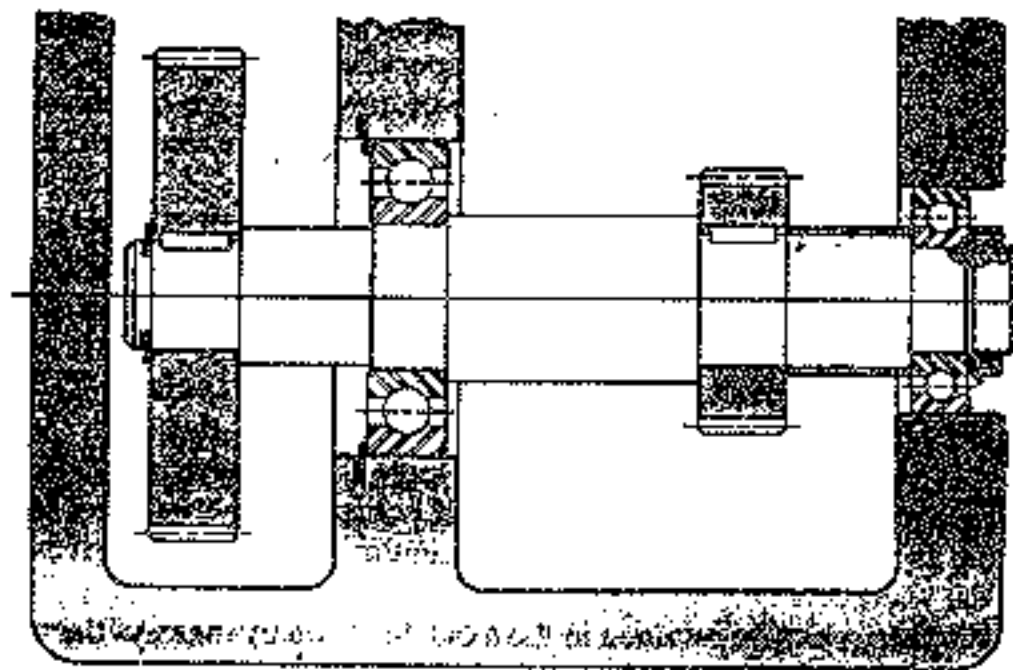


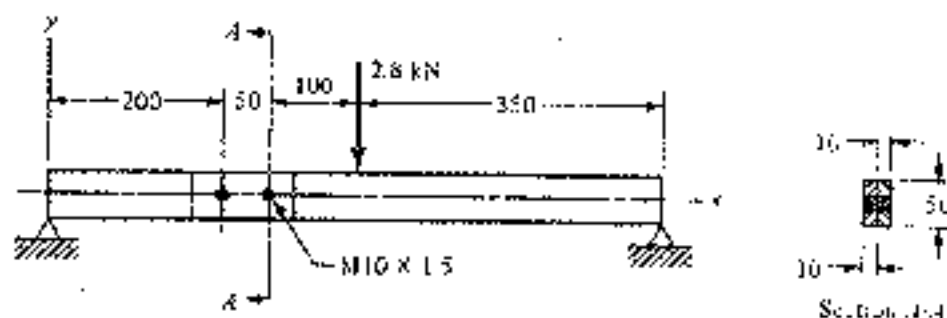
八十四學年度 動力機械研究所 丁組碩士班研究生入學考試

科目 機械設計 科號 210 共 3 頁第 1 頁 \*請在試卷【答案卷】內作答

- 一、(1) 機械設計時用來做為儲能(energy storage)裝置的機械元件 有那些? 舉出二種元件即可。(4%)
- (2) 請以適當之公式說明 (1) 中舉出之機械元件的儲能工作原理。(8%)
- (3) 若欲使用 (1) 中舉出之儲能機械元件提升機車煞車後再啓動之扭力以增加啓動之加速度, 你要使用何種儲能機械元件? 為什麼? 你的設計構想為何?(10%)
- 二、下圖所示為一軸與軸承之裝配圖, 請說明此裝置的缺點, 並在該圖上做必要之修改。(10%)



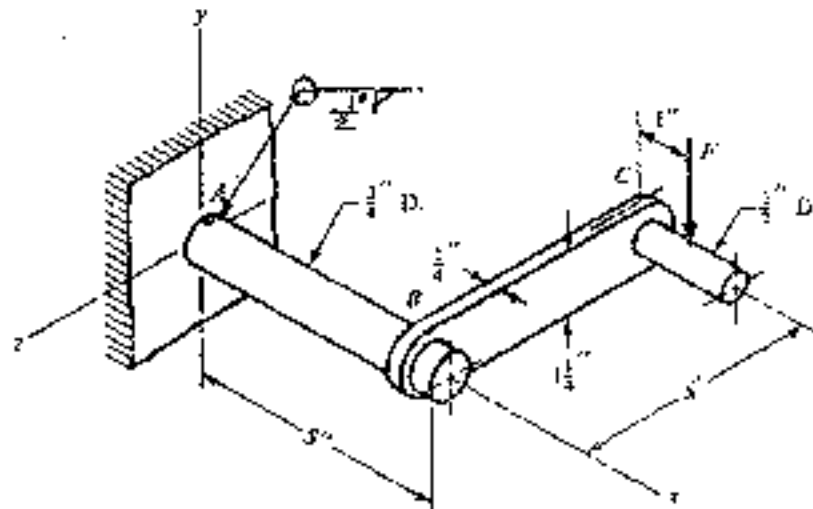
- 三、A beam is made up by bolting together two cold-drawn steel bars as a lap joint, as shown in the figure. Ignoring any twisting, determine the factor of safety of the connection. (Assuming  $A_t$  = unthreaded bolt area, yield strengths for steel and bolt are 370 and 420 Mpa, respectively). (20%)



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四、The figure shows a crank loaded by a force  $F=200$  lb. Find the shear stress in the welds at point A. (15%)



五、A rotating shaft is made of steel tube with an outside diameter of 42 mm and an inside diameter of 38 mm. The shaft is subjected to a torque fluctuating from 20 to 160 N-m and a steady bending moment of 150 N-m (assuming  $S_e = 172$  Mpa and  $S_{ut} = 440$  Mpa). Estimate the factor of safety against fatigue. (15%)

六、The following figure shows a self-adjusting overload coupling. The torque is transferred from the outer ring to the inner section, mounted on the driven shaft, by means of three bell cranks, each carrying a roller and a spring. Maximum torque occurs when contact at point A ceases.

(1) Maximum torque is transferred for the position shown. For this position, please develop an expression for the moment that can be transmitted. Ignore friction and centrifugal forces. (12%)

(2) How would you provide torque adjustment? (6%)

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科目 機械設計 科號 2101 共 3 頁第 3 頁 \*請在試卷【答案卷】內作答

