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R-11 / R13

Code: 1G371

IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Optical Communication

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. What are the three common topologies used for fiber optical network? Give the schematic of any one network? 14M

2. a) Describe the single mode fibers in detail 8M
 b) Given core refractive index of 1.48 and relative refractive index difference 1.5% for a single mode fiber operating at $0.85\mu\text{m}$, Find
 i) the maximum core diameter
 ii) new maximum core diameter if relative refractive index difference is reduced by a factor of 10. 6M

3. Explain the working of a hetero structure LED and also define internal efficiency of a LED and deduce the same expression for the same? 14M

4. What do you understand by optical wave confinement and current confinement in LASER diode? Explain with suitable structure. 14M

5. What do you mean by pulse broadening? Explain its effect on information carrying capacity of a fiber. 14M

6. Discuss basic elements in Analog links with block diagram? 14M

7. a) Brief out Fiber to Fiber Joints concept with required diagrams 7M
 b) Give a comparative analysis of various Photodiodes 7M

8. a) Explain the operational principles of WDM 7M
 b) Write short notes on Tunable light Sources 7M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Digital Signal Processing

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions.

All Questions carry equal marks (14 Marks each)

1. a) Determine the response $y(n)$, $n \geq 0$ of the system described by the linear constant coefficient difference equation $y(n) - 4y(n-1) + 4y(n-2) = x(n) - x(n-1)$ where $x(n) = (-1)^n u(n)$ and initial conditions are $y(-1) = y(-2) = 1$. 10M
 b) Find whether the system is causal or non-causal for the following
 (i) $y(n) = x(n) + x(n-1)$ 4M
 (ii) $y(n) = x(n^2)$
2. Determine the 8-point DFT for the sequence $x(n) = \{1, 1, 1, 1, 1, 0, 0, 0\}$. 14M
3. a) Calculate the number of complex multiplications required for direct DFT and FFT computation for $N=8$. 4M
 b) Compute the 8-point DFT for the sequence $x(n) = \{1, 0, 0, 0, 0, 0, 0, 0\}$ with a neat butterfly diagram using DIT-FFT algorithm. 10M
4. Realize the system with the following difference equation in direct form-I, direct form-II, Cascade and Parallel :
 $y(n) = -3/8y(n-1) + 3/32y(n-2) + 1/64y(n-3) + x(n) + 3x(n-1) + 2x(n-2)$. 14M
5. Design a Chebyshev filter with a pass band attenuation of $p=3\text{db}$ at a frequency $f_p=1\text{Khz}$, and a stop band attenuation of $s=16\text{db}$ at a stopband frequency $f_s=2\text{Khz}$. 14M
6. a) What are the desirable characteristics of the window for FIR filter design. 4M
 b) Design an ideal HPF (high pass filter) with a frequency response
 $H_d(w) = 0, -\pi/2 \leq w \leq \pi/2$
 $= 1, \pi/2 \leq w \leq 3\pi/2$ using Hanning window for $N=7$. 10M
7. a) Sketch the following signals $x(n) = n+4, n \geq 0$
 $= 0, \text{ otherwise}$
 Also sketch their decimated & interpolated version of the above signal with a factor of '3'. 7M
 b) Explain applications of multirate signal processing. 7M
8. a) Discuss about spectral analysis of sinusoidal signals. 7M
 b) Explain about digital music synthesis. 7M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Computer Networks

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All questions carry equal marks (**14 Marks** each)

