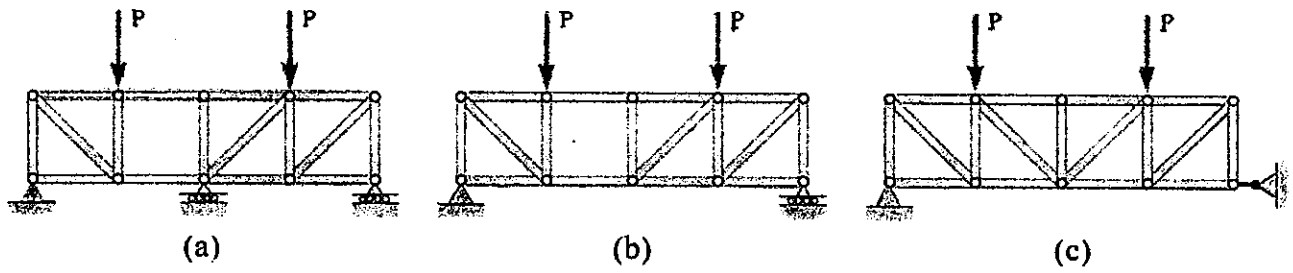
1. **[15 points]** Define and describe the following terms:
(1) Statically determinate structure. (2) Impending motion (please also indicate the expression of friction at the moment).
(3) Coefficient of restitution.

2. **[15 points]** Classify each of the structures shown as completely, partially, or improperly constrained; if completely constrained, further classify as determinate or indeterminate. (All members can act both in tension and in compression.)



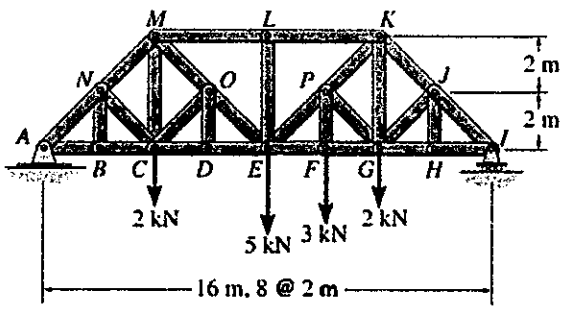
(a)　(b)　(c)

3. **[15 points]** Determine the force in members *EF*, *EP*, and *LK* of the Baltimore bridge truss and state if the members are in tension or compression. Also, indicate all zero-force members.

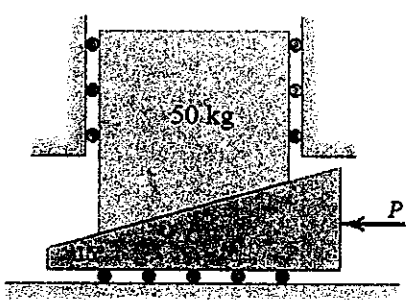
4. **[15 points]** The coefficient of static friction μ_s between the 100 kg body and the wedge is 0.20. Determine the magnitude of the force *P* required to begin raising the 100 kg body if (a) rollers of negligible friction are present under the wedge, as illustrated, and (b) the rollers are removed and the coefficient of static friction $\mu_s = 0.20$ applies at this surface as well.

5. **[20 points]** A thin circular rod 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 $k = 40$ N/m and undeformed length equal to the arc of circle *AB*. A 200-g collar *C*, not attached to the spring, can slide without friction along the rod. Knowing that the collar is released from rest when $\theta = 30°$, determine (a) the maximum height above point *B* reached by the collar, (b) the maximum velocity of the collar.

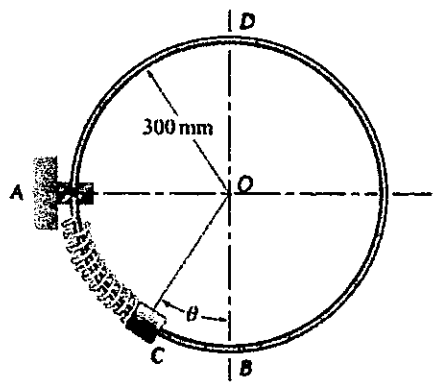
6. **[20 points]** Rod *AB* rotates counterclockwise with a constant angular velocity $\omega = 3$ rad/s. Determine the velocity and acceleration of point *C* located on the double collar when $\theta = 45°$. The collar consists of two pin-connected slider blocks which are constrained to move along the circular path and the rod *AB*.



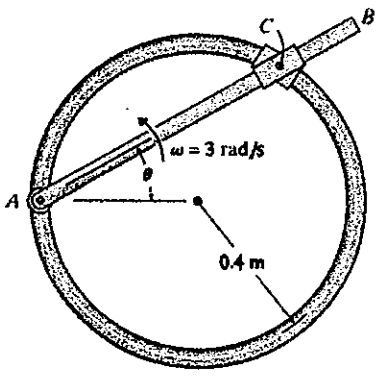
Problem 3



Problem 4



Problem 5



Problem 6

試題隨卷繳回