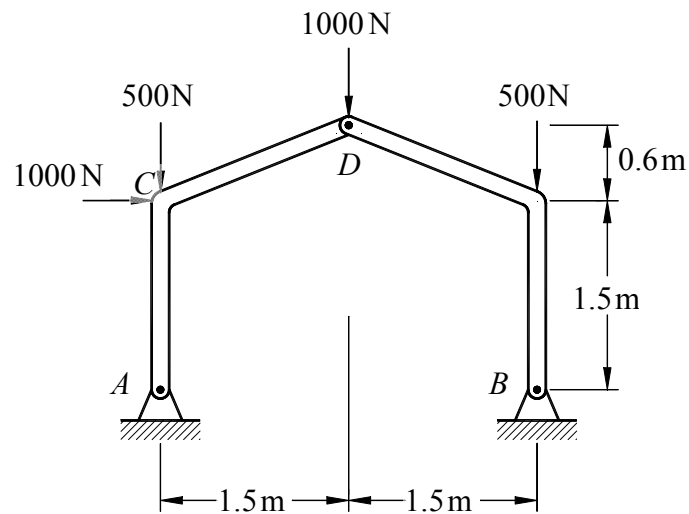


1. The members ACD and BD of the frame as shown are pin connected at D . Determine the reactions at pins A and B , and the internal normal force, shear force and moment at midpoint of AC . (20%)



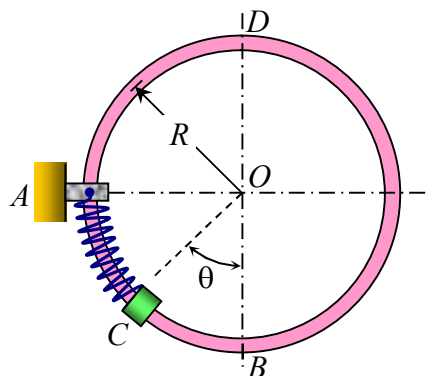
2. A thin circular rod of mean radius R is supported in a vertical plane by a bracket at A . Attached to the bracket and loosely wound around the rod is a spring of constant k and undeformed length equal to the arc of circle AB . A collar C of mass m , not attached to the spring, can slide without friction along the rod. The collar is released from rest when $\theta = 45^\circ$.

Determine

- (a) the maximum velocity of the collar,

(10%)

- (b) the minimum required value of spring constant so that the collar can pass over D . (10%)



3. 春節期間天候又濕又冷，如何降低室內的相對濕度(relative humidity)，請說明方法。 (20%)

4. 工程用材料的強度測試有那幾種不同的方法，請分別說明之。(20%)

5. 請對以下產品選定合適的成形製程：1)家用自來水水龍頭，2)汽車傳動曲軸(crank) ，3)手錶金屬錶殼，4)無縫鋼管，5)直線鐵軌。(20%)