

FACULTY OF ENGINEERING

B.E. (III/IV Year) (ECE) II Semester (Main) Examination, June 2010

DIGITAL SIGNAL PROCESSING

Time : 3 Hours]

[Max. Marks : 75

Answer **all** questions from Part A.
Answer any **five** questions from Part B.

Part A - (Marks : 25)

1. Obtain condition for causality of a system and give an example for a causal system. 3
2. Check the stability of the system whose impulse response is $h(n) = \left(\frac{1}{2}\right)^n u(n)$. 2
3. Find DFT of the sequence $x(n) = [-1 \ 2 \ 0 \ 1]$. 3
4. Write the properties of twiddle factor. 2
5. Using impulse invariance method transform $H(s) = \frac{2}{(s+1)(s+2)}$ into $H(z)$. Assume $T = 1$ sec. 3
6. Compare Butterworth and Chebyshev filters. 2
7. Discuss Gibb's phenomenon. 3
8. State the differences between DIT FFT and DIF FFT. 2
9. What are the various addressing modes in TMS 320C 54XX processors. 3
10. Briefly discuss the operation of CSSU in TMS processor. 2

Part B - (Marks : 5 × 10 = 50)

11. Sketch the magnitude and phase response of the system whose impulse response is given by $h(n) = \frac{1}{2}\delta(n) + \delta(n-1) + \frac{1}{2}\delta(n-2)$. 10

12. Find 4-point DFT and 8-point DFT of the sequence $x(n) = [1 \ 1 \ 1]$ plot magnitudes and phases of DFT and comment on result.
13. (a) Find DFT of the sequence $x[n] = [0 \ 1 \ 2 \ 3]$ using DIT FFT. 5
(b) Discuss about Bit reversal and in place computation. 5
14. Using the bilinear transform, design a HPF, monotonic in pass band with cut-off frequency 1000 Hz and 10 dB down at 350 Hz, with sampling frequency of 5000 Hz. 10
15. (a) Compare FIR and IIR filters. 3
(b) Design an ideal differentiator with frequency response $H(e^{j\omega}) = j\omega \quad -\pi \leq \omega \leq \pi$ using rectangular window for $N = 8$. 7
16. (a) Draw the architecture of TMS 320C 54XX Processor. 5
(b) Compare RISC and CISC CPU. 5
17. Write short notes on any **three** of the following : 10
(a) Limit cycle oscillations
(b) Finite word length effects
(c) Zero padding
(d) Warping effect.