系所組別： 工程科學系丙、戊、己組

考試科目： 工程力學

考試日期：0225，節次：1

請勿在本試題紙上作答，否則不予計分

注意：本試卷共10題，每題只有一個答案。批改人員將只核對每題的最後答案，計算或誘導過程只作為確認答案來源（以防作弊）但不予記分。請考生將每題的最後答案（若有單位請包含單位）以方框標註出來，以利批改作業。重力加速度請使用符號g或9.81 m/s^2。

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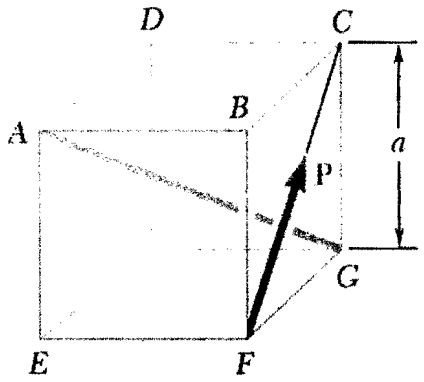
1. (10%) A cube of side a is acted upon by a force **P** as shown. What is the magnitude of the moment of **P** about the diagonal AG of the cube? Express the answer in terms of P and a.



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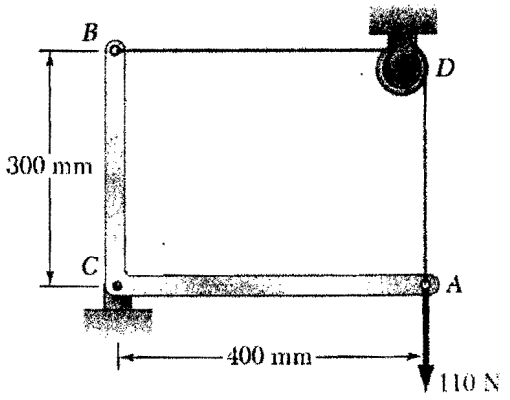
2. (10%) The L-shaped member ACB is supported by a pin and bracket at C and by an inextensible cord attached at A and B and passing over a frictionless pulley at D. What is the tension in the cord?



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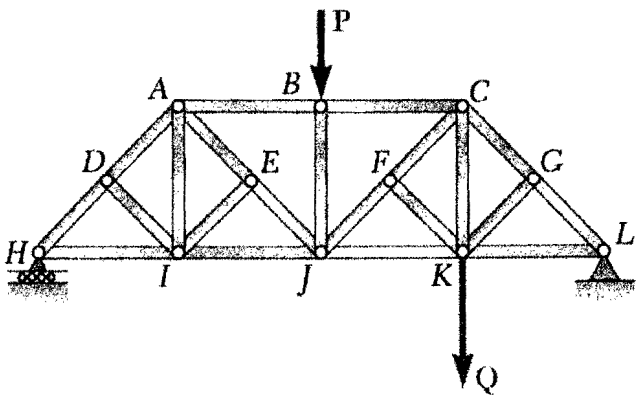
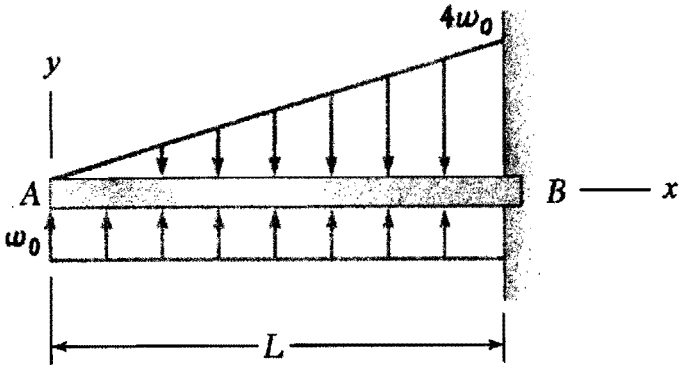
3. (10%) There are 5 zero-force members in the truss shown. Identify all of the 5 members.



(背面仍有題目,請繼續作答)

4. (10%) For the beam and loading shown, determine the bending moment at location x? Express the answer in terms of w_0, L, and x.



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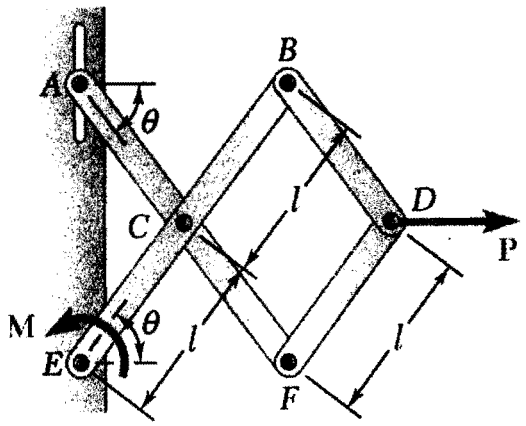
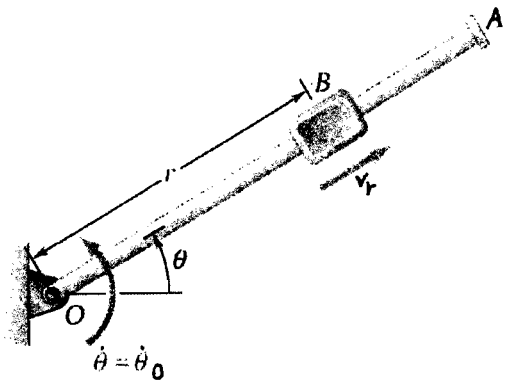
5. (10%) Determine the magnitude of the couple **M** required to maintain the equilibrium of the mechanism shown. Express the answer in terms of P, l, and θ.



