一、是非題(6%)

1. Newton's Law of gravitational attraction is the Newton's Third Law of Motion.

2. Two forces acting on a 3D body can be generally equilibrated by a third force.

3. A number of forces and moments acting on a body can be reduced to a wrench.

二、填充題(6%)

The basic unit for work or energy "Joule" in SI system is defined as __(1)__ . The basic unit for power "Watt" in SI system is defined as __(2)__ . The pitch of a wrench screw is defined as __(3)__ .

三、問答題：(13%)

Show how to draw a Mohr's circle for Moment of Inertia, and explain all the terms in your graph.

四、專業英文：(25%)

1. Describe the principle of virtual work for a system in English, including all the assumptions. (15%)

2. Translate the following sentence into Chinese: (10%)

The rating of chain for its power transmission capacity considers three modes of failure: (1) fatigue of the link plates due to the repeated application of the tension in the tight side of the chain, (2) impact of the rollers as they engage the sprocket teeth, and (3) galling between the pins of each link and the bushings on the pins.

五. A flat belt connects pulley A, which drives a machine tool, to pulley B, which is attached to the shaft of an electric motor, as shown in Figure 1. The coefficients of static friction is $\mu_s = 0.25$ between both pulleys and the belt. Knowing that the maximum allowable tension in the belt is 600 lb, determine the largest torque which can be exerted by the belt on pulley A. (25%)
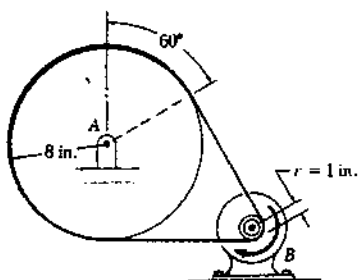

Figure 1

六. Apply the principle of virtual work to find the horizontal reaction Q at point B of the vise system shown in Figure 2. (25%)
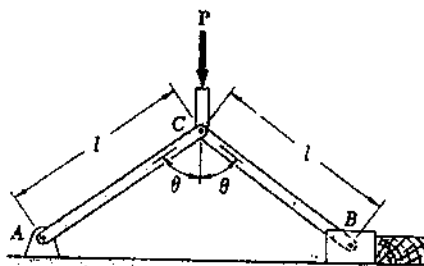

Figure 2