

Code : 1PC314

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

M.Tech. I Semester Regular Examinations, February 2014

Hardware Description Languages
(Common to DECS & VLSISD)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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- 1. a) Write about different Descriptive Styles in HDL. 5M
- b) Explain about Structural (Top-Down) Design Methodology 7M
- 2. a) Give the Verilog Models for Gate Propagation Delay (Inertial Delay) and Net Delay (Transport Delay). 6M
- b) Write some of the user defined primitives required to model both combinational and sequential circuit. 6M
- 3. a) Explain how to describe the Behavioral Model of Finite State Machines. 6M
- b) Write about Intra Assignment Delay and inter assignment delay. Explain with suitable example. 6M
- 4. a) What is the difference between simulation and synthesis? What are the benefits of synthesis? 6M
- b) What are the various styles for synthesizing Combinational Logic circuits? 6M
- 5. a) Write about Timings Controls in Synthesis. 6M
- b) Define task and function. Write about Synthesis of User-Defined Tasks and Synthesis of User-Defined Functions. 6M
- 6. a) What is the difference between static and dynamic CMOS circuits? Write the Verilog code for switch level CMOS NAND gate. 7M
- b) What are the various signal Strength levels. Explain how to reduce signal strength by Primitives. 5M
- 7. a) Draw VHDL Top-Down Design methodology and explain. 8M
- b) What are the various operators used in VHDL. 4M
- 8. a) Write some of the data types used in Verilog. 4M
- b) Write the syntaxes for the following Sequential statements: Wait, if, case, loop, next, exit, return, null. 8M

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WIRELESS COMMUNICATIONS

(DECS)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) Explain in detail the elements of wireless communication system.
b) What are the differences between first and second generation cellular systems?
2. a) Draw the two-Ray ground reflection model and derive the expression for electric field at the receiver at a distance 'd' from the transmitter.
b) What is fading and list its major causes.
3. a) What is meant by diversity reception and explain frequency diversity.
b) Discuss the performance analysis of Rayleigh fading channels.
4. a) Explain in detail TDMA multiple access technique.
b) Describe co-channel interference analysis.
5. a) Explain the fundamental concepts of spread-spectrum systems.
b) Write short note on Pseudo Random Sequence.
6. a) Explain in detail RAKE receiver.
b) Describe Reverse link power control.
7. a) Describe frequency selective fading.
b) What is meant by parallel decomposition of MIMO channels?
8. a) Draw the GSM system architecture and explain.
b) Write the GSM air interface specifications.

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ADVANCED DIGITAL SIGNAL PROCESSING

(DECS)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following**All questions carry equal marks (12 Marks each)*

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1. a) How the discrete systems are classified explain them with suitable examples.
- b) Determine and sketch the Fourier transform of the signal
 $x(n) = \{1, 0, 1, 0, 1, 0, 1, 0, 1\}$
- c) A linear time-invariant system is described by the following difference equation
 $y(n) = aY(n-1) + bx(n)$ $0 < a < 1$ determine the magnitude and phase of the frequency response of the system.
2. a) Develop a one multiplier structure of a digital sine-cosine generator obtained by setting $-\beta \sin \omega_0 / \alpha = 1 + \cos \omega_0$ in equation of the following

$$\begin{bmatrix} S_1[n+1] \\ S_2[n+1] \end{bmatrix} = \begin{bmatrix} \cos \omega_0 & \frac{\alpha}{\beta} \sin \omega_0 \\ -\frac{\beta}{\alpha} \sin \omega_0 & \cos \omega_0 \end{bmatrix} \begin{bmatrix} S_1[n] \\ S_2[n] \end{bmatrix}$$

Show the final structure.

- b) What are the various realizations of FIR filter of order N and compare their computational complexity?
3. a) Write a 'Goertzel Algorithm' and explain how it is used to determine DFT?
- b) Draw the flow graph for the decimation in frequency SRFFT algorithm for N=8. Compare it with Radix-2FFT.
4. a) Design a two state decimator for the following specifications.
 $D=100$
 Passband : $0 \leq F \leq 50$
 Transition band : $50 \leq F \leq 55$
 Input sampling rate : 10,000 Hz
 Ripple : $\delta_1 = 10^{-1}, \delta_2 = 10^{-3}$
- b) Design a sample rate converter that reduces the sampling rate by a factor 2/5.

