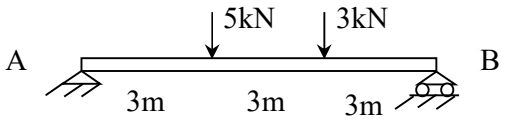
VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD-31

DEPARTMENT OF CIVIL ENGINEERING

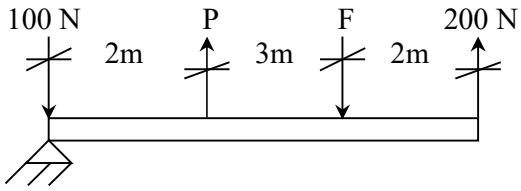
B.E. I Semester – CSE(A) – 2021-22

Basic Engineering Mechanics - Assignment-1

1. List the characteristics of a couple?
2. Write the force vector of a 100kN force, passing from point A(2,4,1) to point B(6,7,8).
3. Find the reactions at support A and B for the beam as shown in Fig.

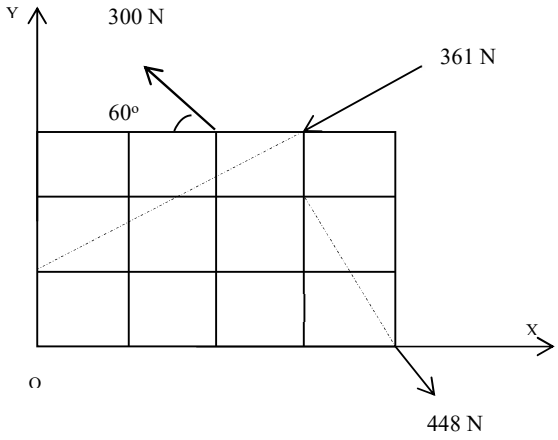


4. Two forces are acting at a point. When they are at right angles to each other their resultant is 10 N. When they are at 60 degree with each other, their resultant is 12.24N, find the two forces
5. State the principle of transmissibility
6. State the conditions of equilibrium.
7. A 100 N force is directed along the line drawn from the points A(2, 0, 4) to the point B (5, 1, 1). What is the moment of this force about the origin?
8. Find the values of P and F so that the four forces shown in the figure produce an upward resultant of 300N acting at 4m from left end of the bar.

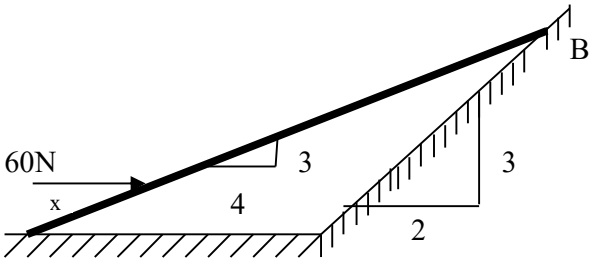


9. State Varignon's theorem
10. Define a Free Body Diagram. Give two examples.
11. Two forces are acting at a point. When they are at right angles to each other their resultant is 10 N. When they are at 60 degree with each other, their resultant is 12.24N, find the two forces.
12. Show that moment of a couple in a plane is independent of moment center.

13. A flat plate is subjected to the coplanar system of forces shown in Fig. The inscribed grid with each square having a length of 1cm locates each force and its slope. Determine the resultant and its x & y intercepts.



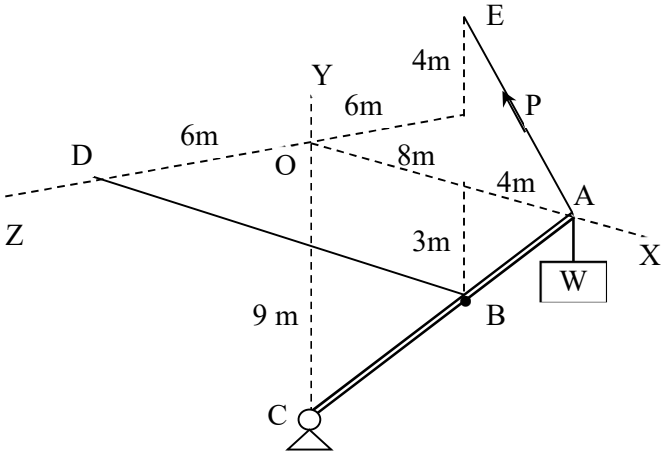
14. Find the distance x along AB, at which a horizontal force of 60N should be applied to hold the uniform bar AB in the position as shown in Fig. Bar AB is 12 m long and weighs 140N. The incline and the floor are smooth.



