



B.E./B.Tech. (Full Time) END SEMESTER EXAMINATIONS NOV / DEC 2011

Common to all Branches

II SEMESTER – (REGULATIONS 2004)

GE181 – ENGINEERING MECHANICS

Time: 3 hours

Maximum marks: 100.

PART – A

(10 x 2 = 20 Marks)

1. State Polygon law of forces
2. State the equations of equilibrium of a coplanar system of forces.
3. Give the different types of support in beams.
4. Define principle of transmissibility
5. State the theorems of Pappus and Guldinus to find out the surface area and volume of a body
6. Write the expression for centroid of hemisphere and circular lamina
7. What is the frictional force generated when a body of mass 10kg resting on a horizontal plane subjected to a horizontal force p in earth gravitational field, if the coefficient of friction is 0.25.
8. A body of weight 150N rest on a horizontal plane. If a horizontal force of 50N can just move it, then what will be the value of coefficient of friction.
9. A small bal is dropped from a height of 19.62 m. At what velocity the ball will strike the ground.
10. Define instantaneous centre of rotation

PART – B

(5 x 16 = 80 Marks)

11. Two smooth circular cylinders, each of weight $W = 1000\text{N}$ and radius 15 cm, are connected at their centres by a string AB of length = 40 cm and rest upon a horizontal plane, supporting above them a third cylinder of weight = 2000N and radius 15 cm as shown in fig11. Find the force S in the string AB and the pressure produced on the floor at the points of contact D and E.

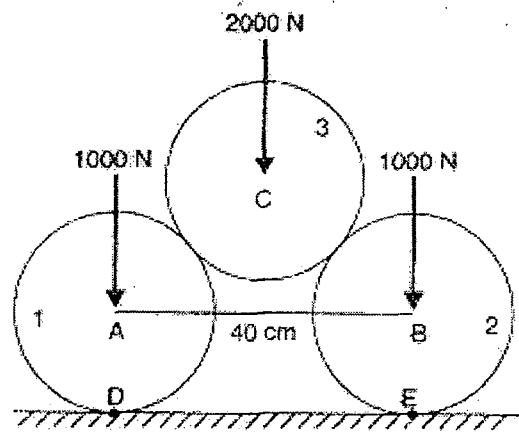


Fig 11

12. (a) Fig.12 (a) shows the coplanar system of forces acting on a flat plate. Determine : (i) the resultant and (ii) x and y intercepts of the resultant.

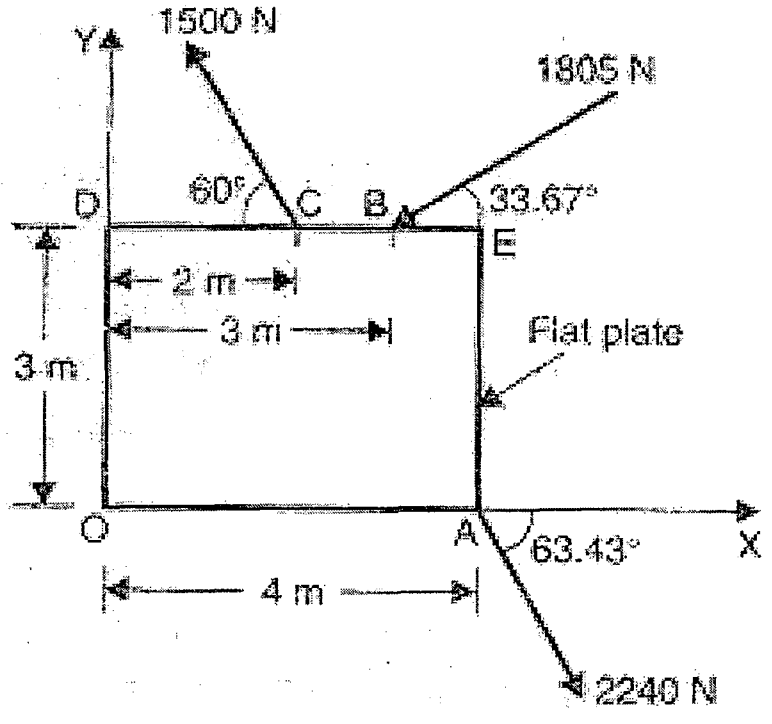


Fig 12 (a)

