MTH 204
Quiz 6
9 Mar 2007

Name: Key

Section: B or C (circle one)

Read the directions carefully.
Write neatly in pencil and **show all your work**
(you will only get credit for what you put on paper).
You may use your homework solutions.
The back page contains the table of Laplace transforms.
If you get stuck, feel free to ask me for help.

LEAD: Thursdays, 5:00 - 7:00 PM
CSF G5D

Exam 3: 23 March
Sections 4.6 -

Find the inverse Laplace transform $F(s) = \frac{6}{s^5} + \frac{2s+3}{s^3 - 2s^2 + 4s - 8}$.

$$\frac{2s+3}{s^2(s-2)+4(s-2)} = \frac{2s+3}{(s-2)(s^2+4)} = \frac{A}{s-2} + \frac{Bs+C}{s^2+4}$$

$$\Rightarrow 2s+3 = A(s^2+4) + Bs(s-2) + C(s-2)$$

$$s=2 \Rightarrow 7 = 8A \Rightarrow A = \frac{7}{8}$$

$$s=0 \Rightarrow 3 = \frac{7}{8}(4) - 2C \Rightarrow C = \frac{1}{4}$$

$$s=-2 \Rightarrow -1 = \frac{7}{8}(8) + 8B + \frac{1}{4}(-4) \Rightarrow B = -\frac{7}{8}$$

$$\mathcal{L}^{-1}\{F(s)\} = \mathcal{L}^{-1}\left\{\frac{6}{s^5} + \frac{\frac{7}{8}}{s-2} - \frac{\frac{7}{8}s - \frac{1}{4}}{s^2+4}\right\}$$

$$= 6\mathcal{L}^{-1}\left\{\left(\frac{4!}{4!}\right)\left(\frac{1}{s^{4+1}}\right)\right\} + \frac{7}{8}\mathcal{L}^{-1}\left\{\frac{1}{s-2}\right\} - \frac{7}{8}\mathcal{L}^{-1}\left\{\frac{s}{s^2+4}\right\} + \frac{1}{4}\mathcal{L}^{-1}\left\{\left(\frac{2}{2}\right)\left(\frac{1}{s^2+4}\right)\right\}$$

$$= \frac{6}{4!}\mathcal{L}^{-1}\left\{\frac{4!}{s^{4+1}}\right\} + \frac{7}{8}\mathcal{L}^{-1}\left\{\frac{1}{s-2}\right\} - \frac{7}{8}\mathcal{L}^{-1}\left\{\frac{s}{s^2+4}\right\} + \frac{1}{4(2)}\mathcal{L}^{-1}\left\{\frac{2}{s^2+4}\right\}$$

$$= \frac{1}{4}t^4 + \frac{7}{8}e^{2t} - \frac{7}{8}\cos(2t) + \frac{1}{8}\sin(2t).$$