Engineering Mechanics

Fourth Assignment (2015-16)

Last date of submission 05-03-2016

1. **A support block is acted upon by two forces as shown in fig:1, knowing that the co-efficient of friction between the block and incline are μ_s =0.35, μ_k = 0.25, determine the force P required.**
   (a) To start the block moving up the plane,
   (b) To keep it moving up and
   (c) To prevent it from sliding down.
2. **Two blocks A and B are placed on inclined planes as shown in fig:2. The block A weighs 1000 N, determine the minimum weight of block B for maintaining the equilibrium of the system. Assume that the blocks are connected by the inextensible string passing over a frictionless pulley. Co-efficient of friction between the block A and the plane is 0.25 and assume the same co-efficient of friction between the block B and the plane.**
3. **Two blocks A=100 N and B = W are connected by a rod at their ends by frictionless hinges as shown in fig:3. Find the weight of block B (W) required for limiting equilibrium of the system. Take co-efficient of friction for all sliding surface is0.3**
4. **The two identical blocks A and B are connected by rod and rest against vertical and horizontal planes as shown in fig:4. If sliding impends when Θ =45°, determine coefficient of friction μ. Assuming it to be the same for both floor and wall.**
5. **Find the value of Θ , if the block A and B shown in fig:5 have impending motion. Given block A = 20Kg, block B = 20 Kg and μ =0.25 for all contact surfaces.**
6. **Three blocks are placed on the surface one above the other as shown in fig:6. The coefficient of friction between the different blocks and surface is also shown in the fig. Determine the maximum value of force P that can be applied before any slipping takes place.**
7. **Determine the force P required to (a) move the block A of weight 5000 N up the inclined plane, (b) maintain the equilibrium as shown in fig:7, when coefficient of friction between all contact surfaces is 0.25.**
8. **A 100 N uniform rod AB is held in position as shown in fig:8, if coefficient of friction is 0.15 at A and B. Calculate range of values of force P for which equilibrium is maintained.**
9. **Fig:9 shows a cylinder of mass 100 Kg resting on a floor and against a wall. If the coefficient of friction between the surface of contacts is 0.25. Find whether the cylinder will slip with the tangential horizontal force of 180 N.**

10. **Block A weighing 200 N is connected to another block B of weight W, by a cord passing over a rough fixed pulley as shown in fig;10. The weight W is slowly increased, Find the value for which motion just impend. Take coefficient of friction for all contact surfaces = 0.2**
11. **Determine minimum weight of block required to keep the beam in horizontal equilibrium as shown in fig:11, assuming rough pulley with coefficient of friction as 0.2**
12. **A uniform bar has a mass of 35 Kg as shown in fig;12. What rightwards force P is needed to start the bar moving to the right. μ = 0.3**
13. **A mass of 500 Kg is to be maintained in position by pulling a rope taken over a half barrel and wrapped twice around a capstan as shown in fig:13. If the coefficient of static friction is 0.2 for all contact surfaces, calculate the minimum force F required to maintain the load.**
14. **The initial tension in an open flat belt is 2000 N, the angle of contact of smaller pulley is 135° and μ is 0.25, the smaller pulley diameter is 36 cm. and rotate at 300 r.p.m. Find thee power transmitted by the belt.**
15. **The dimensions of a brake drum are shown in fig:15, determine the torque exerted on the drum, if the load P is equal to 60 N, assume coefficient of kinetic friction between belt and drum to be 0.20.**

