(79) SE-sem-IV – CBGS – Electrical – SP 31/5/16

Q. P.Code : 543902

[3 Hour] **Total Marks: 80**

Note:
1) **Question No.1 is Compulsory**
2) **Answer any three questions out of remaining.**
3) **Assume suitable data if required.**

Q1 a.Express the even and odd part of the signal x(n)={-2,1,3,-5,4} (5*4)

b.Find the Fourier transform of $x(t) = e^{-at}\cos\Omega_0 t u(t)$

c.Obtain the Z transform of unit step, unit ramp signal.

d.Compute N point DFT of $x(n) = e^{-n}$ $0 \le n \le 4$

Q2 **a)**

i) Check the given signals are periodic or not. If it is periodic find out the fundamental period. $X(n) = 1 + e^{j2\pi n/3} - e^{j4\pi n/7}$ (05M)

ii) Check the given signal is energy or power signal x(t) = 7cos20t + Π/2 (05M)

b)Sketch the signal

(i) X(t) = -u(t+3)+ 2u(t+1) -2 u(t-1) +u(t-3) (05M)

(ii)If x(n) = 1+ n/3 $-3 \le n \le -1$
1 $0 \le n \le 3$ (05M)
0 otherwise

Sketch (i) x(n-1) (ii) x(2n-2)

Q3 **a)**

i) Find the initial value and final value of $X(Z) = \frac{2z^{-1}}{1-1.8z^{-1}+0.8z^{-2}}$ (05M)

ii) Find the Z transform of the given function. $x(n) = n2^n \sin(\frac{\Pi}{2}n)u(n)$ (05M)

b) Find the inverse transform of the given function and sketch
(1)if ROC $|Z|<1$, (2) if ROC $|Z|>2$, (3) if ROC $1<|Z|<2$ (10M)

$$x(z) = \frac{3z^{-1}}{(1-z^{-1})(1-2z^{-1})}$$

Q4 **a)** Find the phase and magnitude response of the system h(n)= [1, -1/2] (10M)

b) A causal LTI system is described by the difference equation. (10M)
y(n)=y(n-1)+y(n-2)+x(n)+2x(n-1)
Find the system function and frequency response of the system. Plot the poles and zeros and indicate the ROC,also determine the stability and impulse response of the system.

Q5 a) Find the Z transform of the given signal $n(1/2)^n u(n) * [\delta(n) - (1/2)\delta(n-1)]$ (8M)

b)Determine the response of discrete time LTI system governed by the difference equation (12M)
Y(n)=-0.5y(n-1) + x(n),When the input is unit step and initial condition, a) Y(-1)=0,and b) Y(-1)=1/3

Turnover

Q6 a) In an LTI system the input X(n)={1,1,1}and the impulse response h(n)={-1,-1}.Determine the response of the LTI system by radix-2 DIT FFT (12M)

b) Prove any three DFT properties. (8M)