Class 1:

1. Define Equilibrium.
2. What is the difference between Equilibrant force and Resultant force.?
3. Write about significance of Free Body Diagram.
4. What is System Isolation?

Class 2 :

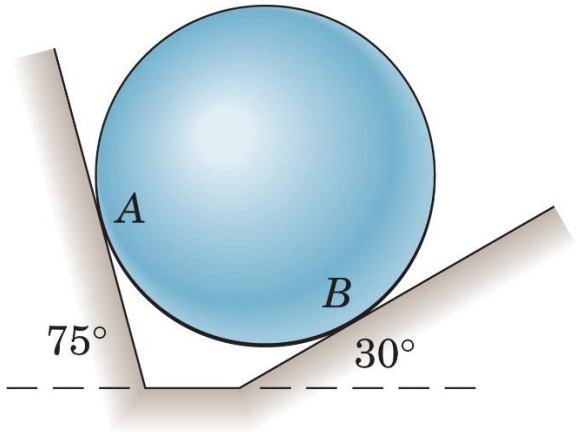
1. How do we model different supports given to a structure?
2. What do you mean by Stiffness of a linearly elastic spring?
3. What are support reactions?
4. A cable is subjected to _____ force always.
5. Self weight of a body is always considered acting from _____
6. _____ are the reactions at a contact surface.
7. State the meaning of the following expression .

$$\Sigma F_x = 0 \qquad \Sigma F_y = 0 \qquad \Sigma M_O = 0$$

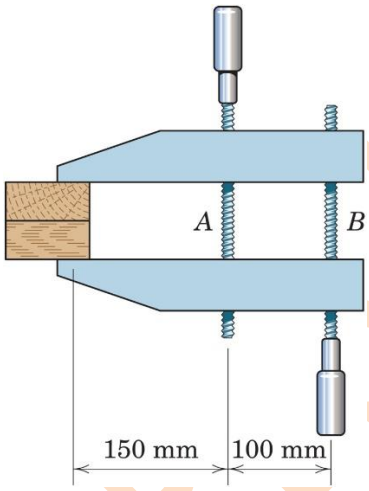
8. Considering different force systems , write the necessary equilibrium equations.
9. For two force member to be in equilibrium , forces must be _____

Class 3 :

1. What are Statically Indeterminate structures and Statically Indeterminate structures?
2. What do you mean by Redundant?
3. The 20-kg homogeneous smooth sphere rests on the two inclines as shown. Determine the contact forces at A and B.

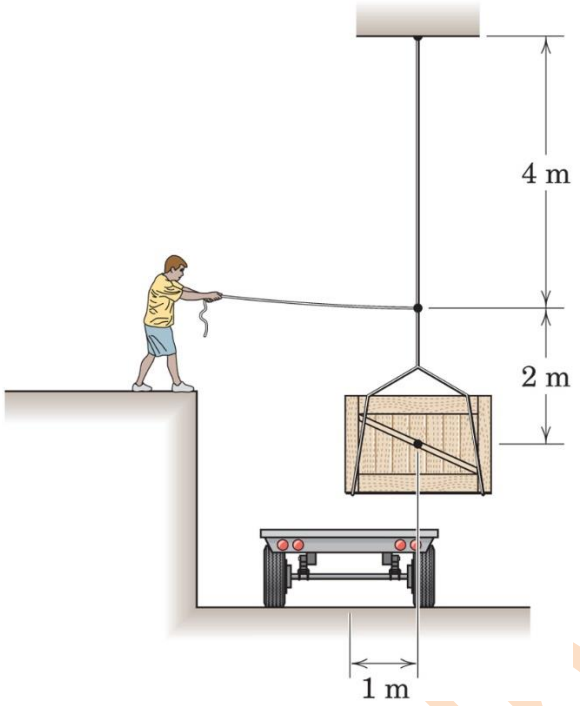


4. If the screw B of the wood clamp is tightened so that the two blocks are under a compression of 500 N, determine the force in screw A. (Note : The force supported by each screw may be taken in the direction of the screw.)

