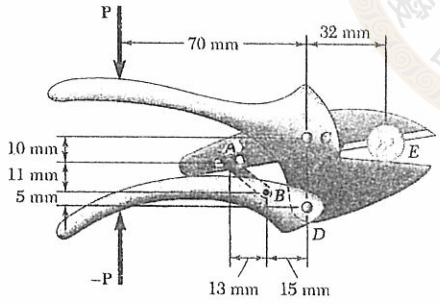
A. Define and describe the following terms: (4 points each, 20 points total)

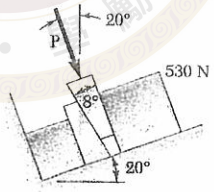
1. 三力體 (Three-force body)
2. 負荷(ω)，剪力(V)與彎曲力矩(M)之關係
3. 形狀中心 (Centroid)
4. 萬有引力
5. 衝量與動量原理

B. Calculation problems (refer to the figures on bottom for the corresponding problems)

6. The compound-lever pruning shears shown can be adjusted by placing pin A at various ratchet positions on blade ACE. Knowing that 1.5-kN vertical forces are required to complete the pruning of a small branch, determine the magnitude P of the forces that must be applied to the handles when the shears are adjusted as shown. (15 points)
7. Two 8° wedges of negligible weight are used to move and position a 530-N block. Knowing that the coefficient of static friction is 0.40 at all surfaces of contact, determine the magnitude of the force **P** for which motion of the block is impending. (15 points)
8. The block A has a mass m_A and rests on the pan B, which has a mass m_B. Both are supported by a spring having a stiffness k that is attached to the bottom of the pan and to the ground. Determine the distance d the pan should be pushed down from the equilibrium position and then released from rest so that separation of the block will take place from the surface of the pan at the instant the spring becomes unstretched. (15 points)
9. Determine the magnitude of force **F** as a function of time, which must be applied to the end of the cord at A to raise the hook H with a constant speed $v = 0.4$ m/s. Initially the chain is at rest on the ground. Neglect the mass of the cord and the hook. The chain has a mass of 2 kg/m. (15 points)
10. The two bars are released from rest at the position θ. Determine their angular velocities at the instant they become horizontal. Neglect the mass of the roller at C. Each bar has a mass m and length L. (20 points)



Problem 6



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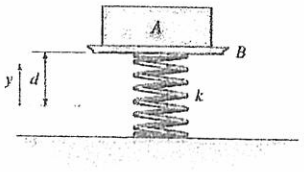

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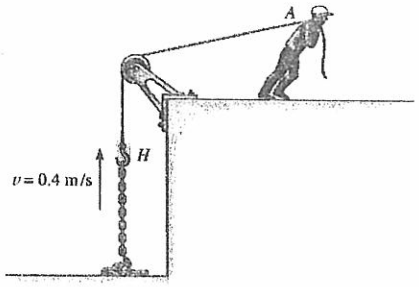
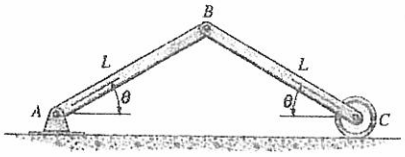


Problem 9



Problem 10

試題隨卷繳回