3.50 $F_{in} = 1.26W$

3.51 (a) $|F_{in}| = 1.92R$

(b) $\frac{\omega_x}{\omega_0} = -0.44$

3.52 (a) $\left|\frac{R}{T_{in}}\right| = 2.24m^{-1}$

(b) $\frac{\omega_2}{V_6} = 2.24m^{-1}$

3.53 (a) $\frac{F_{out}}{F_{in}} = 1.95$

(b) $\frac{F_{out}}{F_{in}} = \frac{1.95}{1 + 0.67\mu}$

3.54 (b) M.A. = $\frac{20}{35}$

3.55 (a) $\frac{\omega_x}{\omega_0} = 1.72$

(b) M.A. =1.72

3.56 M.A. =0.189

3.57 (a) M.A. =0.65

3.58 (a) $\omega_x = 2\text{ rad/sec}\text{ CW}$

(b) M.A. =0.962

3.59 (a) M.A. =0.558

(b) $\frac{\omega_x}{\omega_0} = 3.36$

(c) $\frac{\omega_x}{\omega_0} = 4.58$

3.60 (a) $\frac{F_{out}}{F_{in}} = \frac{7.25}{k_i}in^{-1}$ for position (a); $\frac{F_{out}}{F_{in}} = \frac{19.61}{k_i}in^{-1}$ for position (b)

$k_i =$scale of length

(b) position (b)

(c) $\frac{V_6}{\omega_0} = (0.138k_i)n$ for position (a); $\frac{V_6}{\omega_0} = (0.051k_i)n$ for position (b)
3.61 (a) \( \frac{F_{\text{out}}}{T_{\text{in}}} = 8.21 \text{in}^{-1} \)

(b) \( \frac{F_{\text{out}}}{T_{\text{in}}} = 8.85 \text{in}^{-1} \)

3.62 (a) M.A. = 1.87

(b) \( \frac{V_4}{\omega_2} = 6 \text{mm} \)

3.63 (a) M.A. = 1.17 for solid position and M.A. = \( \infty \) for dashed position

3.64 (a) \( \frac{T_{\text{out}}}{F_{\text{in}}} = 1.18 r_{\text{in}} \) for solid position and \( \frac{T_{\text{out}}}{F_{\text{in}}} = 0.28 r_{\text{in}} \) for dashed position

(b) \( \frac{\omega_1}{\omega_2} = -0.85 \) for solid position and \( \frac{\omega_1}{\omega_2} = -3.57 \) for dashed position

3.65 (a) M.A. = 3.50

(b) M.A. = 3.24

(c) M.A. = 3.14

3.66 M.A. = 5

3.67 (a) \( \frac{F_{\text{out}}}{F_{\text{in}}} = 0.32 \)

(b) \( \frac{F_{\text{out}}}{F_{\text{in}}} = 0.299 \)

3.68 (a) \( \frac{\omega_1}{\omega_0} = 1.718 \)

(b) M.A. = 1.071

3.69 30in

3.70 (a) \( F_s = 5.26 \text{W} \)

(b) yes, because \( r_{\text{out}} \) is increase.

(c) yes, because if it were higher, hood would not close

3.71 M.A. = 0.866

3.72 (a) Fig. 3.11

(c) Easy to open and close; door sweeps; smaller volume; closes tight along both edges.

3.73 (b) \( T_4 = 0.35 T_2 \)

(c) shorten 4, 5 - 4, 6, lengthen link 2, move 1, 2 upward

(f) compactness versus length of link 2

3.74 (b) \( T_4 = 1.27 T_2 \)

(c) move 1, 2 downward

3.75 (a) four bar linkage
(b) M.A. = 10.3 for open position and M.A. = 11 for closed position
(c) to have a long reach without too large a lateral width increase, and to maintain approximately constant high M.A. in both open and closed position, as well as in between

3.76 (a) four bar toggle linkage
(b) M.A. = ∞

3.77 M.A. = 2.85
When clamping, 1, 2 and 2, 4 approach each other. \( \omega_{in} / \omega_{out} \) increases and thus M.A. increases. When slightly over the toggle position, the clamp is locked.

3.78 (a) \( \gamma = 50^\circ, \ \delta = 40^\circ \) for position a and \( \gamma = 32^\circ, \ \delta = 58^\circ \) for position b and \( \gamma = 28^\circ, \ \delta = 62^\circ \) for position c
(b) poor transmission angles are those that are less than or close to 30°
(e) \( T_{in} = 20.63lb \times in \) for position a and \( T_{in} = 50.21lb \times in \) for position b and \( T_{in} = 38.27lb \times in \) for position c

3.79 (a) \( \gamma = 34^\circ, \ \delta = 56^\circ \) for position a and \( \gamma = 68^\circ, \ \delta = 22^\circ \) for position b and \( \gamma = 23^\circ, \ \delta = 67^\circ \) for position c
(e) \( T_{in} = 9.1lb \times in \) for position a and \( T_{in} = 7.85lb \times in \) for position b and \( T_{in} = 4.72lb \times in \) for position c

3.80 (a) \( \frac{T_{in}}{F_{out}} = 6mm \)

3.81 (a) \( \gamma = 60^\circ, \ \delta = 30^\circ \) for position a and \( \gamma = 10^\circ, \ \delta = 80^\circ \) for position b and \( \gamma = 8^\circ, \ \delta = 82^\circ \) for position c
(e) \( T_{in} = 3.05lb \times in \) for position a and \( T_{in} = 43.94lb \times in \) for position b and \( T_{in} = 19.28lb \times in \) for position c

3.83 (a) 2
(b) M.A. = 0.173

3.84 (a) 1
(b) M.A. = 0.5
(c) 0