

Code No: 1PA313

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

DIGITAL COMMUNICATION TECHNIQUES

(Digital Electronics and Communications Systems)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) Explain Bayes theorem with an example.
b) Write about the probability density functions.
2. a) Consider three waveforms $f_n(t)$ as

$$f_1(t) = \begin{cases} 0.5 & \text{for } 0 \leq t \leq 2 \\ -0.5 & \text{for } 2 \leq t \leq 4 \\ 0 & \text{otherwise} \end{cases}$$

$$f_2(t) = \begin{cases} 0.5 & \text{for } 0 \leq t \leq 4 \\ 0 & \text{otherwise} \end{cases}$$

$$f_3(t) = \begin{cases} 0.5 & \text{for } 0 \leq t \leq 1 \text{ \& } 2 \leq t \leq 3 \\ -0.5 & \text{for } 1 \leq t \leq 2 \text{ \& } 3 \leq t \leq 4 \\ 0 & \text{otherwise} \end{cases}$$
 Show that the waveforms are orthonormal.
b) Explain about the orthogonal vector space.
3. a) Compare PAM, PSK & QAM.
b) Explain with a neat sketch about the phase tree, state trellis and state diagram for binary CPFSK.
4. a) Explain about the optimal detection for the vector AWGN channel.
b) Discuss about the Matched filter Receiver with N correlators.
5. Write short notes on
 - i) Rayleigh fading
 - ii) Nakagami fading
 - iii) Diversity Techniques.
6. a) Discuss the structure of generalized RAKE demodulator.
b) Explain frequency selective slowly fading channels.
7. a) With a neat block diagram explain the Predictive Decision-Feedback Equalizer.
b) Explain the effect of distortion and non distortion in Band Limited channels.
8. a) What is OFDM? Explain about modulation and demodulation in OFDM.
b) Explain Filter Bank implementation of OFDM Receiver.

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Code No: IPC314

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

HARDWARE DESCRIPTION LANGUAGES

(Common to DECS and VLSISD)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) In verilog, explain behavioral descriptions?
b) Explain data types and data objects in verilog HDL with suitable examples.
2. a) What is a net delay and propagation delay explain in verilog HDL?
b) Explain the user defined primitives.
3. Explain the following with example.
 - a) Delay-blocked assignment.
 - b) Intra assignment.
4. a) What is technology-independent design? Explain?
b) Explain hierarchical structures and design partitions.
5. a) Explain the synthesis of user defined tasks and functions.
b) Explain the restrictions on synthesis of 'X' and 'Z' with suitable examples?
6. a) Explain the switch level models of static CMOS circuits.
b) Write about CMOS transmission Gates.
7. a) Explain VHDL subprograms with examples.
b) Explain VHDL operators with examples.
8. Write notes on
 - a) Process statement.
 - b) Report statement.
 - c) Assertion statement.

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M.Tech. I Semester Regular Examinations, April/May 2012

WIRELESS COMMUNICATIONS
(Digital Electronics & Communications Systems)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) List five ways of increasing the capacity of cellular system.
b) Write a short note on Bluetooth and Personal Area Networks.
2. a) Explain in detail about Free space propagation model to predict the received signal strength
b) List the types of small scale fading.
3. a) List the space diversity methods and explain any two of them.
b) Write a short note on selective diversity combining.
4. a) Explain in detail FDMA multiple access technique.
b) Describe cell splitting and sectorization.
5. a) Briefly explain Frequency Hopping system.
b) Write a short note on Anti Jamming.
6. a) List the types of spread spectrum multiple access techniques and explain any one of them.
b) Discuss about Hard and soft hand off strategies.
7. a) Explain the Flat fading system.
b) Discuss about the capacity of MIMO channels.
8. a) Briefly explain IS 95 CDMA -3G systems.
b) Write the specification and standard of UMTS & CDMA.

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Code No: 1PA411**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)****M.Tech. I Semester Regular Examinations, April/May 2012****ADVANCED COMPUTER ARCHITECTURE****(Common to DECS & ES)****(For students admitted in 2011-12)****Time: 3 hours****Max Marks: 60**

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) Discuss in detail about processor performance?
b) Write the different classes of computers.
2. a) Explain about data hazards?
b) Write role of computers.
3. Write the advance technique for instruction delivery and speculation.
4. a) Explain dynamic scheduling.
b) What are hardware box speculations?
5. Discuss in detail about virtual memory and its protections.
6. a) Explain disturbed shared memory.
b) Write a short note on synchronization and multithreading.
7. a) Discuss the Bench marking in designing in storage devices..
b) Explain different types of Buses.
8. a) Discuss the practical issues in interconnecting N/W's
b) Explain designing a Cluster.