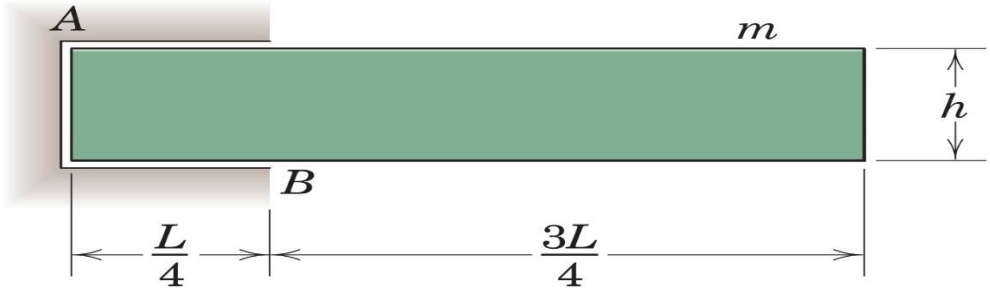


Class 4:

1. What horizontal force P must a worker exert on the rope to position the 50-kg crate directly over the trailer?

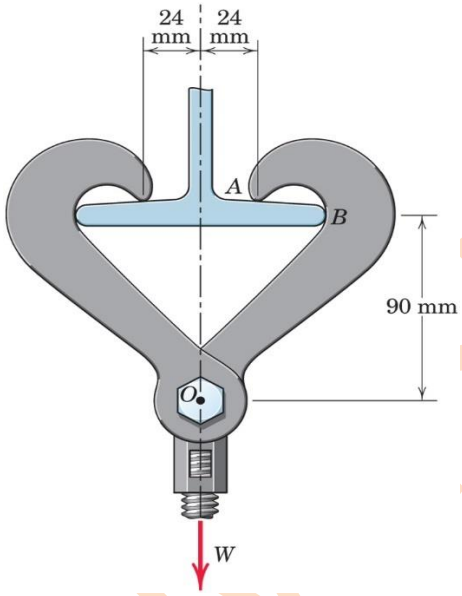


2. The uniform rectangular body of mass m is placed into a fixed opening with slight clearances as shown. Determine the forces at the contact points A and B. Do your results depend on the height h ?

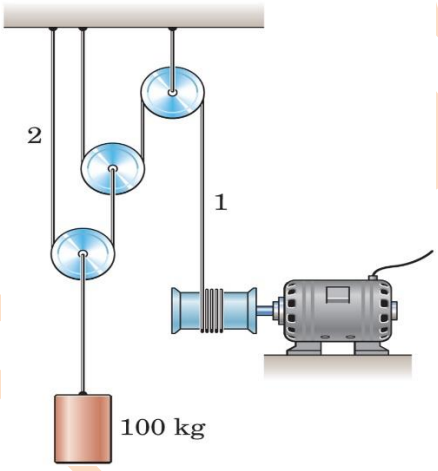


Class 5:

1. The pair of hooks is designed for the hanging of loads from horizontal I – beams. If the load W = 5 kN, estimate the contact forces at A and B. Neglect all friction.

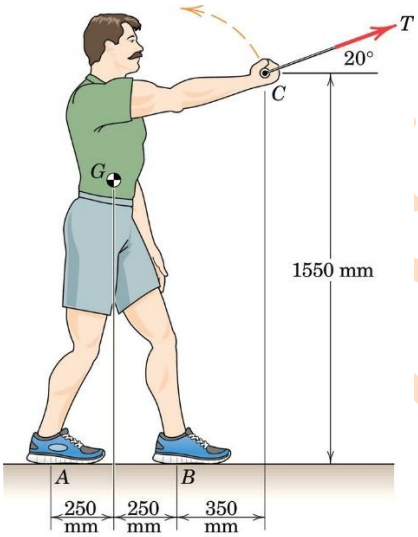


2. The winch takes in cable at the constant rate of 200 mm/s. If the cylinder mass is 100kg , determine the tension in cable 1. Neglect all friction.