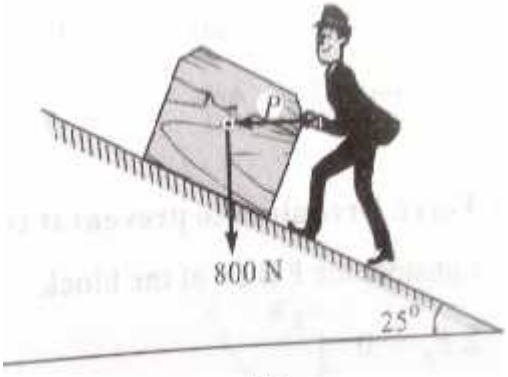

fig:1

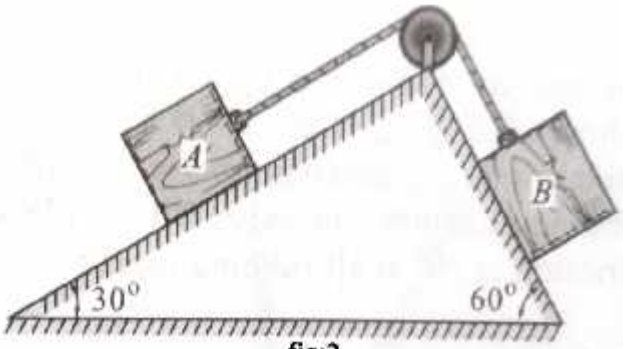

fig:2

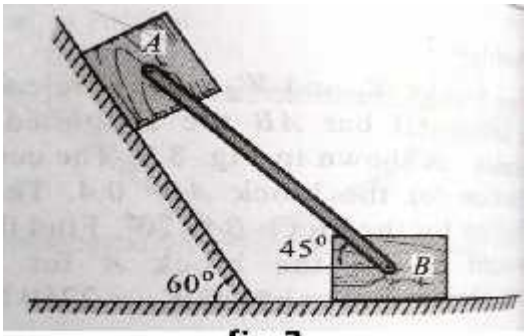

fig:3

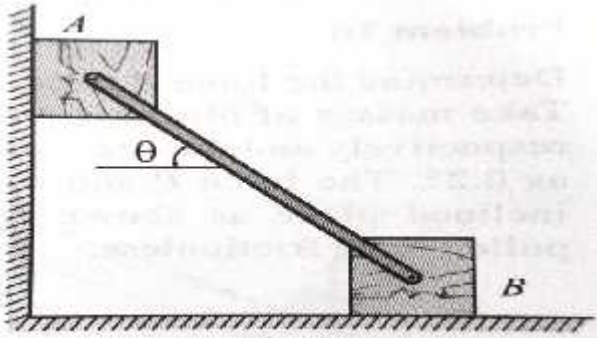

fig:4

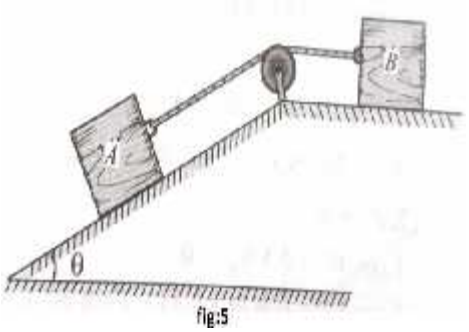

fig:5

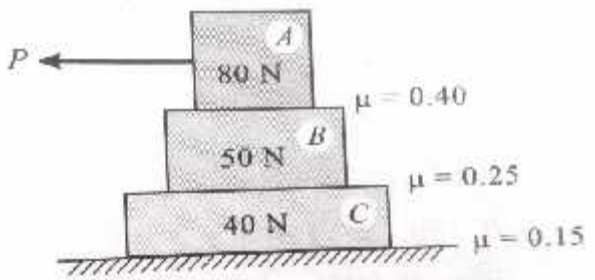

Fig. 6

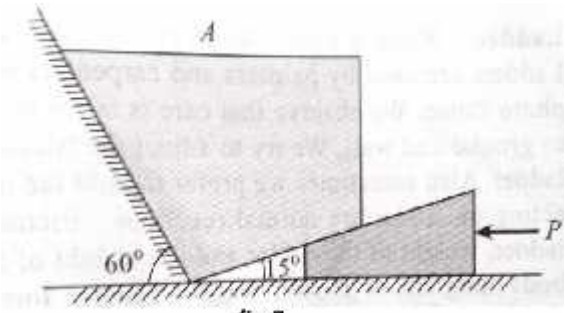

fig:7