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

DIGITAL SYSTEM DESIGN
(Digital Electronics and Communications Systems)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

Answer any FIVE of the following
All questions carry equal marks

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1. a) With an example, explain the use of ASM charts in the design of digital circuits. 6M
b) Discuss about state reduction and state minimization procedures with appropriate examples. 6M
2. a) With an example discuss about the design of a sequential circuit using a PLA. 6M
b) List out the differences between CPLD and an FPGA. 6M
3. a) With an example, explain how the faults are detected using Boolean difference method. 6M
b) Describe the procedural steps involved in Kohavi Algorithm. 6M
4. a) Discuss about D-Algorithm with an appropriate example. 6M
b) With an example, describe the transition count testing method. 6M
5. a) Discuss in detail about state identification experiments. 6M
b) Explain in detail about machine identification experiments. 6M
6. a) Describe the steps involved in PLA folding. 4M
b) For the PLA P_1 , the SSR table given below, obtain the maximum folding using SCF method. 8M

SSRs of PLA P_1

Column	SSRs
A	14
B	1,3
C	3,4,5,9,12
D	1,2,5,10,11,15
E	2,4,7,8,10,15,16
F	1,2,15
G	6,8,11,13
H	3,5,6,14,15
I	7,10,12,13,16
J	4,9,16

7. a) Discuss about the cross point faults that occur in PLAs. 6M
b) With an example discuss about testable PLA design. 6M
8. Write short notes on the following 4x3=12M
 - a) Hazards
 - b) Races
 - c) Cycles
 - d) Flow table.

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Code No: IPA312

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)

M.Tech. I Semester Regular Examinations, April/May 2012

ADVANCED DIGITAL SIGNAL PROCESSING

(Digital Electronics and Communications Systems)

(For students admitted in 2011-12)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks*

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1. a) Using basic building blocks, sketch the block diagram representation of the discrete-time system described by the input-output relation.

$$Y(n) = \frac{1}{4}Y(n-1) + \frac{1}{2}x(n) + \frac{1}{2}x(n-1)$$

Where $x(n)$ is the input and $Y(n)$ is the output of the system.

- b) Show that the Fourier transform of

$$x_1(n) = \begin{cases} 1 & 0 \leq n \leq m \\ 0 & \text{otherwise} \end{cases}$$

$$\text{is } x_1(\omega) = \frac{1 - e^{-j\omega(m+1)}}{1 - e^{-j\omega}}$$

- c) Consider an LTI system with impulse response $h(n) = \left(\frac{1}{2}\right)^n u(n)$. Determine and sketch the magnitude and phase response of the system.
2. a) Consider a length-10 FIR transfer function given by $H(Z) = h[0] + h[1]Z^{-1} + h[2]Z^{-2} + h[3]Z^{-3} + h[4]Z^{-4} + h[5]Z^{-5} + h[6]Z^{-6} + h[7]Z^{-7} + h[8]Z^{-8} + h[9]Z^{-9}$. Develop a four-branch poly phase realization of $H(Z)$ and determine the expression for the poly phase transfer functions $E_0(Z)$, $E_1(Z)$, $E_2(Z)$ and $E_3(Z)$.
- b) Compare the computational complexity of various realizations of an IIR filter of order N .
3. a) Write a split-Radix FFT algorithm, and explain how it is used to determine DFT?
- b) Draw the block diagram for the implementation of the chirp-z transform for computing the DFT and explain function of each block.

4. a) Design a two-stage interpolators to meet the following specifications.

$$I = 20$$

$$\text{Input sampling rate} = 10,000 \text{ Hz}$$

$$\text{Pass band} = 0 \leq F \leq 90$$

$$\text{Transition band} \quad 90 \leq F \leq 100.$$

$$\text{Ripple} : \delta_1 = 10^{-2}, \delta_2 = 10^{-3}$$

- b) Draw the block diagram for general scheme for increasing the sampling rate by L/m and explain.

5. a) An AR(2) process is described by the difference equation $x(n) = 0.81x(n-2) + \omega(n)$. Where $\omega(n)$ is white noise process with variance $\sigma\omega^2$. Determine the parameters of the MA(4).

- b) Explain how power spectrum can be estimated using Burg method?

6. a) Define a Gabor transform? Derive any three properties of it.

- b) What is MRA? How the wavelet function is related to scaling function of MRA?

7. a) What are required conditions for a function to be wavelet? Derive the Inverse CWT.

- b) Write short notes on wavelet packets.

8. a) Explain the role of DSP in musical sound processing system.

- b) Explain how a spectrum of sinusoidal signal can be determined using DSP?