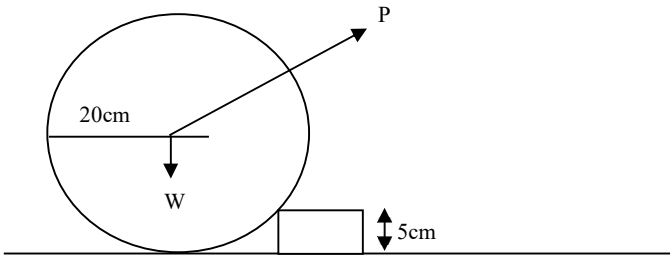
15. If the force multiplier of a force P acting from A to E is P_m=20N/m, referring Fig. Find out the following

a) Component of P along AC

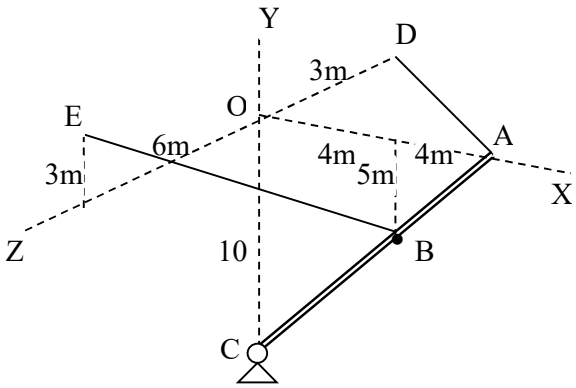
b) Moment of P about D.



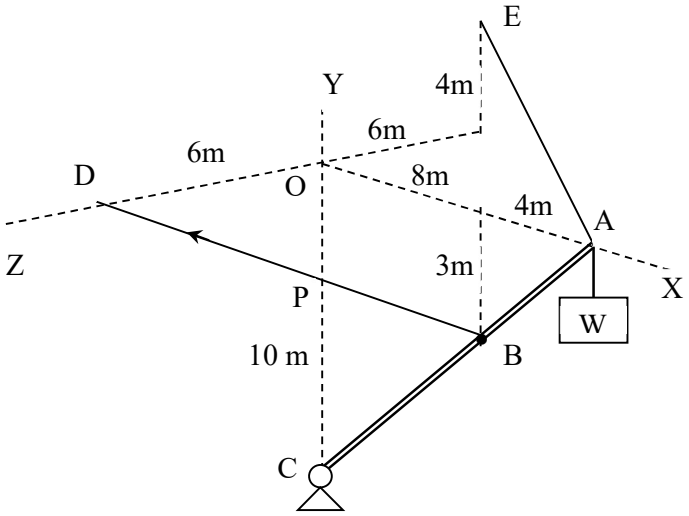
16. Determine the amount and direction of the smallest force P required to start the wheel shown in fig over the block. What is the reaction at the block? Take weight of wheel = 200 N.
The wheel and the block rest on a horizontal ground.

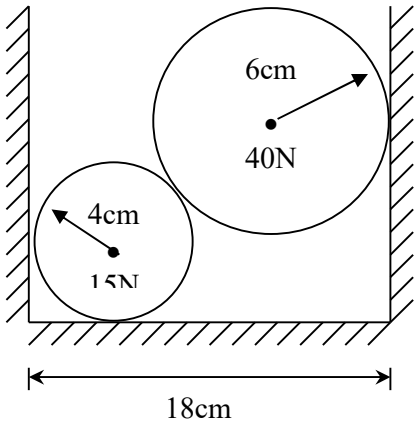


17. In the figure, a boom AC is supported by a ball and socket joint at C and by the cables BE and AD. If the force multiplier of force F acting from B to E is F_m = 10 N/m. (a) find the moment of F about the point C. (b) Find the component of F that is perpendicular to the plane DAC.



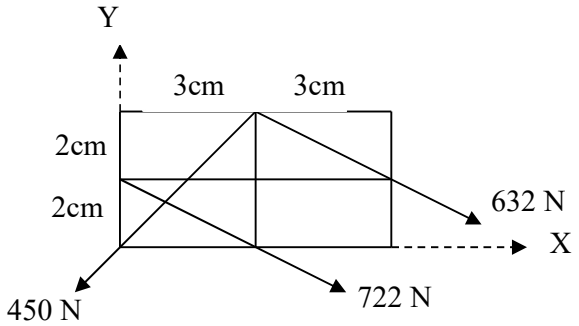
18. In fig. if the force multiplier of a force P acting from B to D is P_m = 20 N/m, Determine the component of P that is perpendicular to the plane defined by pints E, A & C.