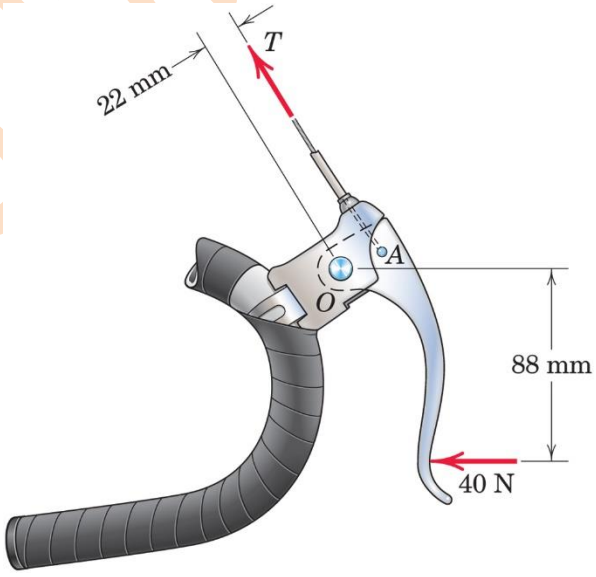


Class 6:

1. The 80 – kg exerciser is beginning to execute some slow, steady bicep curls. As the tension T = 65N is developed against an exercise machine (not shown), determine the normal reaction forces at the feet A and B. Friction is sufficient to prevent slipping and the exerciser maintains the position shown with center of mass at G.

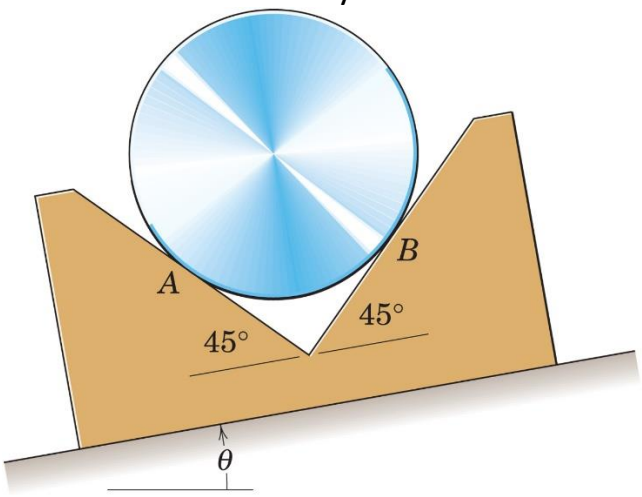


2. A bicyclist applies a 40-N force to the brake lever of her bicycle as shown. Determine the corresponding tension T transmitted to the brake cable. Neglect friction at the pivot O.

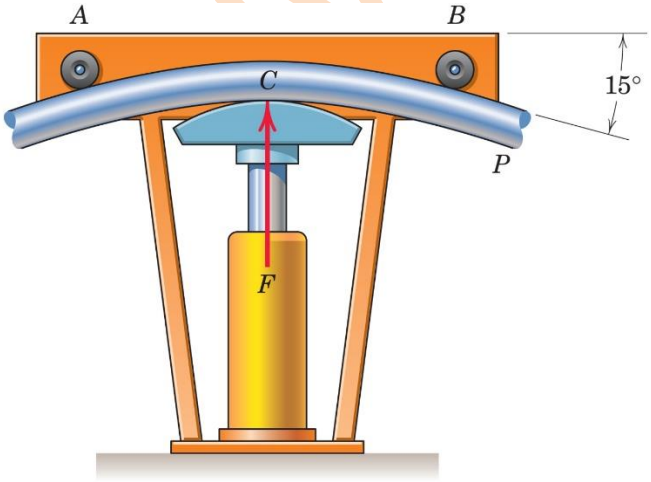


Class 7:

1. Find the angle of tilt with the horizontal so that the contact force at B will be one – half that at A for the smooth cylinder.

