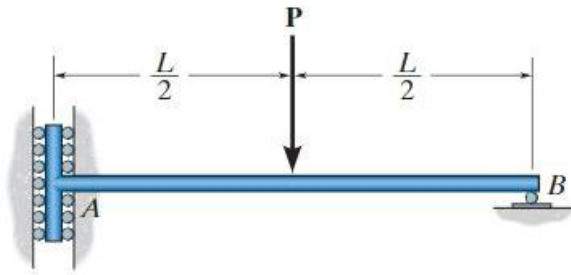


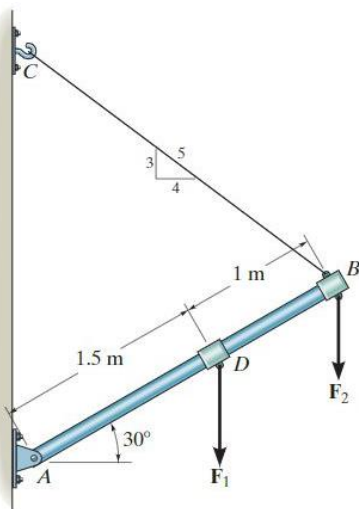
姓名：

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1. (10%) Determine the components of reaction at the supports A and B on the rod.

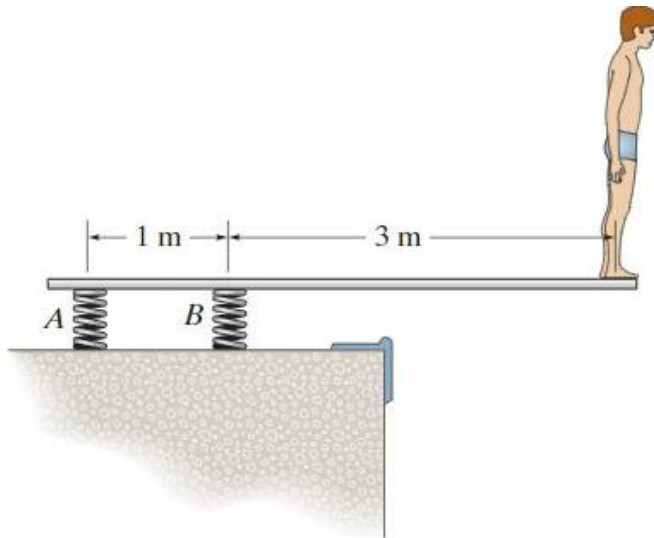


2. (10%) The boom is intended to support two vertical loads,  $F_1$  and  $F_2$ . If the cable CB can sustain a maximum load of 1500 N before it fails, determine the critical loads if  $F_1 = 2F_2$ . Also, what is the magnitude of the maximum reaction at pin A ?

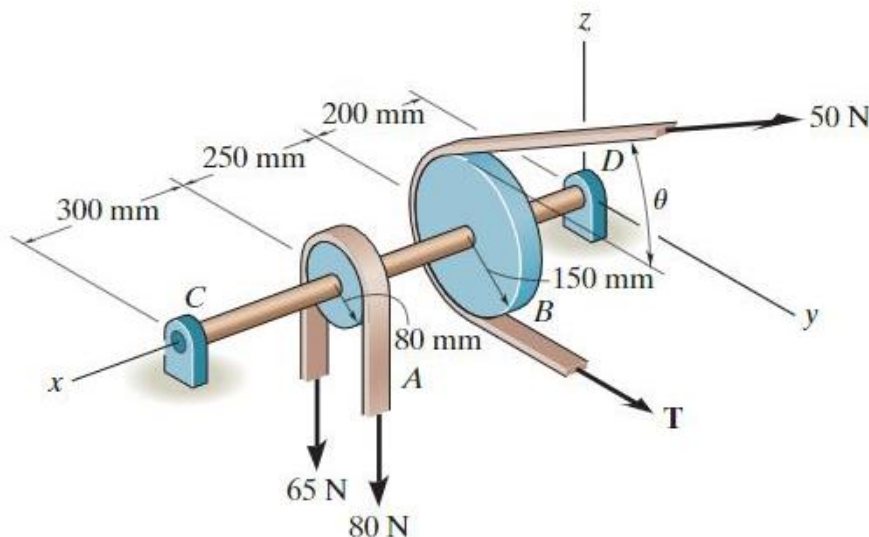


3. (10%) A boy stands out at the end of the diving board, which is supported by two springs A and B, each having a stiffness of  $k = 15 \text{ kN/m}$ . In the position shown the board is

horizontal. If the boy has a mass of 40 kg, determine the angle of tilt which the board makes with the horizontal after he jumps off. Neglect the weight of the board and assume it is rigid.



4. (10%) Both pulleys are fixed to the shaft and as the shaft turns with constant angular velocity, the power of pulley A is transmitted to pulley B. Determine the horizontal tension  $T$  in the belt on pulley B and the  $x$ ,  $y$ ,  $z$  components of reaction at the journal bearing C and thrust bearing D if  $\theta = 45^\circ$ . The bearings are in proper alignment and exert only force reactions on the shaft.



5. (10%) A vertical force of 80 lb acts on the crankshaft. Determine the horizontal equilibrium force  $P$  that must be applied to the handle and the  $x$ ,  $y$ ,  $z$  components of

reaction at the journal bearing A and thrust bearing B . The bearings are properly aligned and exert only force reactions on the shaft.

