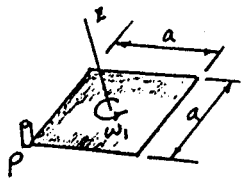
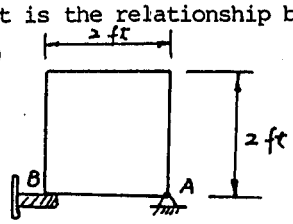
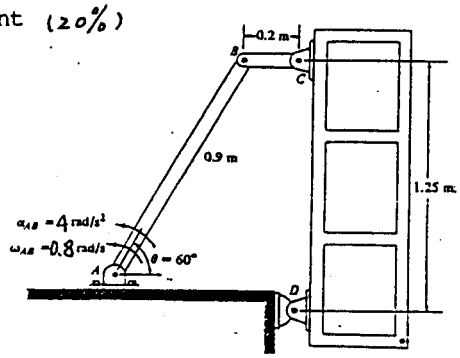
1. The square plate, where a=0.8ft, has a weight of 5 lb and is rotating on the smooth surface with a constant angular velocity of w_1 =12 rad/s. Determine the new angular velocity of the plate just after its corner strikes the peg P and the plate strarts to rotate about P without rebounding. What is the effect of the square plate size and its weight ? (20%)



2. If the support at B is suddenly removed, determine the initial reactions at the pin A. The plate has a weight of 50 lb. What is the relationship between the weight and the reaction ? prove it ! (20%)

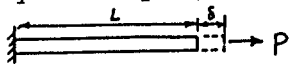


3. At the instant shown, arm AB has an angular velocity of w_{AB}=0.8 rad/s and an angular acceleration of α_{AB}=4 rad/s^2. Determine the angular velocity and angular acceleration of the dump bucket at this instant (20%)



4. What is the steady precession? Express its equations of motion. and explain the gyroscopic effect by using a suitable formula. (20%)

5. (a) An elastic bar subjected to a concentrated end force P, the displacement at end point is δ , what is the work done by P ? why? (10%)



(b) What are the requirements in using the principle of superposition to find the deflection of a beam? (5%)

(c) What does pure bending mean ?(5%)