1. A regulator system has a plant transfer function as given below. By use of the state-feedback control u = **-Kx,** it is desired to place the closed-loop poles at

$$s = -2 + j2\sqrt{3}, \qquad s = -2 - j2\sqrt{3}, \qquad s = -10$$

$$\frac{Y(s)}{U(s)} = \frac{10}{(s+1)(s+2)(s+3)}$$

Use transformation method to evaluate K.

2. A regulator system has a plant transfer function as given below. By use of the state-feedback control u = **-Kx,** it is desired to place the closed-loop poles at -2, -1, +/- j1

$$\frac{Y(s)}{U(s)} = \frac{10}{s(s+1)(s+2)}$$

Use direct substitution method to evaluate K.

3. A regulator system has a state space model given below. By use of the state-feedback control u = **-Kx,** it is desired to place the closed-loop poles at -1, +/- j2, -6.

$$\text{A} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 2 & 1 & -3 \end{bmatrix}, \text{B} = \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix}$$

Use Ackerman's formula to evaluate K.

4. A regulator system has a state space model given below. By use of the state-feedback control u = **-Kx,** it is desired to place the closed-loop poles at s=-2 +/- j4, s=-10.

$$\text{A} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}, \text{B} = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$$

Use direct substitution method to evaluate K.

5. A regulator system has a state space model given below. By use of the state-feedback control u = **-Kx,** it is desired to place the closed-loop poles at -1, +/- j2, -6.

$$\text{A} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 2 & 1 & -3 \end{bmatrix}, \text{B} = \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix}$$

Use transformation method to evaluate K.