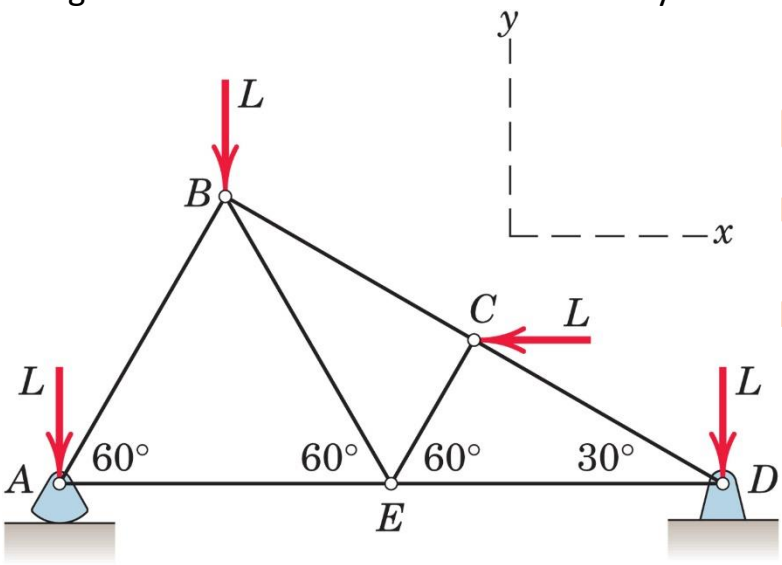


2. A pipe P is being bent by the pipe bender as shown. If the hydraulic cylinder applies a force of magnitude F = 24 kN to the pipe at C, determine the magnitude of the roller reactions at A and B.

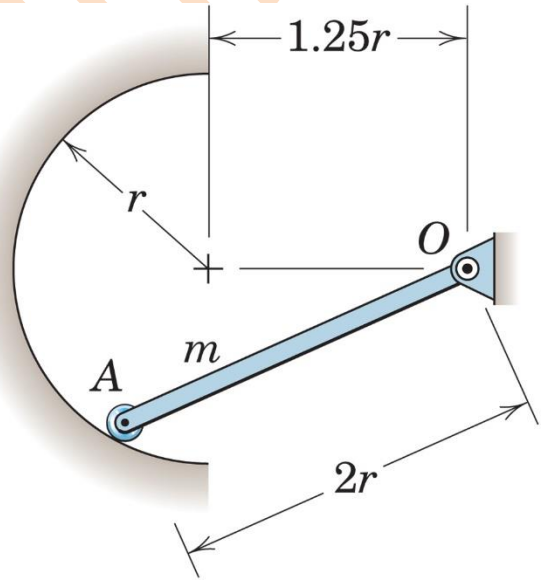


Class 8:

1. The asymmetric simple truss is loaded as shown. Determine the reactions at A and D . Neglect the weight of the structure compared with the applied loads. Is knowledge of the size of the structure necessary?

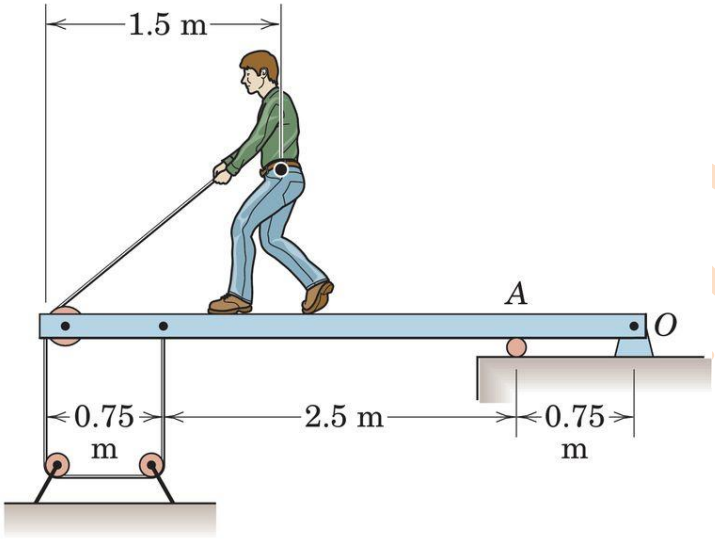


2. The uniform slender bar of length 2r and mass m rests against the circular surface as shown. Determine the normal force at the small roller A and the magnitude of the ideal pivot reaction at O.



Class 9 :

1. To test the deflection of the uniform 100-kg beam the 50-kg boy exerts a pull of 150 N on the rope rigged as shown. Compute the force supported by the pin at the hinge O.



2. It is desired that a person be able to begin closing the van hatch from the open position shown with a 40 N vertical force P. As a design exercise , determine the necessary force in each of the two hydraulic struts AB. The mass center of the 40-kg door is 37.5 mm directly below point A. Treat the problem as two – dimensional.