5. a) Consider the linear system described by the difference equation
$$Y(n) = 0.8Y(n-1) + x(n) + x(n-1)$$
 where $x(n)$ is a wide - sense stationary random process with zero mean and auto correlation $r_{XX}(m) = \left(\frac{1}{2}\right)^{|m|}$
Determine the power density spectrum of the output $Y(n)$
- b) Explain how power spectrum of signal can be estimated in Yule-Waller method?
6. a) Define STFT? What are the limitations of it and how these are overcome in Wavelet transform?
- b) Define the following wavelets
- Haar wavelet
 - Daubechies wavelet.
7. a) Draw a two level filter Bank structure for DWT analysis and synthesis? Why decimator and interpolator are needed in this?
- b) Define CWT? Drive its inverse? Give some examples for wavelet functions.
8. a) Explain how to determine the spectrum of Non-stationary signals?
- b) Write a short notes about over sampling A/D converter.

Code : 1PA313

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M.Tech. I Semester Regular Examinations, February 2014

DIGITAL COMMUNICATION TECHNIQUES

(DECS)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) What is Random variable? Explain the mean and variance of a Random variable.
b) Explain in detail about the classification of Random Processes.
2. a) Show that any two complex exponential functions are orthogonal.
b) Explain Gram-Schmidt orthogonality of signals with an example and determine the vector representation of the signals.
3. a) Explain about 8-QAM Transmitter and Receiver with an example.
b) Write short notes on Signaling schemes with memory.
4. a) Write about the optimal detection for a general vector channel.
b) Explain about the implementation of optimal receiver for AWGN channels.
5. a) Explain about the Nakagami fading.
b) Determine the performance of M-ary orthogonal signals transmitted over Rayleigh fading channel.
6. a) Discuss about the performance of RAKE demodulator.
b) Explain about Tapped Delay Line channel model.
7. a) Write short notes on Linear Equalization.
b) Discuss the Nyquist pulse shaping criteria for designing band limited signals.
8. a) What is OFDM? Explain about modulation and demodulation in OFDM.
b) Explain FFT algorithm implementation of OFDM systems.

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DIGITAL SYSTEM DESIGN

(DECS)

Time: 3 hours

Max Marks: 60

*Answer any FIVE of the following
All questions carry equal marks (12 Marks each)*

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1. a) Name the basic building blocks of an ASM chart? Explain about these blocks. 8M
b) Explain about different methods for state assignment. Give an example. 4M
2. a) What are the procedural steps involved in the design of an iterative circuit. 6M
b) Bring out the characteristics that describe a CPLD or FPGA. 6M
3. a) With an example, explain the procedure involved in the path sensitization technique. 6M
b) Give the classification of faults that may occur in digital circuits with examples. 6M
4. a) Explain the procedure involved in D-Algorithm with an example. 6M
b) With an example explain about the transition count testing method. 6M
5. a) With appropriate examples, explain briefly about the state identification experiments. 6M
b) Clearly, distinguish between Mealy and Moore machines with examples. 6M
6. a) Distinguish between maximum folding and optimum folding. 4M
b) With an example explain about minimization and folding of a PLA using SCF method. 8M
7. a) Describe various faults that may occur in PLAs 6M
b) Discuss briefly about testable PLA design. 6M
8. a) Explain briefly about the following terms.
 - i) Flow table
 - ii) State Reduction.
 - iii) Minimum closed covers.
 - iv) Mode model. 4M
- b) With relevant examples distinguish Races, Cycles and Hazards. 8M

Code : 1PB311**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET
(AUTONOMOUS)****M.Tech. I Semester Regular Examinations, February 2014****EMBEDDED SYSTEM CONCEPTS***(Common to DECS, ES and VLSISD)***Time: 3 hours****Max Marks: 60***Answer any FIVE of the following**All questions carry equal marks (12 Marks each)**** * * * ***

1. a) Draw the functional block diagram of a basic embedded system and explain the functions of each block.
- b) Write note on classification of embedded systems?
2. Explain how processor selection and memory selection are done while designing embedded system?
3. Explain in detail about parallel communication networks using ISA, PCI and PCI-X buses.
4. Explain the various techniques used in embedded system to implement inter process communication?
5. What is meant by requirement analysis? Explain in detail how system analysis and Architecture design is done?
6. Describe embedded system design and co-design issues in the system development processes?
7. What are the features of simulator? What is its role in embedded system design? What are its possible inabilities?
8. Describe a design example for automatic chocolate vending machine?
