

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Odd Mid Semester Examination for Academic Session 2024-25

COURSE NAME: B.Tech

SEMESTER: 2nd

SECTION ~~BRANCH~~ NAME: **●, D, E, F, G, H, I, J**

SUBJECT NAME: Engineering Mechanics

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*
 Assume data if necessary and indicate those clearly

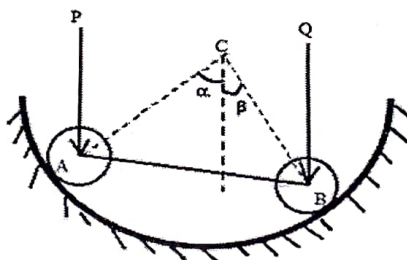
Q1.	Answer all Questions.	[2 × 3]
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|----|--|--|
| a) | Define principle of transmissibility & Free Body Diagram (FBD) and draw FBD of Hinged, Fixed & Roller support. | |
| b) | Explain the term 'redundant constraints' | |
| c) | Define coefficient of friction and limiting friction. | |

Q2.		
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Two roller of weights "P" = 222.5N and "Q" = 445N are connected by a rigid bar at its ends & supported inside a circular ring in a vertical plane as shown in figure. The length of the bar "AB" is such that radii "AC" and "BC" form right-angle at center of the circular ring "C". Neglecting friction and weight of the bar, find the compressive force in the bar "AB".

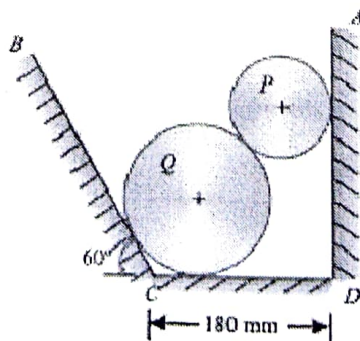
[8]



OR

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.

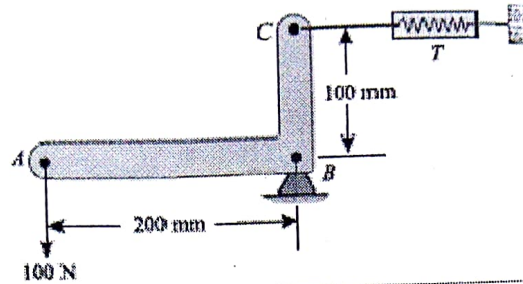
[8]



OR

- 3 (a) As shown in figure, a crank-lever ABC with a tension spring (T). The lever weighs 0.2 N/mm. Determine the tension developed in the spring, when a load of 100 N is applied at A.

[6]



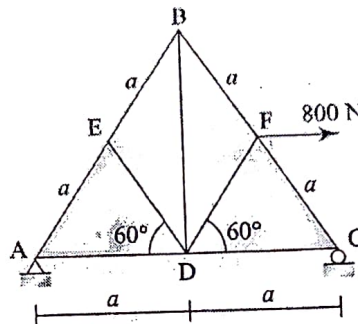
- (b) Explain Varignon's theorem

[2]

OR

Calculate the force induced in each bar of the simply supported loaded truss as shown in Figure.

[8]



- 4 An effort of 200 N is required just to move a certain body up an inclined plane of angle 15° the force acting parallel to the plane. If the angle of inclination of the plane is made 20° the effort required, again applied parallel to the plane, is found to be 230 N. Find the weight of the body and the coefficient of friction.

[8]

OR

A ladder of length 4.4 meter and weight 250 N, is placed at one end on wall and other end on floor. To prevent slipping of ladder, a rope PC is tied with the wall. Using the method of virtual work, determine the tension of the rope.

[8]

