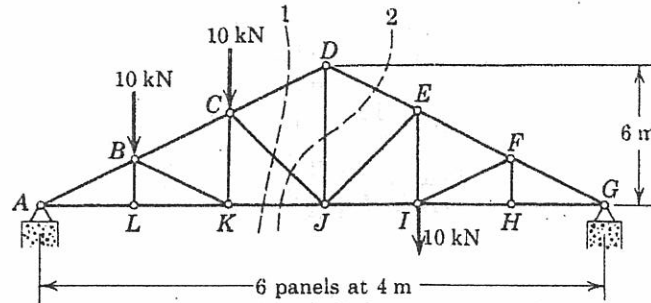1. Calculate the force in member *DJ* of the Howe roof truss illustrated. Neglect any horizontal components of force at the supports.   **(15%)**

2. The frame supports the 400-kg load in the manner shown. Neglect the weights of the members compared with the forces induced by the load and compute the horizontal and vertical components of all forces acting on each of the members.   **(20%)**
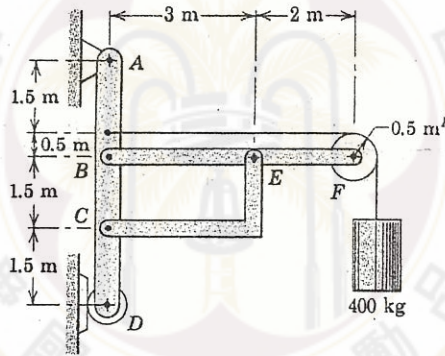

3. Draw the shear-force and bending-moment diagrams for the loaded beam and determine the maximum moment *M* and its x from the left end.   **(15%)**
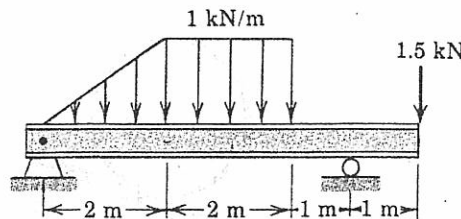

4. A rectangular plate, shown in vertical section *AB*, is 4m high and 6m wide (normal to the plane of the paper) and blocks the end of a fresh-water channel 3m deep. The plate is hinged about a horizontal axis along its upper edge through *A* and is restrained from opening by the fixed ridge *B* that bears horizontally against the lower edge of the plate. Find the force *B* exerted on the plate by the ridge.   **(20%)**

見背面
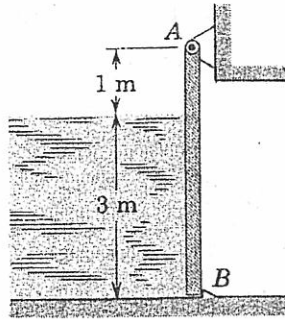
5. Car A is accelerating in the direction of its motion at the rate of 3 ft/sec². Car B is rounding a curve of 440-ft radius at a constant speed of 30 mi/hr. Determine the velocity and acceleration that car B appears to have to an observer in car A if car A has reached a speed of 45 mi/hr for the positions represented.　　　(15%)
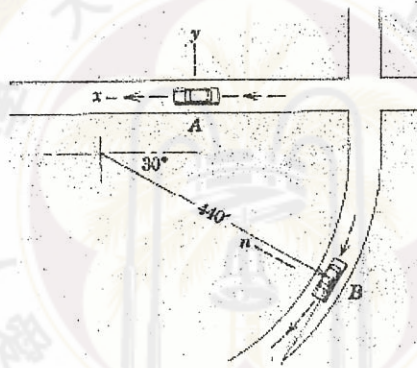
6. A metal hoop with a radius $r = 6$ in. is released from rest on the $20°$ incline. If the coefficients of static and kinetic friction are $\mu_s = 0.15$ and $\mu_k = 0.12$, determine the angular acceleration α of the hoop and time t for the hoop to move a distance of $10\,ft$ down the incline.　　　(15%)

試題隨卷繳回