(OR)

12.(b) Find reactions at supports of an L-bent shown in fig.12(b)

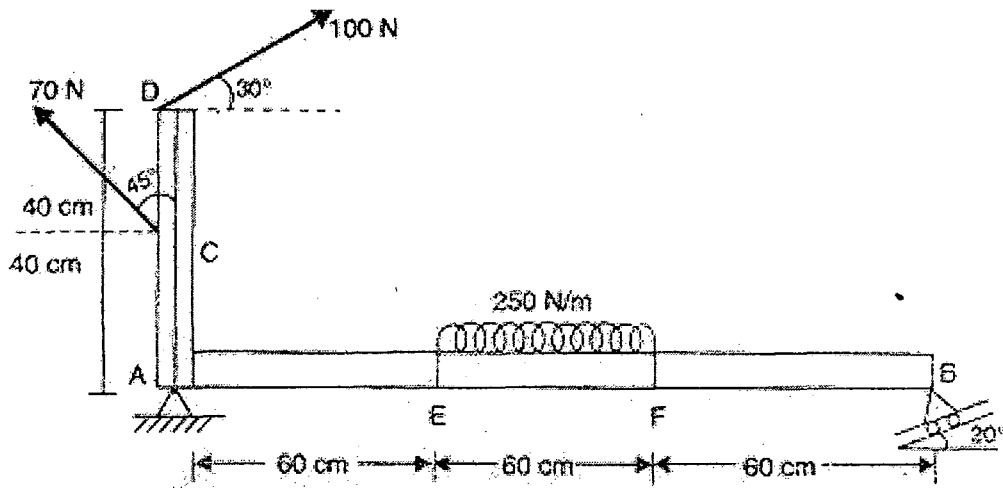


Fig .12(b)

13.(a) The cross-section of a culvert is shown in fig.13(a) Compute the moment of inertia about the horizontal A-A axis.

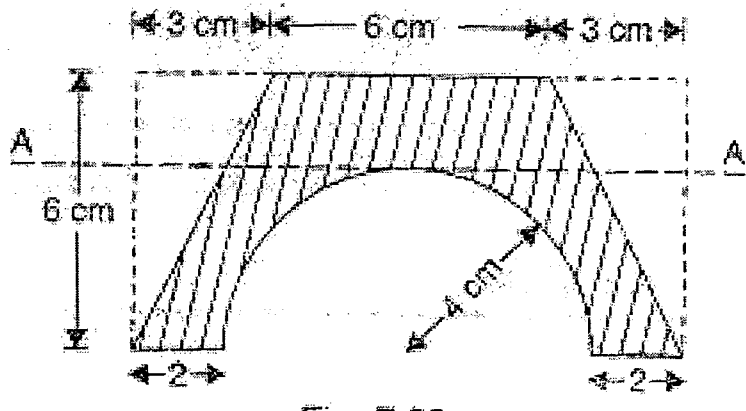


Fig 13(a)

(OR)

15(a) An open belt running over two pulleys 24 cm and 60 cm diameters connects two parallel shafts 3 m apart and transmits 3.75 kW from the smaller pulley that rotates at 300 r.p.m. co-efficient of friction between the belt and the pulleys is 0.3 and the safe working tension is 100 N/cm width. Determine : (i) minimum width of the belt, (ii) initial belt tension, and (iii) length of the belt required.

(OR)

15(b) Find the force required to move a load of 30 N up a rough inclined plane, the force being applied parallel to the plane. The inclination of the plane is such that when the same body is kept on a perfectly smooth plane inclined at that angle, a force of 6 N applied at an inclination of 30° to the plane keeps the same in equilibrium. Assume co-efficient of friction between the rough plane and the load is equal to 0.3.