1 Briefly answer following questions.

   a. (5%) What are Newton's Three Fundamental Laws of motion?

   b. (5%) What is a statically determinate structure?

2. Convert following units in terms of kg, μm (micro meter), and s.

   a. (5%) 1 joule (SI unit for energy)

   b. (5%) 1 psi (pound per square inch, U.S. customary unit for pressure, 1 lbf = 0.4536 kgf, 1 in = 2.54 cm)

3. (20%) The coefficients of friction are $\mu_s = 0.30$ and $\mu_k = 0.25$ between all surfaces of contact. Block C is restrained by cable AB as shown. Determine the smallest force P required to start block D moving.
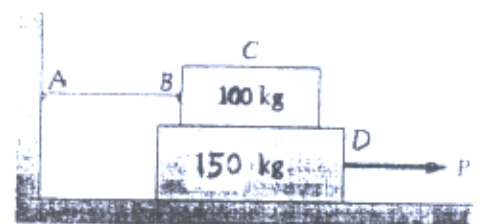

4. (20%) A steel ingot weighing 8000 lb is lifted by a pair of tongs as shown. Determine the forces exerted at C and E on tong BCE.

(背面仍有題目,請繼續作答)

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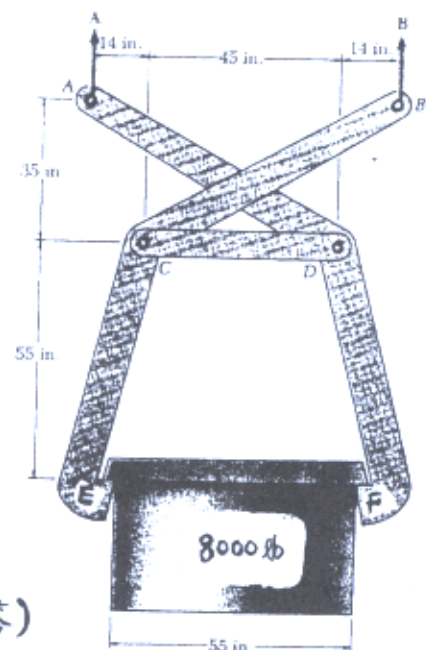
5. (20%) A 0.15 m × 0.2 m rectangular plate weighing 20 kg is suspended from two pins A and B. If pin B is suddenly removed, determine (a) the angular acceleration of the plate, (b) the components of the reaction at pin A, immediately after pin B has been removed.
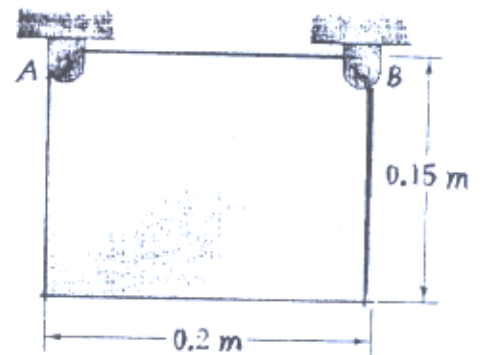
6. (20%) A 750 g uniform rod AB is attached to a hinge at A and to two springs, each of constant k = 300 N/m. (a) Determine the mass m of block C for which the period of small oscillations is 0.4 s. (b) If end B is depressed 40 mm and released, determine the maximum velocity of block C.