

1. 產品規格是該產品設計過程中重要的依據。若你是設計工程師，試設定一輛電動自行車之規格。設計過程中，該產品規格是否可以變更？為什麼？(10%)
2. 設計機械元件時，需要依據那些辨別條件(Criteria)或是原則來選擇材料？(可舉例說明)。(10%)
3. 作用在一機械元件之負荷型式(type of loading)，有可能是穩定負荷(steady load)或是變動負荷(fluctuating load)。負荷型式不同，對設計過程及選擇材料有何影響？(10%)
4. 設計機械元件時，除了要核算應力之外，常需要估算該元件之變形量，為什麼？試舉例說明(譬如一旋轉軸及組裝在其上之零件，...，或其他實例)。(10%)
5. 以孔與軸之組配傳遞動力之機械元件，其連結(以傳遞動力)之方式有那幾種？請舉例以簡圖說明。(10%)

(背面仍有題目,請繼續作答)

6. Explain the following terms:
- (a) Self-locking of power screw. (5%)
  - (b) Sommerfeld number. (5%)
  - (c) Chordal speed variation. (5%)
7. (a) For rolling bearings, explain (i) what is "rating life" and (ii) what is "basic load rating"? (10%)
- (b) What change in the loading of a roller bearing will double the expected life? (10%)
8. (a) What is the major stress in the (i) torsion springs and (ii) helical springs. (5%)
- (b) What primary factors must be considered when determining appropriate numerical values of the shaft diameters? (10%)