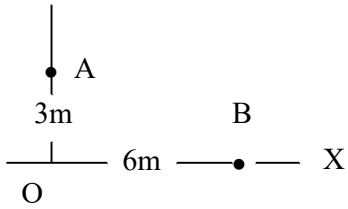


19. Two cylinders are piled in a rectangular ditch as shown in figure. Neglecting friction, determine the reactions at various contact points.

20. A flat plate is subjected to the coplanar system of forces shown in figure. Determine the resultant and its x & y intercepts.



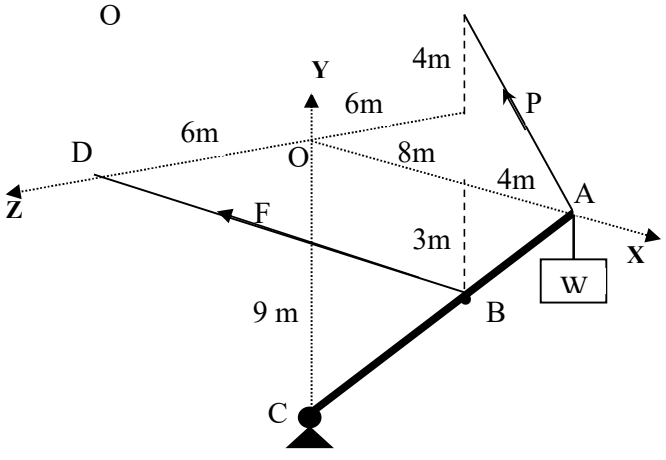
21. In the figure, the moment of a certain force F is 180 Nm clockwise about O and 90 Nm anticlockwise about B. If its moment about A is zero, determine the force.



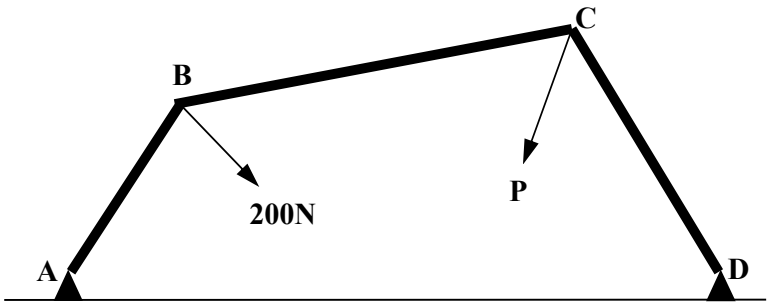
22. Referring the cantilever framework shown in the figure, if the force multiplier of a force P acting from A to E is P_m=10N/m and the force multiplier of a force F acting from B to D is F_m=20N/m . Find out the following

a) Component of P along BD

b) Moment of F about C.



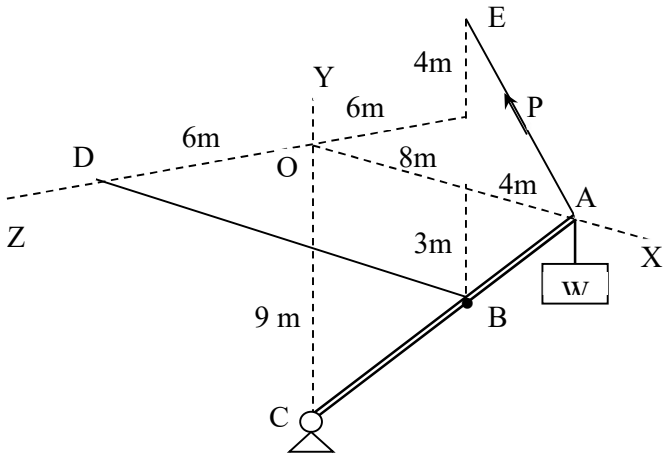
23. Three bars, pinned together at B and C and supported by hinges at A and D as shown in figure below, form a four link mechanism. Determine the value of P that will prevent motion. Angles ABC and BCD are known to be 120^0 and 150^0 and the forces bisect the given angles.



24. If the force multiplier of a force P acting from A to E is P_m=10N/m, and that of F acting from B to D is F_m=30N/m referring Fig. Find out the following

a) Component of each force along AC

b) Moment of P about the axis CD.



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2	1602-21-733-011 to 020	2,4,6,8,10,12,14,16,17
3	1602-21-733-021 to 030	1,2,3,4,5,6,18,20,21
4	1602-21-733-031 to 040	7,8,9,10,1,12,13,22,23
5	1602-21-733-041 to 050	1,2,4,8,10,12,14,16,24
6	1602-21-733-050 to 067	3,5,6,7,9,11,18,19,23