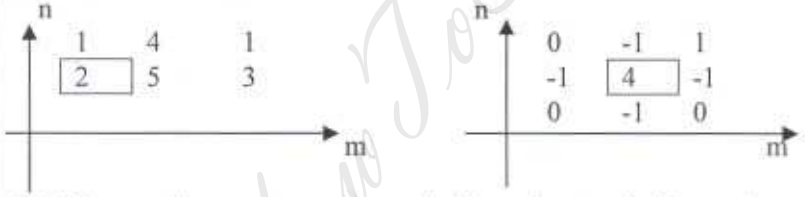
ELECTRONICS AND COMMUNICATION ENGINEERING DEPARTMENT

END SEMESTER EXAMINATION – DECEMBER 2006 (M.E. (ECE) – FIRST YEAR

CN-001 ADVANCED DIGITAL SIGNAL PROCESSING

Time Allowed : 3 hrs. Max. Marks :36

Note : Attempt four Questions from section – A and one from section-B.

	SECTION -A	
QNo.1	What do you mean linear prediction? Discuss forward and backward linear prediction leading to normal equations? Name the algorithms to solve these normal equations	7
QNo.2	a) Discuss widrow LMS algorithms for adaptive equalization. What are its advantages and what are its limitations? b) Discuss the architecture of typical floating point DSP processor . What type memory architecture is followed by DSP processor.	4 3
QNo.3	(a) Determine 8-point DFT V(k) of the length – 8 real sequence v(n) given below : V[n] = { 1 2 2 2 0 1 1 1} ↑ (b) Determine the unit step response of the system described by the difference equation y(n) = 0.9y(n-1) – 0.81 y (n-2) + x(n) under the following conditions (a) y(-1) = y (-2) = 0 (b) y(-1) = y (-2) = 1	4 3
QNo.4	(a) Find the two dimensional convolution  (b) Discuss the spectrum for periodic and a periodic continuous time and discrete-time signals. Write the corresponding analysis and synthesis equations also.	3 4
Qno.5	Implement a two-stage decimator for the following specifications. Sampling rate of the input signal = 20,000 Hz. M = 100 Passband = 0 to 40 Hz Transition band = 40 to 50 Hz Passband ripple = 0.01 Stop band ripple = 0.002	7
	SECTION – B	
QNo.6	Develop DIT FFT algorithms for decomposing the DFT for N = 6 and draw the flow diagrams for (a) N = 2.3 and (b) N = 3.2 (c) Also, using the FFT algorithm developed in part (b) ; evaluate the DFT values for x(n) = {1,2,3,4,5,6}.	8
Qno.7	a. Compare the performance of different types of window functions. In what way Kaiser window is superior to other window functions. b. Design a digital chebyshev filter to satisfy the constraints $0.707 \le \lvert H(e^{jw}) \rvert \le 1, \quad 0 \le \omega \le 0.2\pi$ $\lvert H(e^{jw}) \rvert \le 0.1, \quad 0.5\pi \le \omega \le \pi$	4 4