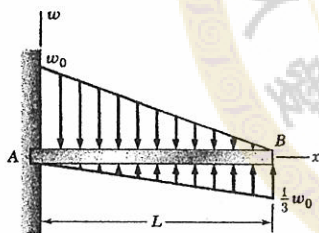


A. Define and describe the following terms: (4 points each, 20 points total)

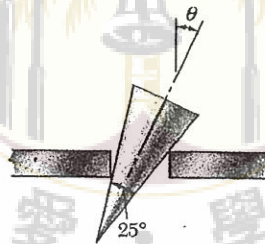
1. Equilibrium of a 2-force body
2. Rolling resistance
3. Principle of virtual work
4. Damped forced-vibration
5. Kinetics

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

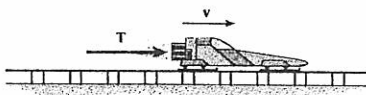
6. For the beam and loading shown, (a) write the equations of the shear and bending moment curves, (b) determine the magnitude and location of the maximum bending moment. (15 points)
7. A conical wedge is placed between two horizontal plates that are then slowly moved toward each other. Indicate what will happen to the wedge if the coefficient of static friction is (a) 0.20, (b) 0.30. (15 points)
8. The rocket sled has a mass of 4 Mg and travels from rest along the smooth horizontal track such that it maintains a constant power output of 450 kW. Neglect the loss of fuel mass and air resistance, and determine how far it must travel to reach a speed of  $v = 60$  m/s. (15 points)
9. The disk has a mass of 20 kg and is originally spinning at the end of the strut with an angular velocity of  $\omega = 60$  rad/s. If it is then placed against the wall, for which the coefficient of kinetic friction is  $\mu_k = 0.3$ , determine the time required for the motion to stop. What is the force in strut  $BC$  during this time? (15 points)
10. The two-link mechanism serves to amplify angular motion. Link  $AB$  has a pin at  $B$  which is confined to move within the slot of link  $CD$ . If at the instant shown,  $AB$  (input) has an angular velocity of  $\omega_{AB} = 2.5$  rad/s and an angular acceleration of  $\alpha_{AB} = 3$  rad/s<sup>2</sup>, determine the angular velocity and angular acceleration of  $CD$  (output) at this instant. (20 points)



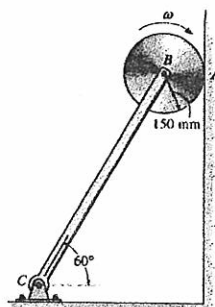
Problem 6



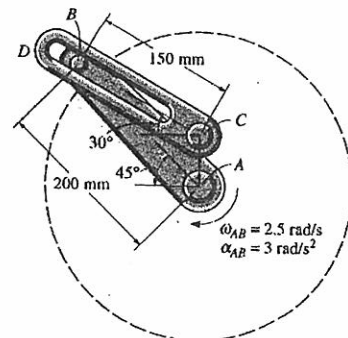
Problem 7



Problem 8



Problem 9



Problem 10

試題隨卷繳回