6. (10%) A block B of mass m can slide freely on a frictionless arm OA which rotates in a horizontal plane at a constant rate $\dot{\theta}_0$. Knowing that B is released at a distance r_0 from O, determine the component v_r of the velocity of B along OA. Express v_r as function of r.



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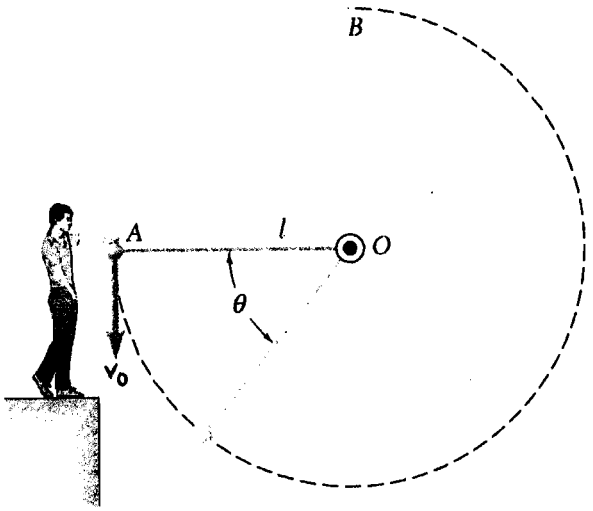
7. (10%) The sphere at A is given a downward velocity $\mathbf{v}_0$ and swings in a vertical circle of radius l and center O. Determine the smallest magnitude of the velocity $\mathbf{v}_0$ for which the sphere will reach point B as it swings about O if AO is a slender rigid rod of negligible mass.



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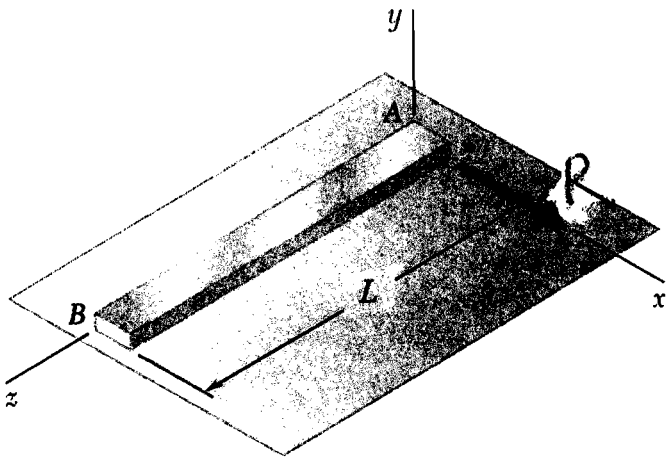
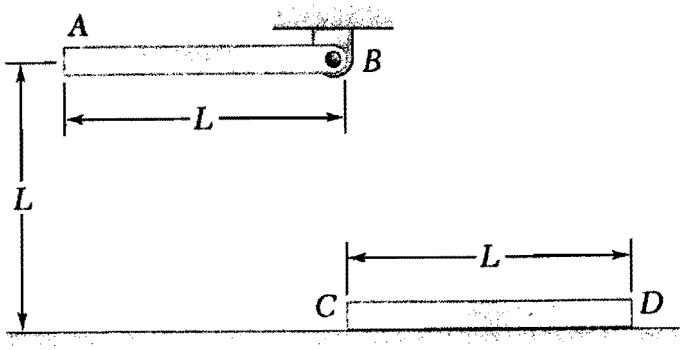
8. (10%) A uniform slender rod AB of mass m and length L rests on a frictionless horizontal surface, and a force $\mathbf{P}$ is applied at A as shown. Determine the magnitude of the acceleration of point A.



(背面仍有題目,請繼續作答)

9. (10%) A slender rod *AB* is released from rest in the position shown. It swings down to a vertical position and strikes a second and identical rod *CD* which is resting on a frictionless surface. The coefficient of restitution between the rods is *e*. Determine the magnitude of the velocity of rod *CD* immediately after the impact.



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10. (10%) Determine the period of the small oscillations of a square plate of side *a* which is suspended from the midpoint *O* of one of its sides (as shown).