1. a) Differentiate between guided and unguided media for physical communication among the devices. Give suitable examples. 7M
b) What is the role of MODEMs in establishing communication network? Enumerate the characteristics of ADSL MODEMs. 7M
2. a) Describe the principles of Go-Back-n ARQ protocol. 10M
b) A sliding window protocol uses a window size of 127. Determine the number of bits needed to define the sequence number. What will be your answer if the window size is 107? 4M
3. a) Explain the fields of IEEE 802.3 MAC frame format. 7M
b) What is 'collision'? Explain the method of avoiding collisions by back off algorithm. 7M
4. a) State the differences between the following communication devices: switch and router. 4M
b) Demonstrate the use of Dijkstra algorithm in constructing the routing table in Link State Routing protocol. 10M
5. a) Discuss the need for fragmentation of packets in the network layer. 7M
b) With a neat sketch of packet structure, explain the fields of IPv4 packet format. 7M
6. a) What are the services provided by the transport layer to the application layer? List and explain the meaning of simple primitives used in transport protocols. 7M
b) Describe the relevance of "two-army problem" to releasing connections between transport layers in peer computers. 7M
7. a) Summarize the resource record types specified in DNS. 7M
b) What is MIME? Specify the MIME types and subtypes defined in RFC2045. 7M
8. a) Explain the role of P-Box and S-Box in symmetric key cryptography with suitable example. 7M
b) List the properties of Message Digest. Compare and contrast between the MD5 and SHA-1 functions. 7M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Digital Design Through Verilog HDL

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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| 1. | a) Explain about different data types in Verilog HDL. | 5M |
| | b) List out verilog keywords and operators. | 5M |
| | c) Define functional verification of verilog HDL. | 4M |
| 2. | a) Write the Verilog for 8X1 Multiplexer in behavioural model | 7M |
| | b) Realize T FF using JK FF and write Verilog code. | 7M |
| 3. | a) Write the Verilog code for 3X8 Decoder in behavioural model | 7M |
| | b) Write the Verilog code for 1X8 Demultiplexer in behavioural model. | 7M |
| 4. | a) Write about different types of system tasks and explain with example. | 7M |
| | b) Design Full adder using Dataflow model. | 7M |
| 5. | a) Explain about Moore and Mealy differences with examples. | 6M |
| | b) Write Verilog HDL for CMOS NAND gate using switch level modelling. | 8M |
| 6. | a) What is SM chart? Explain the basic blocks with example. | 7M |
| | b) Explain about UDPs. | 7M |
| 7. | a) Explain about Altera FLEX 10K series CPLD. | 7M |
| | b) Explain about one hot state assignment. | 7M |
| 8. | a) Explain about UART design Verilog model. | 7M |
| | b) Explain about interfacing of memory in microprocessor bus. | 7M |

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Embedded Systems

(Electronics & Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All questions carry equal marks (**14Marks** each)

1. a) Broadly explain the categories and application areas of embedded system. 7M
 b) Considering washing machine example explain the power, features and comfort by using embedded systems. 7M

2. a) Explain the purpose of CPU, Memory, Watchdog timer, communication interface with regard to embedded system architecture. 9M
 b) Explain the process of generating executable image in embedded system. 5M

3. a) Explain the memory organization of 8051. 8M
 b) Write a program to perform multiplication of two 8 bit numbers using repetitive addition. 6M

4. a) What is the need of timers in 8051? Write the steps to program Timers in mode 1 of operation and explain with an example. 7M
 b) Explain how baud rate is calculated for serial data transfer in mode 1 7M

5. Write a program for 8051 microcontroller to display on LCD, "WELCOME" when switch is pressed and "THANK YOU" when the switch is not pressed. Draw the neat interface diagram. 14M

6. a) Write a brief note on CAN bus architecture 7M
 b) What is the need of communication interface? Discuss the differences between RS232 and RS 422. 7M

7. a) Write an overview on memory management in general purpose kernel and real time kernel. 8M
 b) Explain various factors to be considered for the selection of scheduling criteria 6M

8. a) Explain the goals of real time operating system (RTOS) 8M
 b) Differentiate a desktop computer operating system like DOS & Real time Operating system (RTOS) of an embedded system. 6M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Nano Electronics

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (14 Marks each)

