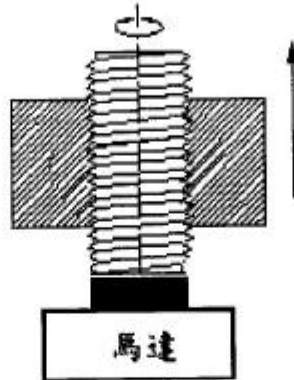
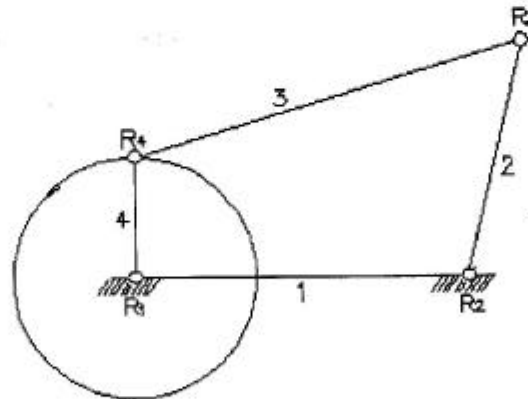


1. 如下圖所示，一個步進馬達帶動螺桿旋轉，將螺拴向上推，請問這個機構接點叫做什麼接點？有幾個自由度？假設螺桿導程為 2.0mm，步進馬達步進角 1.8 度，這時每一個脈衝訊號輸入可以達到的位置精度為何？(10%)

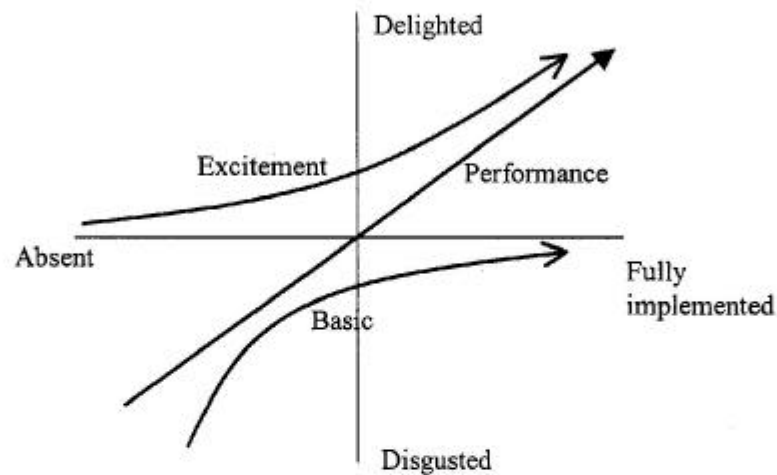


2. 平面機構設計中，四連桿機構為何如此重要？下圖四連桿機構中，連桿 1、2、3、4 長度分別為 50cm、40cm、60cm、20cm，如果我們希望以 4 號曲柄作為輸入軸，你如何判斷 4 號連桿是否可以進行 360 度的旋轉？當 4 號曲柄 360 度旋轉時，2 號輸出曲柄的動作軌跡為何？請以簡圖示意。這個機構的名稱為何？(10%)



3. 軸承的「額定壽命(rated life)」經常用所謂 L10 壽命來表示，請說明軸承的「L10」壽命的意義，並解釋軸承型錄上「基本額定動負荷」的意義。在某項產品應用上使用滾珠軸承承受之等效負荷為 1,000N，期望軸承 L10 壽命需大於兩千七百萬轉，所選擇軸承基本額定動負荷至少要多少？(10%)

4. 試繪圖或列出計算公式表達下列正齒輪之專有名詞：gear, pinion, base circle, pitch circle, pressure line, pressure angle, pitch, module, addendum, dedendum, idle gear。試解釋下列傳動元件的特性，簡單繪出其外型並討論你會在什麼場合使用這些元件？(a)正齒輪(b)螺旋齒輪(c)斜齒輪(d)蝸齒輪。與齒輪傳動相較皮帶和鏈條有何優點？何種狀況較適合選用皮帶傳動？何種狀況較適合選用鏈條傳動？(10%)
5. Kano presented a model of customer satisfaction. According to this model, there are three different types of product quality that give customer satisfaction: basic quality, performance, and excitement quality, as shown in the figure below.



Basic quality is the customers' requirements that are not verbalized as they specify assumed functions of the device. Performance quality refers to customer's requirements that are verbalized in the form that the better the performance, the better the product. The products that include excitement quality will be popular and delighted. However, these customers' requirements are often unspoken because customers do not expect them to be met in the products. Therefore, an engineering designer has a responsibility to find the excitement qualities of the products that customers may not even realize.

Use a product that you are familiar with as an example, to describe what are the basic quality, performance quality, and excitement quality of this product. (10%)

2005/4 Doctoral Qualification Exam: Manufacturing Processes

1. What are the three types of polymer structures?
How are they related to the three types of polymer materials?
 2. Name three casting processes and give short description.
 3. Name five products made by forming processes and their respective name of forming process.
 4. What are the three categories of metal removal processes?
Name three processes of each category.
 5. Describe the following non-traditional machining processes:
 - (i) EDM (Electrical Discharge Machining)
 - (ii) ECM (ElectroChemical Machining)
 - (iii) EBM (Electron Beam Machining)
 - (iv) WJC (Water Jet Cutting)
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