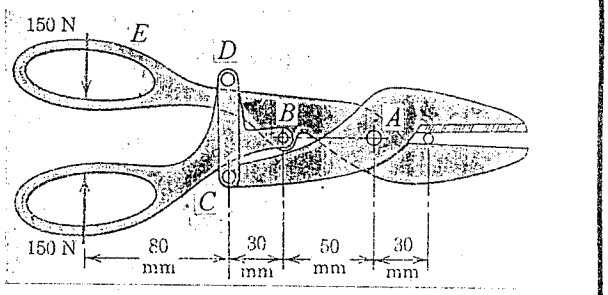
淡江大學八十七學年度日間部轉學生入學考試試題

系別：機械工程學系三年級　　科目：工程力學(含靜力學、材料力學、動力學)

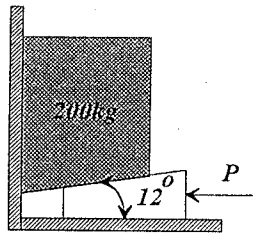
本試題共 2 頁

1. *(10%)* The upper blade and lower handle of the compound-lever shears are pin-connected to the main element *ABE* at *A* and *B*, respectively, and to the short link *CD* at *C* and *D*, respectively. Determine the forces exerted on a twig when two *150N* forces are applied to the handles.



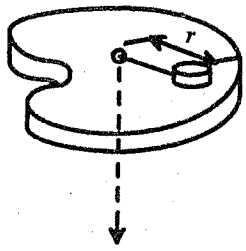
Problem 1

2. *(10%)* Determine the horizontal force *P* required to raise the *200 Kg* block, The coefficient of friction for all surfaces is *0.4*.



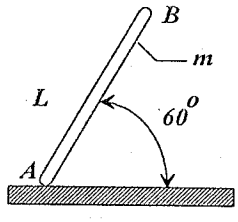
Problem 2

3. *(20%)* A *2 Kg* disk slides on a smooth horizontal table and is connected to an elastic cord whose tension is $T=6r$ *N*, where *r* is the radial position of the disk in meters. If the disk is at *r=1 m* and is given an initial velocity of *4 m/s* in the transverse direction, what are the magnitudes of the radial and transverse components of its velocity when *r=2 m*?



Problem 3

4. *(20%)* A homogeneous slender bar *AB* of mass *m* and length *L* is released from rest in the position shown. For this position, determine the acceleration of end *A*, the reaction at *A*, and the angular acceleration of the bar. Assume that the horizontal plane is smooth.

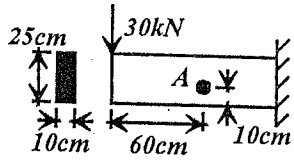


Problem 4

淡江大學八十七學年度日間部轉學生入學考試試題

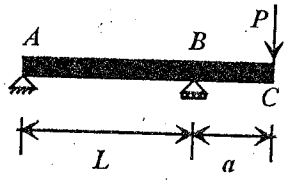
系別：機械工程學系三年級　　科目：工程力學（含靜力學、材料力學、動力學）

5. *(20%)* A cantilever beam of rectangular cross section is subjected to a concentrated load at the free end. Calculate the principal stresses and the maximum in-plane shear stresses at point *A*.



Problem 5

6. *(20%)* The overhanging steel beam *ABC* carries a concentrated load *P* at end *C*. For portion *AB* of the beam, (a) derive the equation of the elastic curve, (b) determine the maximum deflection.



Problem 6