

國立成功大學  
110學年度碩士班招生考試試題

編 號： 67

系 所： 機械工程學系

科 目： 靜力學及專業英文

日 期： 0202

節 次： 第 1 節

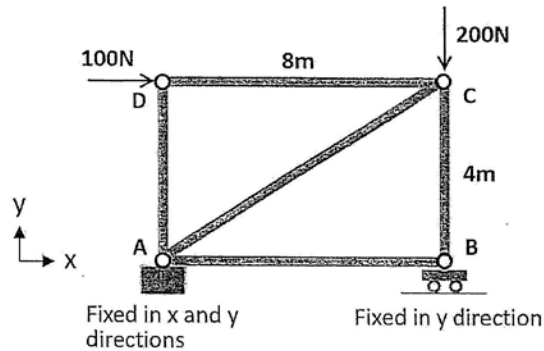
備 註： 可使用計算機

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

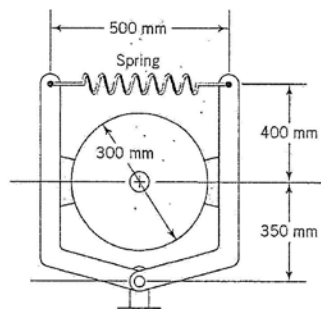
1. (25%) 請將以下中文翻譯成英文。

- (1) 滾動接觸軸承包含滾珠軸承和滾子軸承。
- (2) 螺紋聯結物包含螺釘、螺絲、和螺桿。
- (3) 鉚釘、焊接、和黏結都是連接的方法。
- (4) 齒輪模數的定義為節圓直徑除以齒數。
- (5) 最大畸變能理論可用來預測延性材料的破壞。

2. (25%) Truss ABCD in the following figure is with 5 members (AB, AC, AD, BC, and CD) and 4 joints (A, B, C, and D). The loading conditions are shown in the figure. The overall dimension of the truss is 8m×4m. The forces of the members are  $T_{AB}$ ,  $T_{AC}$ ,  $T_{AD}$ ,  $T_{BC}$ , and  $T_{CD}$ , respectively. Use the method of joints to find the force in each member of the truss.



3. The short-shoe drum brake in Figure is applied by the spring force and released by a hydraulic cylinder( not shown). The coefficient of friction between drum surface and brake is  $\mu$ . The rotating direction of the drum is clockwise. (a) Draw as free bodies in equilibrium each of the brake shoe and arm assemblies, the spring, and the drum. (8%)(b) In the self-energizing brake, the moment of the friction force assists the applied force. Determine which side of brake is self-energizing and which side of brake could be self-locked if we have enough friction.(4%) (c) If the applied spring force is 8000 N and  $\mu=0.2$ , estimate the braking torque developed by this brake system. (5%) (d) Also, calculate the reaction forces at the center of the drum and the pin of the arm. (7%)



4. An automobile jack is shown as follows. Rotating the square-threaded rod AC causes joints A and C to move closer together, thus raising the weight W. For the square-thread rod AC, the mean diameter is  $d_m$ , the lead angle is  $\lambda$  and the coefficient of friction is  $\mu$ . Neglect the collar friction. (a) Determine the axial force in the rod by using virtual work method. (12%) (b) Compute the torque about rod AC to raising the weight W. (8%)(c) Estimate the efficiency for this automobile jack. (5%)

