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06EC71

# Seventh Semester B.E. Degree Examination, June/July 2011
## Computer Communication Networks

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting at least TWO questions from each part.***



### PART – A

1 a. With a neat diagram, explain the TCP/IP reference model, giving a brief description of the protocols in each layer. **(10 Marks)**

b. Differentiate between CM and CMTS. **(04 Marks)**

c. Explain the operation of ADSL using discrete multi one modulations indicating the different channels, with a neat diagram. **(06 Marks)**

2 a. Explain byte stuffing and unstuffing and bit stuffing and unstuffing, with necessary diagrams. **(10 Marks)**

b. With a neat diagram, explain three different types of HDLC frames. **(10 Marks)**

3 a. Define random access method explain three different protocols in this category. **(10 Marks)**

b. Explain reservation, polling and token passing in controlled access method. **(10 Marks)**

4 a. What are the advantages of dividing an Ethernet LAN with a bridge? Explain with a neat diagram. **(06 Marks)**

b. Compare the data rates for standard, fast, gigabit and ten-gigabit Ethernet. Mention one example in each case. **(04 Marks)**

c. Explain DCF and PCF modes of 802.11 MAC protocol. **(10 Marks)**

### PART – B

5 a. Define repeater, hub, switch, router and gate way with necessary neat diagrams. **(10 Marks)**

b. Create a system of three LANs with four bridges. The bridges (B1 to B4) connect the LANs as follows :

i) B1 connects LAN1 and LAN2
ii) B2 connects LAN1 and LAN3
iii) B3 connects LAN2 and LAN3
iv) B4 connects LAN1, LAN2 and LAN3.

Choose B1 as the root bridge. Show the forwarding and blocking parts, after applying the spanning tree procedure. **(10 Marks)**

6 a. Distinguish between class A, class B and class C addressing. **(06 Marks)**

b. What is subnetting? Why it is required? What is the maximum number of subnets in class C networks with the following subnet mask?

i) 255.255.255.0
ii) 255.255.255.224
iii) 255.255.255.248. **(06 Marks)**

c. Explain IPV4 header format. **(08 Marks)**

7 a. With necessary diagrams, explain distance vector routing. **(10 Marks)**

b. Explain briefly forwarding techniques. Explain three different forwarding techniques. **(10 Marks)**

8 a. Explain connection establishment and connection termination in TCP. **(10 Marks)**

b. Describe DNS in the internet. **(10 Marks)**

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# Seventh Semester B.E. Degree Examination, June/July 2011

## Optical Fibre Communication

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting at least TWO questions from each part.***



### PART – A

1 a. Discuss briefly the inherent advantages of optical fibers over conventional copper systems. **(06 Marks)**

b. Describe the different types of optical fiber waveguide structures, using ray theory with neat diagrams. Explain the light propagation. **(08 Marks)**

c. Briefly discuss modified chemical vapor deposition (MCVD) process of fabrication of optical fiber, with neat diagrams. **(06 Marks)**

2 a. Describe the different types of attenuation mechanism for an optical fiber. **(08 Marks)**

b. Derive an equation for material dispersion and waveguide dispersion in an optical fiber. **(08 Marks)**

c. A 30 km long optical fiber has an attenuation of 0.4 dB/km at 1310 nm, with input decibel power level referred to 1 mW. Find out the optical power output, if 200 μW of optical power is launched into the fiber. **(04 Marks)**

3 a. With a neat diagram, explain the working of an edge-emitting double-heterojuction LED structure. **(08 Marks)**

b. Discuss the different types of noise which occur in photo detectors. **(08 Marks)**

c. An InGaAs pin-photodiode has the following parameters at a wavelength of 1300 nm.

i) Quantum efficiency = 0.90

ii) Plank's constant = $6.625 \times 10^{-34}$ J.S.

iii) Electron charge = $1.6 \times 10^{-9}$ C. (Assume velocity = $3 \times 10^{8}$ m/sec)

Assume surface leakage current negligible. Find out the primary photo detector current. **(04 Marks)**

4 a. Explain the different types of fiber splicing techniques, with neat diagrams. **(06 Marks)**

b. With the principal requirements of a good connector design, explain basic coupling mechanism used in Butt-Joint and expanded-beam connectors. **(10 Marks)**

c. A GaAs optical source with refractive index of 3.6 is coupled to a silica fiber that has a R.I. of 1.48. If the fiber end and the source are in close physical contact, find out the Fresnel reflection (R) and power loss in dB. **(04 Marks)**

### PART – B

5 a. With a neat diagram, explain the working of optical receiver. **(08 Marks)**

b. Discuss briefly, how the eye diagram is powerful measurement tool for assessing the data-handling ability in a digital transmission system. **(08 Marks)**

c. Differentiate between Heterodyne and Homodyne coherent detection schemes, with respect to probability of error function of a BER. **(04 Marks)**

