MECH 6300-HW3

3)

a) $A = \begin{bmatrix} 1 & 0 & 0 \\ 10 & 2 & 0 \\ 0 & 5 & 4 \end{bmatrix}$ $J = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

$\lambda_1 = 1$

$\lambda_2 = 2$

$\lambda_3 = 4$

i) Cayley-Hamilton Theorem Method

$$e^{At} = \begin{bmatrix} \frac{2}{3}e^{t} + \frac{1}{2}e^{2t} - \frac{1}{6}e^{4t} & 0 & 0 \\ -10e^{t} + 10e^{2t} & -\frac{8}{3}e^{t} + 3e^{2t} - \frac{1}{3}e^{4t} & 0 \\ \frac{50}{3}e^{t} - 25e^{2t} + \frac{25}{3}e^{4t} & -\frac{5}{2}e^{2t} - \frac{5}{2}e^{4t} & -\frac{8}{3}e^{t} + 2e^{2t} + \frac{2}{3}e^{4t} \end{bmatrix}$$