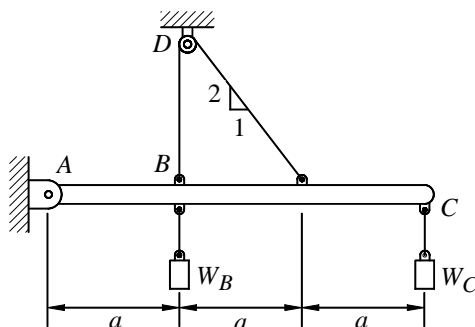# 99 學年度精密與自動化工程入學考題

1. Determine the tension in the cable and the horizontal and vertical components of reaction of the pin A shown. The pulley at D is frictionless and the loads W_B and W_C weigh 100N and 200N, respectively. (20%)

2. The anemometer measures the speed of the wind due to the rotation of the three cups shown. Let a wind gust cause the cups to have an angular velocity of $\omega = (3t^2 + 2)$ rad/sec, where t is in seconds, during a 3-second time period.
   (a) Determine the angular acceleration of the cups when $t = 2$ sec. (10%)
   (b) Determine the total distance traveled by each cup during the 3-second time period. (10%)
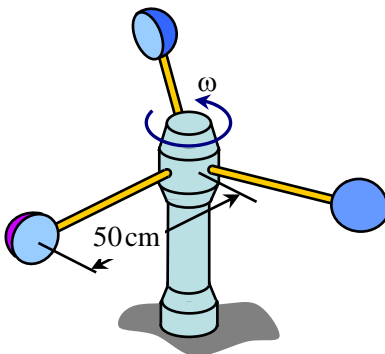
3. 何謂綠色能源(green energy)？有何特徵？與傳統能源有何不同？(20%)

4. (a) 請說明使用螺栓與螺帽(bolts and nuts)結合，兩個機械零件為何需加預力(preload)？並說明此預力分別對被結合之機械元件與螺栓在承受外力之下破壞的影響。(10%)
   (b) 一 2"直徑之軸狀元件由 1020 鋼條(材料之疲勞強度為 28 kpsi)車削而成，設計用以在 500℃ 溫度下承受往復之軸向負載，如欲使其可忍受至少一千萬次往復負載並有 99%可靠度，請列舉出疲勞強度所需修正之參數項目，並說明各修正項目對疲勞強度之影響(變大或變小)。(10%)

5. (a) 請舉出兩種工程塑膠的成形(processing)方法並說明之。 (10%)
   (b) 鎂合金(magnesium alloys)是工程用金屬材料中比重最輕的，請問筆記型電腦的鎂合金機殼是如何製造的？ (10%)