

ME 101: Engineering Mechanics
QUIZ # 1

Time: 55 minutes

Total marks: 100

- Q. No.1 The press shown in Fig. 1 is used to emboss a small seal at E . Knowing that the coefficient of static friction between the vertical guide and the embossing die D is 0.30, determine the force exerted by the die on the seal.

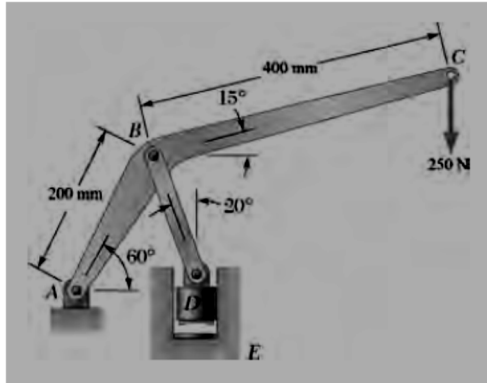


Fig. 1

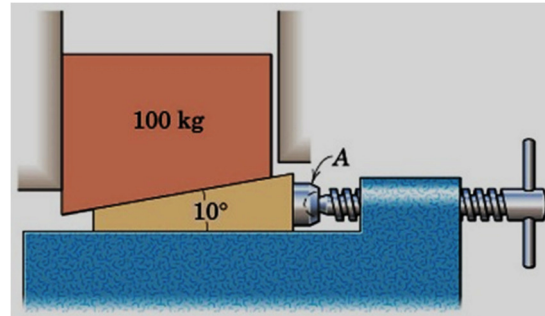


Fig. 2

- Q. No.2 The vertical position of the 100 Kg block is adjusted by the screw activated wedge shown in Fig. 2. Calculate the moment M which must be applied to the handle of the screw to raise the block. The single threaded screw has square threads with a mean diameter of 30 mm and advances 10 mm for each complete turn. The coefficient of friction for the screw threads is 0.25, and the coefficient of friction for all mating surfaces of the block and wedge is 0.40. Neglect friction at the ball at joint A.
- Q. No.3 The truck shown in Fig. 3 is used to deliver food to aircraft. The elevated unit has a mass of 1000 kg with center of mass at G . Determine the required force in the hydraulic cylinder AB.

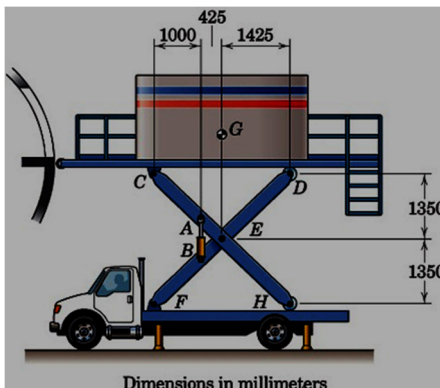


Fig. 3

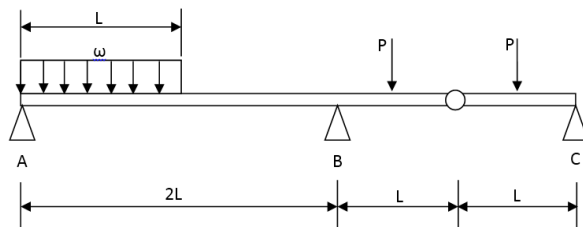


Fig. 4

- Q. No.4 Find the support reactions and draw the SFD & BMD for the structure shown in Fig. 4. Given that the intensity of the UDL is ω per unit length and the point loads P are acting at the quarter points in the span BC which has an internal hinge. Also locate the max SF, BM and Point of Contraflexure, if any.
- Q. No.5 Calculate the forces in members CD and CG of the loaded truss composed shown in Fig. 5 of equilateral triangles, each of side length 8 m.

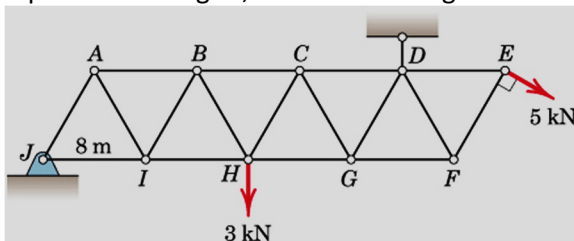


Fig. 5