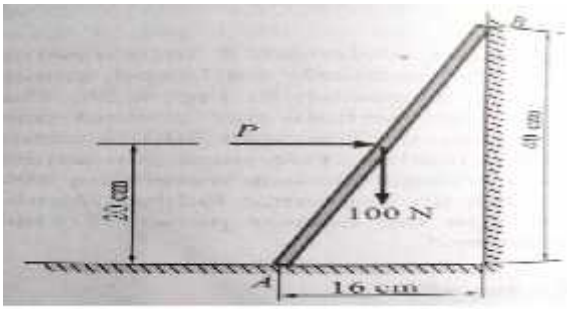

fig:8

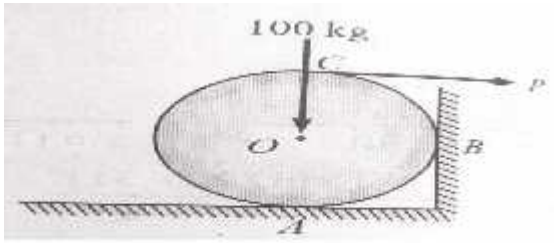

fig:9

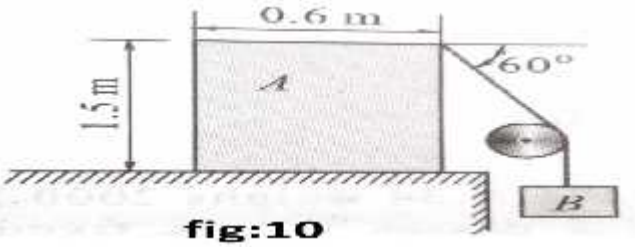

fig:10

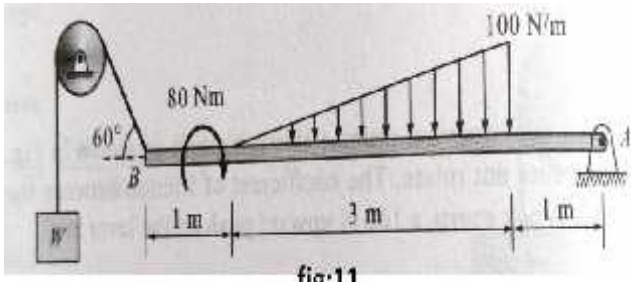

fig:11

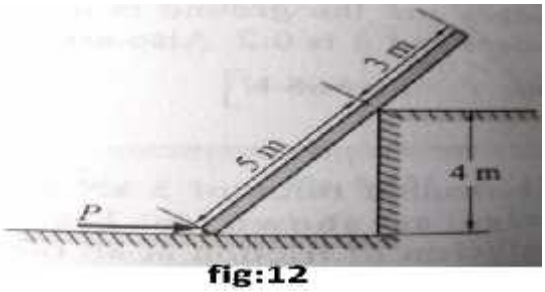

fig:12

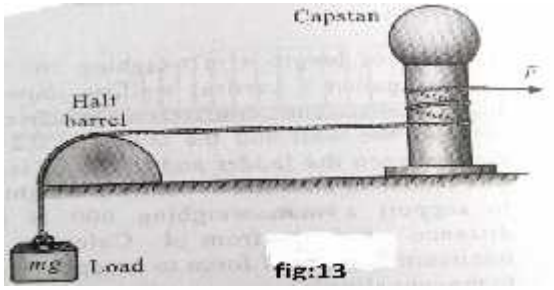

fig:13

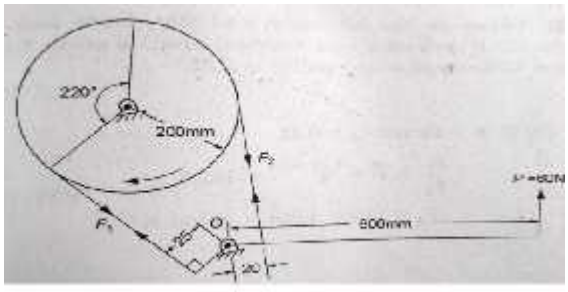

fig:15