1001 機械系博士班資格考試題目

考試科目	方式	
設計製造	**Closed Book,**不可使用計算機	**Part I**

1. Name four categories of traditional manufacturing processes, provide 2 specific name of manufacturing processes in each categorie and provide short descriptions.   20%

2. Name four categories of non-traditional manufacturing processes, provide 2 specific name of manufacturing processes in each categorie and provide short descriptions.   20%

3. (i) describe rapid prototyping;   5%
   (ii) explain reverse engineering.   5%

1. A Bezier can be expressed by the following parametric equation:

$$\mathbf{P}(u) = \mathbf{P}_0(1-u)^3 + \mathbf{P}_1 3u(1-u)^2 + \mathbf{P}_2 3u^2(1-u) + \mathbf{P}_3 u^3, \ 0 \le u \le 1$$

Assume the coordinates of the 4 control points are, $\mathbf{P}_0$=(1, 3), $\mathbf{P}_1$=(3, 5), $\mathbf{P}_2$=(5, 4), $\mathbf{P}_3$=(7, 1), draw the control polygon(5%).Plot 5 points on the curve at u=0, u=0.2, u=0.5, u=0.8, and u=1, and roughly plot the curve. (5%)

2. Calculate the direct shear stress in the pin and bolts in the following figures (5% each).
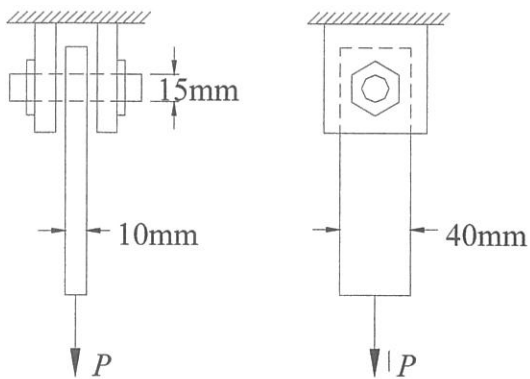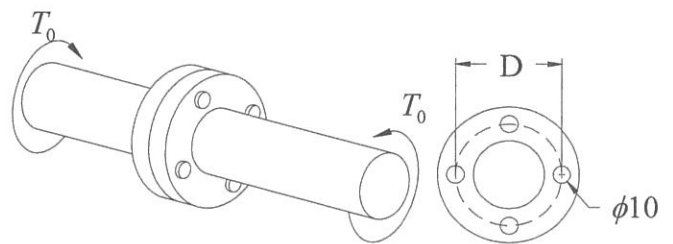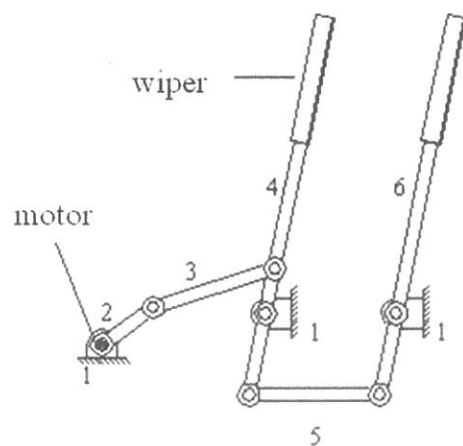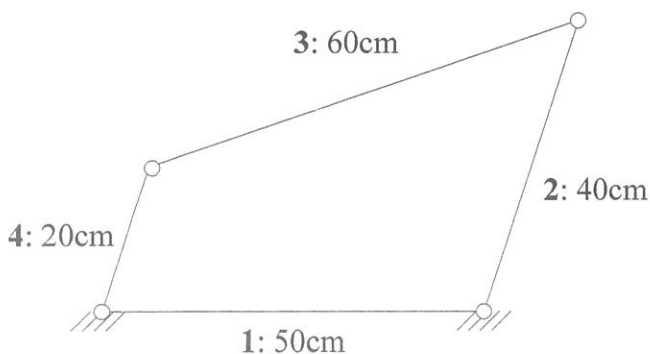

(a) P=500N   (b) T0=100N m

3. The following figure (left) is a simple four-bar linkage mechanism.

(1) Why is the four-bar linkage mechanism so important? (6%)

(2) Give the names of the 4 links. (4%)

4. What is a "light dependent resistor (LDR)"? Give 2 examples of its applications. (5%)What is a "light emitting diode (LED)"? Give 2 examples of its applications. (5%)

5. Explain the following "human-machine system" using the elevator of Building 3 as an example. (10%)

Human

Decision

Input sensory signals

Output muscle force, torque motion

Human-machine Interface

Output performance displays

Input control signals

Function (*s*)

Machine