1. Determine the force and moment reactions at A for the beam subjected to the loading shown. Free Body Diagram required.
2. The rectangular gate shown in section is 10 ft. long (perpendicular to the paper) and is hinged about its upper edge $B$. The gate divides a channel leading to a fresh-water lake on the left and a salt-water tidal basin on the right. Calculate the $M$ on the shaft of the gate at $B$ required to prevent the gate from opening when the salt-water level drops to $h = 3$ ft. The unit weight of fresh-water is 62.4 lbs/ft$^3$ and the unit weight for salt-water is 64.0 lbs/ft$^3$. Free Body Diagram required.
3. Determine the forces in members BC, CI and JK for the truss shown. Indicate whether the members are in tension or compression. Free Body Diagrams required.
4. The bracket and pulley assembly weighs 85 lbs with combined center of gravity at \( G \). Calculate the magnitude of the force supported by the pin at \( C \) when the tension of 100 lb is applied to the cable as shown. Free Body Diagram required.
5. The light vertical mast supports the 4-kN force and is constrained by the two cables BC and BD and by a ball-and-socket connection at A. Calculate the tensions in the cables and the magnitude of the reaction at A. Free Body Diagram required.