

國立虎尾科技大學 107 學年度第二學期博士班資格考試題

所別：機械與機電工程研究所

共 3 頁

科目：機構學

注意事項：

- (1) 本試題共有 5 題，任選 題作答，每題 20 分，合計一百分。
- (2) 請依序作答於答案卷上並註明題號，若未註明選答題號及超過規定題數時，謹採計作答順序較前之題目計分。
- (3) 可 使用計算機

1. Fig. 1 show a four-bar linkage, which is a crank-rocker mechanism. If $r_2=100\text{cm}$, $r_3=150\text{cm}$, $r_4=200\text{cm}$, please find the length range of r_1 . (15%)

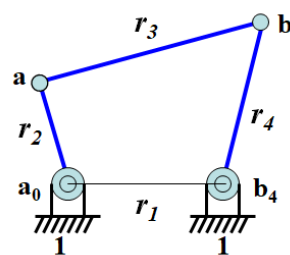


Fig.1. Four-bar linkage

2. Fig. 2 show an offset crank-slider. For the mechanism, if $e=50\text{cm}$, $r_2=200\text{cm}$, $r_3=400\text{cm}$, (a) Max. transmission angle and Min. transmission angle, (b) The stroke of this offset crank-slider. (15%)

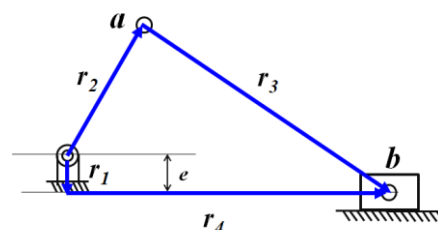


Fig. 2 An offset crank-slider

3. Fig. 3 show a four-bar linkage. For the mechanism, if $r_1=180\text{cm}$, $r_2=100\text{cm}$, $r_3=150\text{cm}$, and $r_4=200\text{cm}$, (a) write down the vector loop equation, (b) if $\theta_2=60^\circ$ and $\omega_2=2400\text{rpm}$, please find the values of θ_3 , θ_4 , and transmission angle μ , (c) if $\omega_2=2400\text{rpm}$, please find the values of ω_3 and ω_4 . (20%)

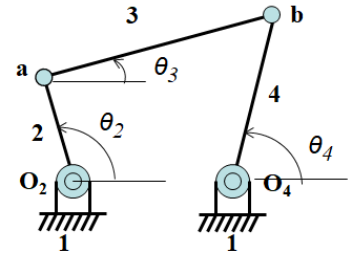


Fig.3. Four-bar linkage

4. For the mechanism shown in Fig.1, (a) please write down the vector loop equation, (b) find the close form equation for r_4 , (c) if $\theta_2=60^\circ$ and $\omega_2=2400\text{rpm}$, please find r_4 , θ_3 , V_b , and ω_3 . (20%)

5. Figs. 5(a) and 5(b) show two mechanisms. Please draw all instantaneous centers. (15%)

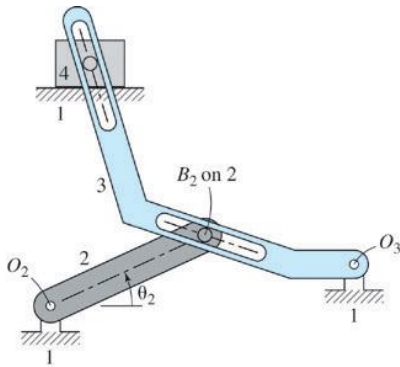


Fig. 5(a) Four-bar mechanism

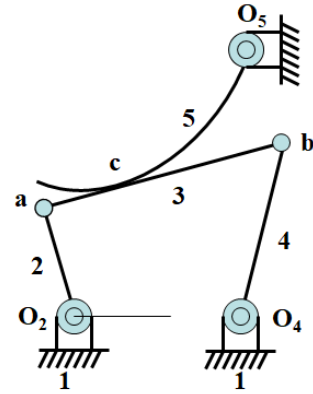


Fig. 5(b) Five-bar mechanism

6. Fig. 6 show a crank-slider. For the mechanism, if $a_{a_0}=200\text{cm}$, $a_{ob}=400\text{cm}$, $ad=800\text{cm}$, $cd=600\text{cm}$, $be=500\text{cm}$, and $\omega_2=100\text{ rad/s}$. (a) According to the real dimensions of mechanism, please redraw this mechanism, (b) Using instant center method, find the angular velocity of link 3 (ω_3) and linear velocity of point c (V_c). (15%)

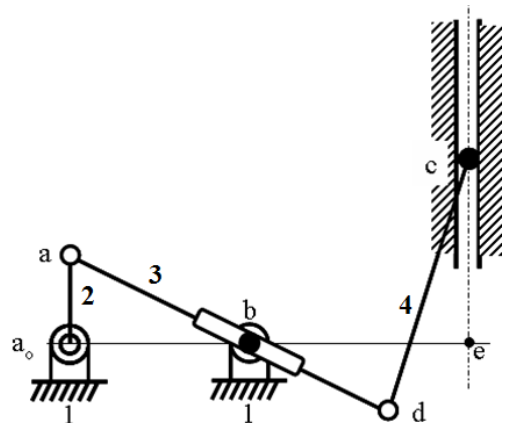


Fig. 6 Four-bar mechanism