



Code No. : 5147/M

**FACULTY OF ENGINEERING**  
**B.E. 3/4 (ECE) II Semester (Main) Examination, May/June 2012**  
**DIGITAL SIGNAL PROCESSING**

Time: 3 Hours]

[Max. Marks : 75

**Note : Answer all questions from Part A, Answer any five questions from Part B.**

**PART – A**

**(25 Marks)**

1. Differentiate between energy signal and power signal. 3
2. Determine Inverse DTFT of  $X(e^{j\omega}) = \delta(\omega)$ ,  $-\pi < \omega < \pi$ . 2
3. Explain any two properties of DFT. 3
4. What does one mean by In-place computation ? 2
5. Give the mathematical expressions for Hamming and Bartlett Windows. 2
6. Discuss advantages and disadvantages of FIR over IIR filter. 3
7. Explain Warping effect and discuss how can it be eliminated. 3
8. Compare Direct form-I and Direct form-II realisation structures. 2
9. Explain circular addressing mode for a DSP processor. 3
10. What purpose does MAC unit serve for DSP applications ? 2

**PART – B**

**(50 Marks)**

11. Find the system response described by the following difference equation  
$$y(n) - \frac{7}{12}y(n-1) + \frac{1}{12}y(n-2) = 2 \text{ for } n \geq 0. \text{ The initial conditions are } y(-1) = 2$$
  
and  $y(-2) = 3$ . 10
12. Determine the output of a linear FIR filter whose impulse response is  $h(n) = \{1, 2, 3\}$  and the input signal is  $x(n) = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$  using Overlap-save method. 10



13. Determine 8-point DFT of the sequence  $x(n) = \{3, -1, 4, 5, 9, -8, 7, 10\}$  using DIF FFT algorithm. 10

14. Design an ideal HPF whose desired frequency response is

$$H_d(e^{j\omega}) = \begin{cases} 1, & \pi \geq |\omega| \geq \frac{\pi}{3} \\ 0, & \text{otherwise} \end{cases}$$

using Bartlett Window for  $N = 9$ . 10

15. Design a digital Chebyshev Type – I BPF with the following specifications :

$$H(e^{j\omega}) = \begin{cases} -3 \text{ dB}, & 0.55\pi \leq \omega \leq 0.65\pi \\ -15 \text{ dB}, & 0 \leq \omega \leq 0.1\pi \text{ and } 0.95\pi \leq \omega \leq \pi \end{cases}$$

Using bilinear Transformation. 10

16. Explain various CPU components of TMS 320 C 54 xx processor with the help of a neat block diagram. 10

17. Write short notes on :

a) Sampling of analog signals. 3

b) RISC Vs CISC CPU. 4

c) Advantages of FFT algorithm. 3