(c) State and prove Initial Value & Final Value theorems in Laplace.

(d) Using Laplace transform, solve differential equation.

$$2\frac{d^2x}{dt^2}+7\frac{dx}{dt}+6x=0, \quad x(0)=0, \quad \frac{dx}{dt}=1$$

4) Attempt ANY TWO of the following: 5×2=10

(a) What is difference between Z Transform & Laplace Transform ,find the Z Transform of sequences x(n) = {1,2,3,4,5,0,7}.

(b) Determine the Inverse Z Transform of following X(z)= 1 / 1- $1.5Z^{-1} + 0.5Z^{-2}$

For ROC > 1, z <0.5, 0.5<z>1

(c) $\begin{bmatrix} \dot{X_1} \\ \dot{X_2} \end{bmatrix} = \begin{bmatrix} -2 & -3 \\ 4 & 2 \end{bmatrix}\begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 3 \\ 5 \end{bmatrix}U$

$Y = \begin{bmatrix} 1 & 1 \end{bmatrix}\begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$

—×—

293

NEE-303

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121314

Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ]

B.Tech. (Semester-III)

SPL. THEORY EXAMINATION, 2014-15

BASIC SYSTEM ANALYSIS

Time : 2 Hours]   **[Total Marks : 50**

Note: Attempt all Questions. All question carry equal marks.

1) Attempt ANY TWO of the following: 6×2=12

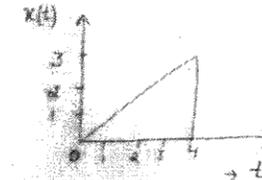(a) A signal x(t) is shown below in fig(1), sketch x(t-2), x(t/2), x(-t).

Fig. (1)

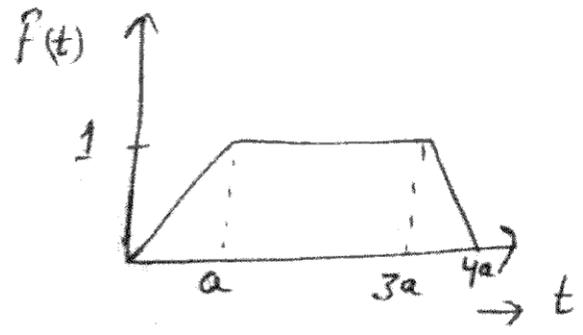(b) Synthesis the signal f(t) as shown in fig (2) by using basic signals:

Fig. (2)

(c) Write the Equivalent mechanical system shown in fig (3). Also draw the force-voltage analogous circuit.

Fig. (3)

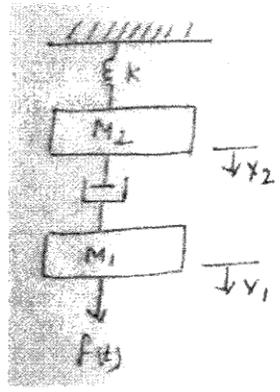2) Attempt ANY FOUR of the following: $4 \times 4 = 16$

(a) Define odd and even function in Fourier analysis with Suitable Example.

(b) Explain Convolution property in Fourier Transform.

(c) Determine Fourier series for following periodic waveform f(t)= 1, 0<t< β , otherwise 0.

(d) Find the Fourier Transform of function (i) u (t) (ii) sgn (t).

(e) Find the Laplace Transform of function e^{-at} sinwt.

(f) Define following terms- State, State Variable, State vector, and State equation.

3) Attempt ANY THREE of the following: $4 \times 3 = 12$

(a) Find the Inverse Laplace Transform of function using Convolution Theorem:

$$F(s) = s / (s+5) (s+10)$$

(b) Determine output voltage across capacitor to a current source excitation i(t)= e^{-t} u(t) as shown in fig(4):
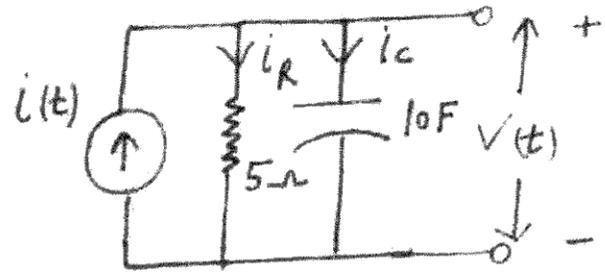

Fig. (4)