6 a. Discuss the basic elements of an analog link and the major noise contributors of an analog link, with a neat diagram. **(08 Marks)**

b. With a simplex point-to-point link, explain the key system requirements which are needed in analyzing a link and how to fulfill these requirements. **(08 Marks)**

c. Explain the polarization mode dispersion penalty in power penalties of a digital link. **(04 Marks)**

7 a. With a neat diagram, explain the working of dielectric thin film filters. **(08 Marks)**

b. With basic operational principles of WDM, explain the working of typical WDM network and mention WDM standards. **(08 Marks)**

c. Explain MEMS technology, with a simple diagram. **(04 Marks)**

8 Write short notes on:

a. Optical amplifiers **(10 Marks)**

b. SONET/SDH **(10 Marks)**

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# Seventh Semester B.E. Degree Examination, June/July 2011
## DSP Algorithms & Architecture

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions selecting at least TWO questions from each part.***



### PART – A

1 a. Explain a digital signal processing system with the help of a block diagram. **(08 Marks)**

b. The signal shown in the following figure is to be sampled. Determine the minimum sampling rate without any aliasing effect. If the signal is sampled at a rate 8 kHz, determine the cut off frequency of the anti-aliasing filter. **(06 Marks)**

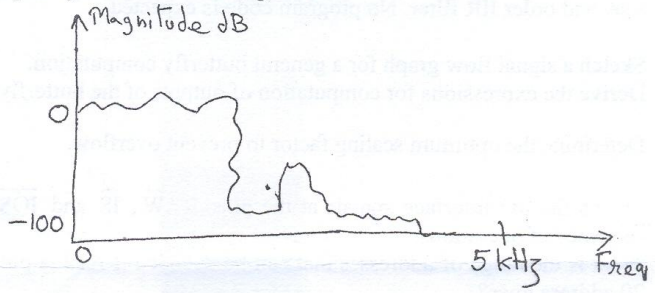


Fig. Q1 (b)

c. Explain with the help of mathematical equations, how signed numbers can be multiplied. **(06 Marks)**

2 a. Implement a 3-bit shift right, barrel shifter. Tabulate the outputs for different bit shifts. **(10 Marks)**

b. 256 unsigned numbers, 16 bit each are to be summed up in a processor. How many guard bits are needed to prevent overflow? **(03 Marks)**

c. Discuss the role of saturation logic. Explain its function with the help of a block diagram. **(07 Marks)**

3 a. Implement an 8 tap or 8 co-efficients FIR filter using a single MAC unit and other standard blocks. **(04 Marks)**

b. Discuss any three data addressing modes of a TMS320C54XX processor. Give one example for each mode. **(09 Marks)**

c. Explain sequential and other types of program control. **(07 Marks)**

4 a. Find out the contents of accumulators A, B and T register after execution of each of the following instructions:

i) MAC *AR5+,#0123h, A

ii) MPY #0123, A

Initial contents in both the cases are as follows:

| | | |
|---|---|---|
| A 010h, | AR5 | 0410h |
| 0410h 10h | T | 020h |
| 0411h 11h | B | 030h |

**(10 Marks)**

b. Show the pipeline operation with the help of a table, for the following sequence of instructions if the initial value of AR3 is 81 and the values stored in memory location 81, 82, 83 are 1, 2 and 3 respectively. Also tabulate the contents of AR3 and A at the end of each cycle.
Instructions:
LD*AR3+,A
ADD #1000h, A
STL A, *AR3+ **(10 Marks)**

## PART – B

5 a. What values are represented by the 16 bit fixed point number N = 2000 h in the Q0, Q7 and Q15 notations? **(09 Marks)**

b. Explain with the help of a block diagram and mathematical equations, the implementation of a second order IIR filter. No program code is expected. **(11 Marks)**

6 a. Sketch a signal flow graph for a general butterfly computation. **(04 Marks)**

b. Derive the expressions for computation of outputs of the butterfly sketched in Q6 (a). **(06 Marks)**

c. Determine the optimum scaling factor to prevent overflow. **(10 Marks)**

7 a. Sketch the I/O interface signals at the pins $R/\overline{W}$, $\overline{IS}$ and $\overline{IOSTRB}$ for a read-write-read sequence of operations. **(08 Marks)**

b. What is the range of addresses that can be decoded if A19 is pulled low in a processor with 20 address lines? **(06 Marks)**

c. What is interrupt? **(02 Marks)**

d. What are the various classes of interrupts available in the TMS320C5416 processor? **(04 Marks)**

8 a. Explain with the help of a block diagram, how DMA operation is configured. **(05 Marks)**

b. Explain each instruction in the following code:
DMSA, set 55h
DMSDN, set 57h
DMSRC2, set 0Ah
STM DMSRC2, DMSA
STM #1110h, DMSDN
What will be the content of DMSRC2 after execution of this instruction? **(05 Marks)**

c. Explain JPEG encoding and decoding with the help of a block diagram. **(10 Marks)**

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# Seventh Semester B.E. Degree Examination, June/July 2011
## Image Processing

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions selecting at least TWO questions from each part.***



### PART – A

1 a. Write in detail the fundamental steps in digital image processing. **(10 Marks)**

b. How is image formed in the human eye? Explain with examples the perceived brightness is not a simple function of intensity. **(10 Marks)**

