

109 學年度秋季班機械工程學系機械產業碩士專班 筆試題目

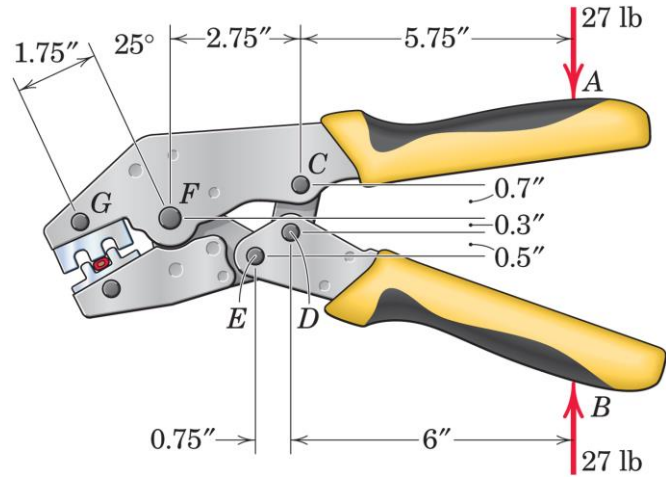
系所：機械工程學系 考試科目：靜力學 考試日期：0328 第1頁，共2頁

※ 考生請注意：本試題可使用計算機。 請於答案卷作答，於本試題紙上作答者，不予計分。

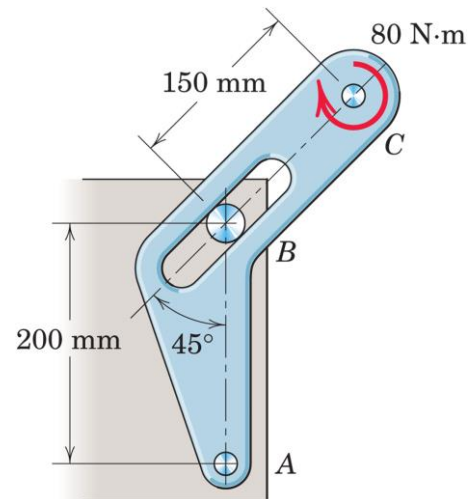
1. Sketch the free body diagrams

(FBDs):

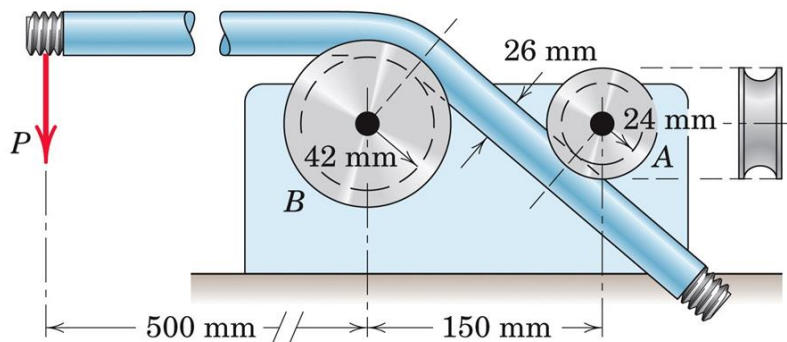
(a) (10%) The handles of the crimper tool are subjected to a pair of 27-lb forces. Assuming that the pin connections are frictionless, forces between the crimping tooth and wire are only in the normal direction, and the weight of the tool is negligible, sketch the FBD of the upper member $ACFG$.



(b) (10%) The light bracket ABC is freely hinged at A , constrained by the fixed pin in the smooth slot at B , and under the action of the applied couple moment at C . Sketch the FBD of the bracket ABC .



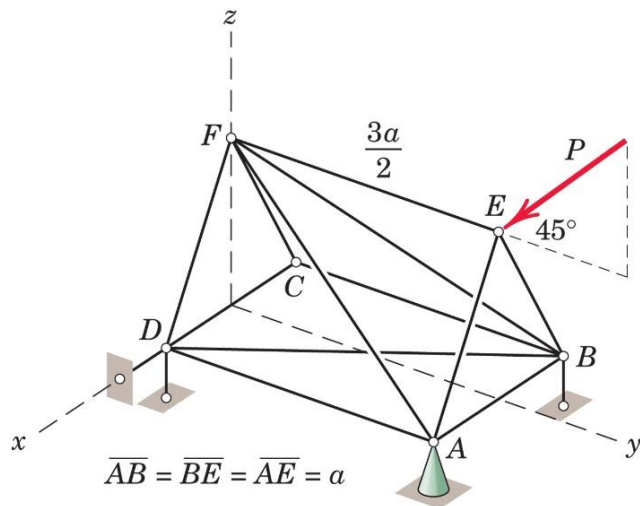
2. (20%) The pipe bender as shown consists two pulleys mounted on a fixed frame. A pipe is bent with a load $P = 300$ N. Determine the forces supported by the bearings of the pulleys.



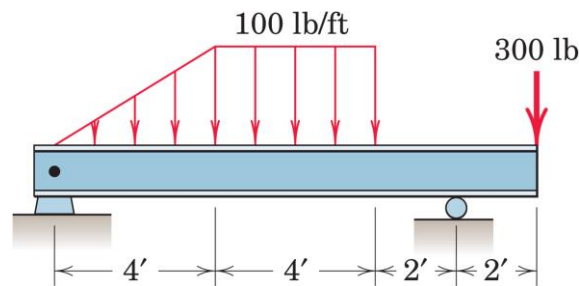
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3. (20%) For the space truss subjected to the load P in the yz -plane as shown, identify the zero-force members (2 points will be deducted for each incorrect answer). Calculate the force in member AF (positive if in tension, negative if in compression).



4. (20%) Draw the shear force and bending moment diagrams for the beam shown.



5. (20%) By using the principle of virtual work (alternative solution approach is not allowed), determine the force F between the jaws of the clamp in terms of a torque M exerted on the handle of the adjusting screw. The screw has a lead (advancement per revolution) L and friction is to be neglected.

