Total No. of Questions : 6]

SEAT No. :

P1328

[Total No. of Pages : 2

TE/Insem./APR-124
T.E. (Electronics Engineering)
DSP & APPLICATIONS
(2015 Pattern) (Semester - II) (304206)

Time : 1 Hour] *[Max. Marks :30*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 Or Q.4, Q.5 or Q.6.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Consider analog signal $x(t) = 2\cos 100\pi t$. **[6]**

i) Determine minimum sampling rate required to avoid aliasing.

ii) Suppose the signal is sampled at rate Fs = 150 Hz. What is Discrete time signal obtained after sampling. Comment on aliasing.

iii) Suppose the signal is sampled at rate Fs = 75 Hz. What is Discrete time signal obtained after sampling. Comment on aliasing.

b) What are advantages of Digital signal processing over analog signal processing. **[4]**

OR

Q2) a) State need of sampling in time domain. Also describe sampling theorem in time domain. **[6]**

b) With neat block schematic describe sampling rate conversion by non integer factor M/L. **[4]**

Q3) a) Using Radix 2 DIT FFT algorithm find DFT of a signal $x(n) = [1\ 2\ 2\ 1]$. **[6]**

b) State & explain significance of following DFT properties. **[4]**

i) Circular convolution

ii) Periodicity

OR

P.T.O.

Q4) a) What is need of Linear filtering? Illustrate with neat sketch & describe in brief overlap & save method. **[6]**

b) Find circular convolution of following signals.

$x(n) = [1\ \ 2\ \ 3\ \ 4]$ $h[n] = [1\ \ 2\ \ 2\ \ 1]$ **[4]**

Q5) a) State & explain following properties of *z* transform. **[6]**

i) Time shifting

ii) Differentiation in *z* domain

iii) Convolution of two sequences.

b) Using properties of z trasnform find z transform of the sequence defined as **[4]**

$$x(n) = \frac{1}{5}\delta(n+1) + 5\left(\frac{1}{2}\right)^n u(n).$$

OR

Q6) a) The LTI system is described by the difference equation **[6]**

$$y(n) = x(n) - 3x(n-1) + 2x(n-2) + 2y(n-1)$$

i) Find system function

ii) Draw & obtain pole zero plot

iii) Comment on stability of the system from pole zero plot.

b) What is ROC? What is significance of ROC? What is ROC for right handed & left handed signal. **[4]**

EEE