

Roll No

MEVD-104

M.E./M. Tech., I Semester

Examination, December 2016

Digital Signal Processing

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All questions carry equal marks.

1. a) Describe sampling and reconstruction of signals in detail.
b) Determine z transform of following functions :
 - i) $x(n) = n^2 u(n)$
 - ii) $x(n) = (na^n \cos \omega_0 n) u(n)$
2. a) Define DFT of a given time sequence $x(n)$ and hence write four properties of DFT by giving suitable illustrations.
b) Compute the eight point DFT of the following :
 $x(n) = [1, 2, 3, 4, 5, 6, 7, 8]$
3. a) What is the need for FFT algorithm. State the computational requirements of FFT? Give the computational efficiency of FFT over DFT.
b) Draw the flow graph for decimation in time FFT algorithm for $N=8$ using radix 2. Show various steps of decimation.
4. a) What are different design techniques available for the FIR filters? Explain.
b) Discuss effect of finite register length is FIR filter design.
5. a) What is an IIR filter? Compare its characteristics with an FIR filter.
b) Explain mapping of a analog filter from S-plane to digital filter in Z-plane using bilinear transformation.

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6. a) What is Butterworth approximation? Write the properties of Butterworth filter.
b) Write the procedure for designing FIR filter using windows. What are the various window techniques used for designing?
7. a) How transformations for high speed using pipelining is done? Explain.
b) Discuss designing of programmable DSP's.
8. Write short notes on any two of the following :
 - a) Representation of signals on orthogonal basis
 - b) Chebyshev approximation
 - c) Parallel processing and folding techniques