1. a) What is Microscopy? List the different categories of Electron Microscopies? 4M
b) Explain the working of scanning microscopy with a neat sketch? 10M
2. a) Define carbon nanotube? What are the types of carbon nanotubes, & highlight the properties of carbon nano tubes? 7M
b) List the methods for producing carbon nano tubes and explain any one of the method with a neat sketch? 7M
3. Define the following:
a. Quantum Wells 3M
b. Quantum Wires 4M
c. Quantum dots 3M
d. Nano particles 4M
4. Explain briefly about Quantum Electronic Devices (QED)? 14M
5. a) What is a Tunneling Diode & RTDs? Enlist and explain the applications of Tunneling? 7M
b) Explain three terminal RTDs technology? 7M
6. a) What is Coulomb Blockade? Explain Coulomb Blockade in Quantum dot circuit? 10M
b) Compare and contrast FET & SET Circuit Design? 4M
7. Write & explain the various physical limits of integrated electronics? 14M
8. Explain the properties of complex integrated systems Design & its interfaces in detail? 14M

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Code: 1G47D

IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Object Oriented Programming

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (14 Marks each)

1. a) Write short notes on the following:
 - i) Platform independence in Java
 - ii) Operators in Java8M
- b) Describe in detail the notion of class with an example. 6M
2. a) Write a Java program to find determinant of a matrix 6M
- b) What is a constructor? What is the type of constructor? How many types of constructors are present in Java. Write a Java program illustrating the use of constructors. 8M
3. a) Describe in detail the different types of inheritance. 8M
- b) In the context of inheritance, describe and show with example the use of 'super' keyword. 6M
4. a) What is package? How do you create a package? Explain about the access protection in packages. 7M
- b) Define an interface for a stack named Stack Interface with push, pop and top methods and write a Stack class that implements that interface. 7M
5. a) Explain Exception Handling in Java with an example demonstrating try, catch and passing on exceptions through stack unwinding. 7M
- b) Explain the purpose of multithreading. Explain how to achieve synchronization in Java with an example. 7M
6. a) Write short notes on:
 - i) Limitations of AWT
 - ii) Border Layout8M
- b) Write a simple program that illustrates the use of Listeners for implementing delegation event model. 6M
7. a) What is an applet? Explain types of applets. Write a program to create an applet by passing parameters to applets. 8M
- b) What are Swings? Explain the limitations of AWT 6M
8. a) What is a socket? Explain the methods in ServerSocket class with a suitable example. 8M
- b) Write a simple client server program in Java. 6M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov 2016

Radar Engineering

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (14 Marks each)

1. a) Derive the basic Radar equation. 7M
b) What are different Radar waveforms., mention its purpose 4M
c) Discuss about the frequencies used for radar. 3M
2. a) Derive an expression for the radar range in terms of the noise figure of the receiver, and integration efficiency. 9M
b) Explain how the effect of blind speeds reduced by operating at more than one PRF. 5M
3. a) Derive an expression for unambiguous range of a two frequency CW Radar. 8M
b) An FMCW Radar operates at a frequency of 9.25 GHz. A symmetrical triangular modulating waveform is used, the magnitude of the slope being 800 MHz/sec. The return from a moving target produces a beat frequency of 3.85 KHz over the positive slope and 3.5KHz over the negative slope of the FM. Determine
(i) Target Range
(ii) The Range rate.
(iii) Whether the target is moving toward or away from the Radar. 6M
4. a) With a neat block diagram, explain the principle of working of a CW radar with IF receiver. 7M
b) What is the importance of providing isolation between transmitter and receiver? Explain clearly the different method of providing isolation in the case of CW Radar. 7M
5. a) A simple MTI delay line canceler is an example of time domain filter. Why? Explain. 7M
b) Draw the block diagram of Range-Rated Doppler Filters and explain. 7M
6. a) What are the various methods of acquisition before tracking a target with a radar? Explain in detail. 9M
b) Explain the scanning patterns employed with pencil beam antenna. 5M
7. a) Explain the characteristics of a matched filter receiver, with necessary equations. 7M
b) Discuss the relations between the matched filter characteristics and correlation function. 7M
8. a) List out the different types of displays used for radar applications, and their characteristics. 7M
b) Write notes on feed illumination angle, feed support, and f/d ratio with reference to radar antennas. 7M
