

(Prob. 1)

(20
pt)

A transport jet plane has a weight without fuel of 220 kN. If one wing is loaded with 50 kN of fuel, what are the forces in each of the three landing gear?

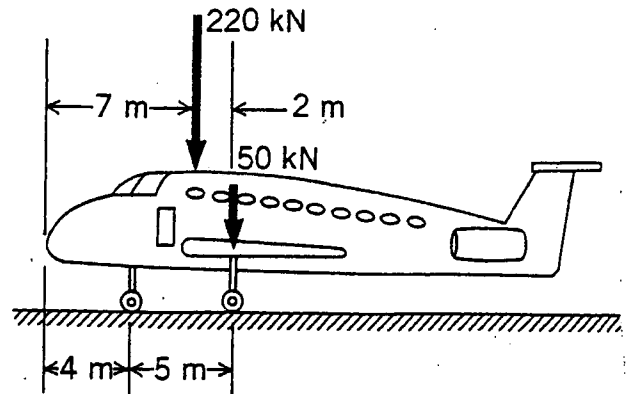
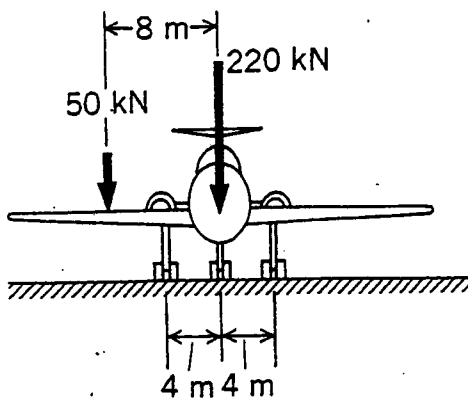


Figure P.1

(Prob. 2)

(20
pt)

A rock crusher is shown in action. If $p_1 = 50$ psig and $p_2 = 100$ psig, what is the force on the rock at the configuration shown? The diameter of the pistons is 4 in.

Notice: Use the method of Virtual Work, other methods are not acceptable!

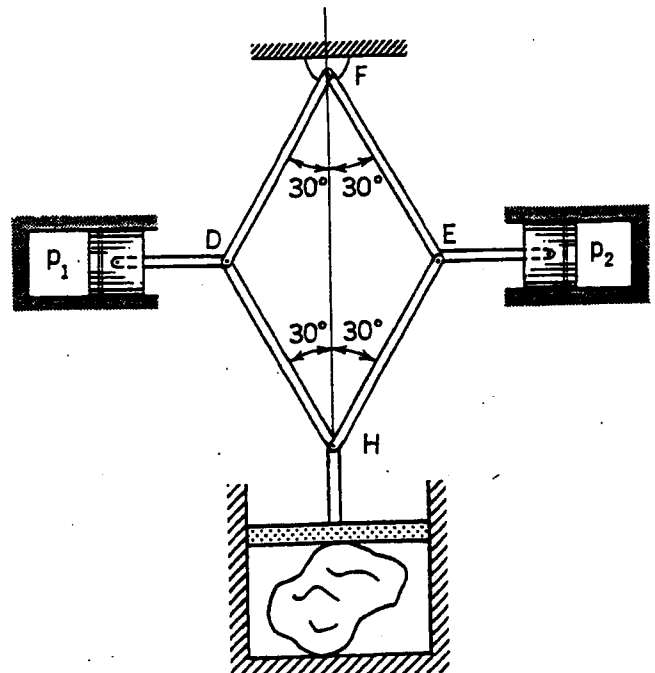


Figure P.2

(Prob. 3)

(20pt)

A rod is supported on two rotating grooved wheels. The contact surfaces have a coefficient of friction of μ_d . Explain how the rod will oscillate in the horizontal direction if it is disturbed in that direction. Compute the natural frequency of the system.

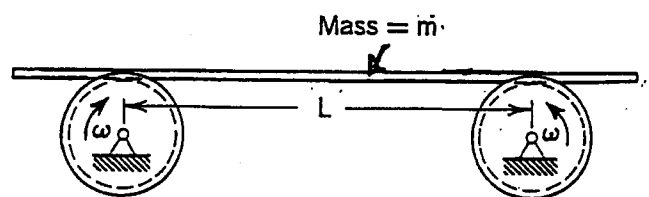


Figure P.3

(背面仍有題目, 請繼續作答)

(Prob. 4)(20pt)

Two identical rods are pinned together at B and are pinned at A and C . At B there is a torsional spring requiring $500 \text{ N}\cdot\text{m}/\text{rad}$ of rotation. What is the maximum weight W that each rod can have for a case of stable equilibrium when the rods are col-linear?

Notice: Use the method of Potential Energy, other methods are not acceptable!

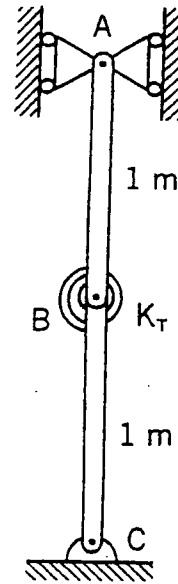


Figure P. 4

(Prob. 5)(20pt).

A pin is confined to slide in a circular slot of radius 6 m . The pin must also slide in a straight slot which moves to the right at a constant speed, V , of $3 \text{ m}/\text{sec}$ while maintaining a constant angle of 30° with the horizontal. What are the velocity and acceleration of the pin A at the instant shown?

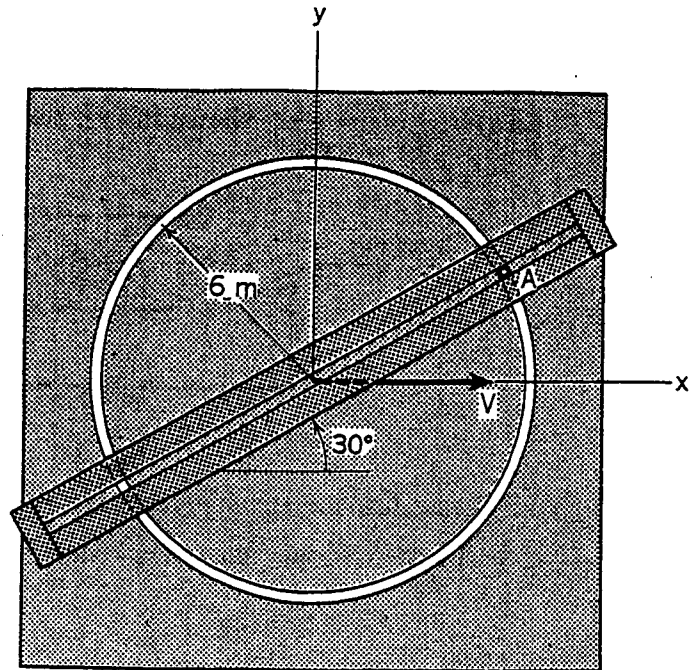


Figure P. 5