

ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : MAY / JUNE 2010

REGULATIONS : 2007

SIXTH SEMESTER : COMPUTER SCIENCE & ENGG.

070230051 - DIGITAL SIGNAL PROCESSING

TIME : 3 Hours

Max.Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Show whether the system, $y(n) = n x(n)$ is (a) Linear (b) Time Varying
2. Draw a discrete sampled signal.
3. Determine the Z transform for the analog input signal $x(t) = e^{-at}$ applied to digital filter.
4. What are energy and power signal?
5. Write any four properties of DFT.
6. Find the N point DFT for $x(n) = a^n$ for $0 < a < 1$.
7. Define Gibb's phenomenon
8. Write the relation between Z transform and Fourier transform.
9. Mention the advantages of FIR filters?
10. Use the backward difference for the derivative and convert the analog filter with system function. $H(s) = 1/s^2 + 16$
11. Compare IIR and FIR filters.
12. Define Hilbert transformer?
13. List the advantages of DSP?
14. What is VLIW architecture?
15. Compare fixed point and floating point digital signal processors
16. What are the addressing modes of TMS320C50.
17. Determine the DTFT of the sequence $x(n) = \{1, -1, 1, -1\}$.
18. Write the biomedical applications of DSP.

19. How many bits are used in floating point DSP?
20. What are the factors that influence a selection of DSP processor?

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. a Find the inverse Z transform of $X(Z) = \frac{Z}{3Z^2 - 4Z + 1}$ 6
- b Convolve the following sequences , $x(n) = \{1, 3, 1, 3\}$ and $h(n) = \{1, 2, 1\}$ 6
22. a Explain the different types of correlation. 6
- b Compute the FFT sequence $x(n) = n+1$ where $N=8$ using DIT algorithm. 6
23. a Design a low pass FIR filter that approximates the following frequency response , $H(f) = \{1 ; 0 \leq f \leq 1000 \text{ Hz}\}$ $\{0 ; \text{elsewhere in the range } 0 \leq f \leq f_s/2\}$ 8
- b Design the coefficients of FIR- LPF whose cut off frequency $f_c = 2f_s/11$ 4 where f_s is the sampling frequency. $H(k) = \{1 \text{ for } K = 1, 2, \text{ and } 9, 10\}$ $\{0 \text{ for } 3 \leq K \leq 8.\}$
24. a Explain briefly : 8
 - i) Harvard architecture
 - ii) Pipelining

24. b $H(z) = 1 / \{(1-0.35 Z^{-1}) (1-0.62 Z^{-1})\}$, realize this using cascade form. 4
25. a Explain the application of DSP as Fetal ECG monitoring. 6
- b What are the different addressing modes supported by C5X processor? Explain any four of them with an example. 6
26. a Name the different types of superscalar architectures. 4
- b Describe the VLIW architecture and its features for DS processors. 8
27. a Find the DFT of sequence $x(n) = a^n$ for $a|a| < 1$, $b)a=1$ where $n=0,1,\dots,N-1$ 6
- b Design a band pass FIR filters that approximates the following frequency response
 $H(f) = \{1 ; 160 \leq f \leq 200 \text{ Hz}$
 $= \{0 ; \text{elsewhere in the range } 0 \leq f \leq f_s/2$ 6
28. a Describe the application of DSP in set Top Box for Digital TV reception. 6
- b Discuss the DSP based closed loop controlled Anaesthesia. 6

*****THE END*****