A necessary to impend the motion of the block B weighing 2 kN . Assume the angle of limiting friction for all the contiguous surfaces is 21° as shown in figure. [14M]

**UNIT- IV**

- 7 Determine the moment of inertia of the shaded area of about the X axis. [14M]

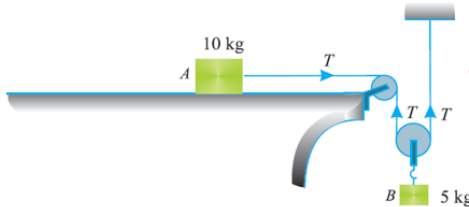
**(OR)**

- 8 Derive the moment of inertia of the right circular cone as shown in figure about its longitudinal axis. [14M]



UNIT- V

- 9 A block of wood A of mass 10 kg is held in a rough horizontal table. An elastic string connected to the block passes over a smooth pulley at the end of the table and then under a second smooth pulley carrying a body B of mass 5 kg as shown in figure. [14M]



(OR)

- 10 A ball is dropped from a height $h_0 = 1.2$ m on a smooth floor as shown in figure. [14M]
Knowing that for the first bounce $h_1 = 1$ m and $D_1 = 0.4$ m, determine
- The coefficient of restitution
 - The height and the range of the second bounce

