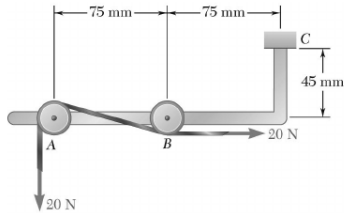APL100 Tutorial Sheet 6
Topic: Supports, Friction, Conservation of Momentum

Part A: Will be solved during tutorial sessions

1. B&J 4.46 A tension of 20N is maintained in a tape as it passes through the support system shown. Knowing that the radius of each pulley is 10 mm, determine the reaction at C.

2. PCD 2.21 (p 132) Draw the FBD of body 1 of mass m for both the cases below. The coefficients of friction are μ_s, μ_k respectively.
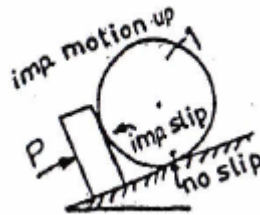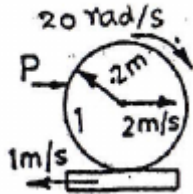

3. B&J 16.19 The triangular weldment ABC is guided by two pins that slide freely in parallel curved slots of radius 150 mm cut in a vertical plate. The weldment weighs 8 kg and its mass center is located at point G. Knowing that at the instant shown the velocity of each pin is 750 mm/s downward along the slots, determine the reactions at A and B.
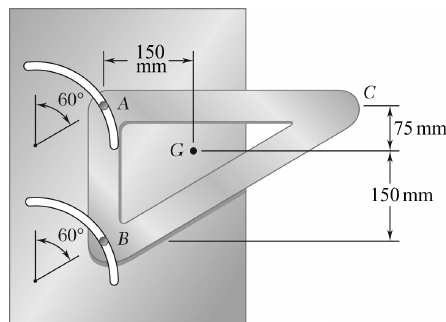
Part B: Practice problems

1. B&J 4.25 For each of the plates and loadings shown, find the reactions at A and B

(a)   (b)
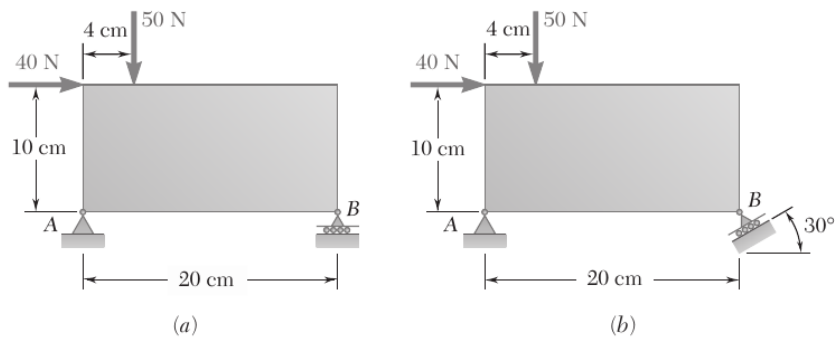
2. B&J 12.127 A 100g pin B slides along the slot in the rotating arm OC and along the slot DE which is cut in a fixed horizontal plane. Neglecting friction and and knowing that rod OC rotates at the constant rate $\dot{\theta}_0 = 12$ rad/s, determine for any given value of θ (a) the radial and transverse components of the resultant force $\mathbf{F}$ exerted on pin B, (b) the forces $\mathbf{P}$ and $\mathbf{Q}$ exerted on pin B by rod OC and the wall of slot DE respectively.
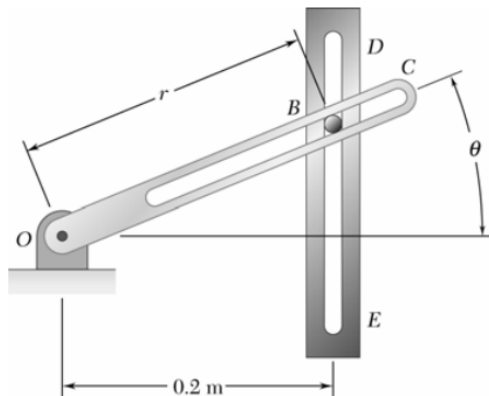
3. PCD 2.18 (p127) Find the condition to be satisfied by the coefficients of static friction μ_1, μ_2 so that the light wedges gripping a specimen in a testing machine ensure no slip of the specimen. Here α is the angle made by the wedge plane with the vertical.