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SUBJECT CODE NO:- P-85
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EEE/EEP/EE) Examination May/June 2017
Digital Signal Processing
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.1 is compulsory. Solve any two questions from the remaining of section A.
ii) Solve any three questions from section B.
iii) Assume suitable data wherever necessary.

Section A

Q.1 Solve:-
a) What is deterministic signal, Explain with example? 02
b) Differentiate between time variant and time invariant system. 02
c) Define energy and power signals. 02
d) What is the significance of ROC in z-transform? 02
e) Give the advantages of DSP over ASP. 03
f) Explain the concept of aliasing & sampling. 03

Q.2 (a) Draw the block diagram of digital signal processing and explain the function of each block. 06

(b) For the analog signal $x_a(t)=3\cos 100\pi t$
(i) Determine The minimum sampling rate required to avoid aliasing. 01
(ii) What is the discrete time signal ,if the signal is sampled at the rate F_s=200Hz. 02
(iii) What is the discrete time signal if signal is sampled at Fs=75Hz. 02
(iv) What is the frequency 0<F<Fs12 of analog signal that yields samples identical to those obtained in part (3) 02

Q.3 (a) A discrete time signal x(n) is defined as:
$x(n)=1+\frac{n}{3}$, $-3\leq n\leq -1$
$=1$, $0\leq n\leq 3$
$=0$, elsewhere
(i) Determine its value and sketch the signal x(n) 01
(ii) Sketch the signal that result if we:
(a) First fold x(n) and then delay, resulting signal by four samples. 03
(b) First delay x(n) by four samples and then fold the resulting signals. 03

(b) State the following systems are linear or Non-linear. 06
(i) y(n)=Cos(x(n)) (ii) y(n)=x(n)+nx(n+1)
(iii) y(n)=x(-n) (iv) y(n)=Ax(n)+B

Q.4 (a) Find the inverse z-transform of x(z). 06
$x(z)=\frac{1-3z^{-1}}{1+3z^{-1}+2z^{-2}}$, $|z|>2$.

(b) State and explain properties of z-transform. 07

Q.5 Write short note on. (any two).
(a) Interconnection of LTI system 06
(b) Classification of discrete time signal 07
(c) Relation between S-plane and Z-plane 06

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Section B

Q.6	(a)	Find the convolution of two finite length sequences. X(n)={1,-1,1,2} h(n)={1,2,1,-1}	07
	(b)	State and explain the properties of convolution.	06
Q.7	(a)	Find DFT of the sequence for N=4. X(n)=1 For $0 \leq n \leq 2$ =0 Otherwise	07
	(b)	State and explain at least 3 properties of DFT.	06
Q.8	(a)	Give the relationship of Fourier transform & discrete Fourier transform.	06
	(b)	Determine IDFT of the sequence. X(k)={5,0,1-j,0,1,0,1+j,0}.	07
Q.9	(a)	Draw lattice realization of FIR filler system.	07
	(b)	Draw and explain direct-form-I structure of IIR filter system.	06
Q.10		Write short note on:- (i) Signal flow graphs.	07
		(ii) Auto correlation and cross correlation.	07