2 a. How many minutes would it take to transmit a 1024×1024 image with 256 gray levels using 56 k baud modem? (Baud rate is the number of bits transmitted per second. Assume each byte is one packet with a start bit and a stop bit.) **(04 Marks)**

b. Explain image sampling and quantization. **(10 Marks)**

c. Consider the image segment given in Fig.Q2(c). Let V = {0, 1}, Compute the lengths of the shortest 4, 8 and m-path between 'p' and 'q'. If path does not exists, explain why. **(06 Marks)**

| | | | | |
|---|---|---|---|---|
| | 3 | 1 | 2 | 1 (q) |
| | 2 | 2 | 0 | 2 |
| | 1 | 2 | 1 | 1 |
| (p) | 1 | 0 | 1 | 2 |

Fig.Q2(c)

3 a. Derive the expression for 2D circular convolution theorem. **(10 Marks)**

b. Consider the 2×2 transform A and the image U given below:

$$A = \frac{1}{2}\begin{bmatrix} \sqrt{3} & 1 \\ -1 & \sqrt{3} \end{bmatrix}, \qquad U = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

Calculate the transformed image V and the basis images. Check the transformed image V using the basis images and U. **(10 Marks)**

4 a. Derive the relation between DCT and DFT. **(10 Marks)**

b. Write H matrix for the Harr transform for N = 8 and explain how it is constructed. **(05 Marks)**

c. Write four properties of Hadmard transform. **(05 Marks)**

### PART – B

5 a. Explain histogram equalization technique. **(10 Marks)**

b. Explain the following with applications:
i) Contrast stretching ii) Bit plane slicing iii) Gray-level slicing
iv) AND operation v) OR operation. **(10 Marks)**

6 a. Discuss homomorphic filtering. **(08 Marks)**

b. Explain sharpening filters in the frequency domain. **(06 Marks)**

c. Explain smoothing filters in the frequency domain. **(06 Marks)**

7 a. Explain adaptive median filter and its advantages. **(06 Marks)**

b. How do you reduce the periodic noise using frequency domain filters? **(06 Marks)**

c. Derive the expression for observed image when the degradations aee linear, position invariant. **(08 Marks)**

8 a. Explain RGB and HSI colour models with their conversions. **(10 Marks)**

b. Explain pseudo colour image processing. **(05 Marks)**

c. Explain inverse filtering. **(05 Marks)**

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# Seventh Semester B.E. Degree Examination, June/July 2011
## Real Time Systems

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting at least TWO questions from each part.***



### PART – A

1 a. Define the real time system? Explain the computer control system showing communication tasks with the block diagram. **(10 Marks)**

b. Explain the following types of programming:
i) Multitasking ii) Real time **(06 Marks)**

c. Differentiate between clock based and event based tasks. **(04 Marks)**

2 a. Explain the sequence control by taking the example of a simple chemical reactor vessel. Show the block diagram of a typical chemical batch process. **(10 Marks)**

b. Explain the dual computer scheme. **(05 Marks)**

c. List out the responsibilities of a control engineer in designing the suitable computer system. **(05 Marks)**

3 a. Write the block diagram of a single chip micro computer and explain the following blocks:
i) Interrupt controller ii) Series communication iii) EPROM **(06 Marks)**

b. Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation. **(10 Marks)**

c. Explain the following : **(04 Marks)**
i) HDLC protocol ii) Asynchronous and synchronous transmission techniques.

4 a. A stream of data in character form is received from a remote station over a serial link. The data has to be processed character by character by a routine process item until the EOT character is received. The EOT must not be processed. Write a simple loop structure using EXIT statement. **(06 Marks)**

b. List out some major requirements that CUTLASS language has to meet. **(08 Marks)**

c. Explain the use of co-routines showing an example. **(06 Marks)**

### PART – B

5 a. Explain the typical structure of a RTOS. **(08 Marks)**

b. What is task management? Explain the typical task state diagram. **(08 Marks)**

c. Write notes on : i) Semaphore ii) Swapping. **(04 Marks)**

6 a. Explain the following loss system commands :
i) DTRC01 ii) INRC02 iii) OVCC01 iv) OURC01
v) FMRC01 vi) SCRC11 vii) DORC04 viii) RMRC01 **(08 Marks)**

b. Define the following :
i) Live lock ii) Dead lock iii) Indefinite postponement **(06 Marks)**

c. Show the OS Kernel Hierarchy and briefly explain them. **(06 Marks)**

7 a. Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed) **(10 Marks)**

b. Write the flow chart for a single program approach. **(05 Marks)**

c. Explain the concept of data sharing using common memory. **(05 Marks)**

8 a. Show the outline of abstract modeling approach of Ward and Mellor and explain. **(10 Marks)**

b. Differentiate between Ward Mellor and Hatley and Pirbhai methodologies. **(05 Marks)**

c. Explain the CFDO drying over controller using Hatley and Pirbhai notation. **(05 Marks)**

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