Total No. of Printed Pages:2

SUBJECT CODE NO:- H-377
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (EEP/EE/EEE) (Sem-I)
Digital Signal Processing
[Old]

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B.: i) Q.No.1 is compulsory. Solve any two questions from remaining question of Section A.
ii) Solve any three questions from Section B.
iii) Assume suitable data if necessary.

SECTION– A

Q.1 Attempt any five questions: 14

a) Enlist the applications of DSP.
b) Explain concept of aliasing.
c) Define causal & non causal system.
d) Define periodic and aperiodic signal.
e) What is signal & signal processing.
f) Define ROC in z-transform.
g) Define LTI system.

Q.2 a) A discrete time signal $x(n)$ is defined as, 07

$$x(\mathrm{n}) = \begin{cases} 1 + \mathrm{n}/3 & -3 \le \mathrm{n} \le -1 \\ 1 & 0 \le \mathrm{n} \le 3 \\ 0 & \text{elsewhere} \end{cases}$$

1) Determine and sketch signal $x(n)$
2) Sketch signal result if we;
   (a) First fold $x(n)$and delay resulting signal by far sample.
   (b) First delay $x(n)$ by far sample and then fold.

b) Explain in detail sampling of a signal. 06

Q.3 a) Explain in detail time variant / time invariant system. 06

b) Perform convolution sum using mathematical equation of convolution given 07

$h[n] = \{ 1, \underset{\uparrow}{2}, 1, -1 \}$

$x(n) = \{\underset{\uparrow}{1}, 2, 3, 1\}$

Q.4 a) Explain properties of z-transform. 06

b) Find the inverse z-transform of $X(z) = \frac{1+3z^{-1}}{1+3z^{-1}+2z^{-2}}, |Z| > 2$ 07

Q.5 Write short note on (any two):

(a) Block diagram of Digital Signal Processing. 07
(b) Quantization & encoding 06
(c) Properties of LTI system. 06

SECTION – B

Q.6 a) Explain in detail properties of fourier transform. 06

b) Find the 4-point bFT of the sequence $x(n) = \cos n\pi/4$ 07

Q.7 a) Find the circular convolution of the two sequences 06
$x(n) = \{1, 2, 2, 1\}$ *and* $x_2(n) =$
$\{1, 2, 3, 1\}$ using concentric circle method.

b) Explain in detail properties of DFT. 07

Q.8 a) Determine the IDFT of 06
X(K)={3, (2 + j), 1,(2 –j)}

b) Determine the Direct Form I realization of IIR filter. 07

Q.9 a) Realize the system function: 06

$$H(z) = \frac{1}{2} + \frac{1}{3}z^{-1} + z^{-2} + \frac{1}{4}z^{-3} + z^{-4} + \frac{1}{3}z^{-5} + \frac{1}{2}z^{-6}$$

b) Explain Lattice structure or FIR filter. 07

Q.10 Write a short note on (any two):

(a) Signal flow graph. 06

(b) Comparision between FIR & IIR filter. 06

(c) Relation between DFT & Z transform? 07