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10EC/TE71

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Computer Communication Networks

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With a neat diagram explain TCP/IP reference model. How do the layers of TCP/IP model correlate to the OSI models? **(10 Marks)**

b. Name the major components of a telephone networks. **(04 Marks)**

c. What is ADSL? Explain the operation of ADSL using discrete multitone modulation with a neat diagram. **(06 Marks)**

2 a. Explain normal response mode (NRM) and Asynchronous Balanced Mode (ABM) in HDLC. **(04 Marks)**

b. What is ARQ? In stop and wait ARQ system the bandwidth of the line is 1Mbps and it takes 20ms to make roundtrip. What is the bandwidth delay product? If the system data frames are of 1000bit length, what is utilization percentage of the link? **(04 Marks)**

c. What are sliding window protocols? Explain Go back – N protocol for noisy channel. **(12 Marks)**

3 a. Explain 1 – persistent, non – persistent and p – persistence with flow diagram. **(06 Marks)**

b. With a flow diagram explain CSMA/CA protocol. **(08 Marks)**

c. What are the reasons for poor channel utilization in ALOHA system? How the same is improved in CSMA? **(06 Marks)**

4 a. Explain frame format of 802.3 MAC frame. **(06 Marks)**

b. Define the type of the following destination addresses.
i) 4A : 30 : 10 : 21 : 10 : 1A ii) FF : FF : FF : FF : FF : FF iii) 47 : 20 : 1B : 2E : 08 : EE. **(06 Marks)**

c. What is a Fast Ethernet? Mention the goals of fast Ethernet. Explain autonegotiation. **(08 Marks)**

PART – B

5 a. A system with four LAN's and five bridges is shown in Fig. Q5(a). Choose B1 as the root bridge. Show the forwarding and blocking ports, after applying the spanning tree procedure.

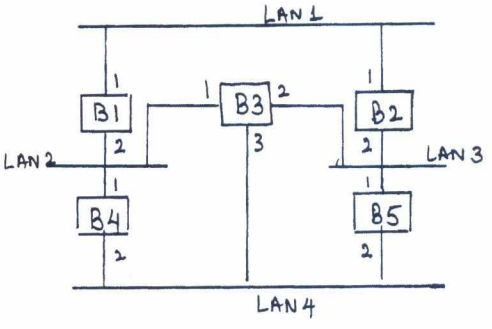

Fig. Q5 (a)

(10 Marks)

b. What are virtual LAN's? Enumerate the advantages of having VLAN's. **(10 Marks)**

6 a. Find the class of the following IP address :
i) 237.14.2.1 ii) 129.14.6.8 iii) 208.35.54.12 iv) 114.34.2.8 **(04 Marks)**
b. Compare IPV4 and IPV6 packet headers. **(06 Marks)**
c. What is NAT? Explain now NAT help in address depletion. **(10 Marks)**

7 a. With suitable diagram explain distance vector routing. **(10 Marks)**
b. Explain the different forwarding techniques used to forward the packets from source to destination. **(10 Marks)**

8 a. Explain with diagram the TCP segment format. **(10 Marks)**
b. Write short notes on :
i) Domain name system (DNS)
ii) Resolution. **(10 Marks)**

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10EC/TE72

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Optical Fiber Communication

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Differentiate between :
   i) single mode and multimode fibers
   ii) step index and graded index multimode fibers. **(10 Marks)**

b. What are the different types of fiber materials used in optical fibers, explain briefly. **(06 Marks)**

c. A MMGI fiber has a core with a parabolic refractive index profile, with a diameter of 60 μm. The fiber has an NA of 0.2. Estimate the total number of propagating modes at a wavelength of 1 μm. **(04 Marks)**

2 a. Explain the material absorption mechanism in an optical fiber. **(10 Marks)**

b. Derive the expression for material absorption in an optical fiber. **(06 Marks)**

c. A MMGI fiber has a cone refractive index of 1.46, cladding RI of 1.45. The critical radius of curvature at which maximum bending loss occurs is 0.84 μm. Determine wavelength of the transmitted light. **(04 Marks)**

3 a. Derive the expression for quantum efficiency and output power for an LED. **(08 Marks)**

b. Describe the different noise sources affecting the photo detector along with expressions and derive the expression for the S/N ratio at the O/P of the photo detector. **(08 Marks)**

c. The quantum efficiency for an APD is 90%. Find the responsivity at 1600 nm. **(04 Marks)**

4 a. Name the different types of fiber joints. Explain the types of mechanical misalignments while joining two fibers. **(07 Marks)**

b. Explain the three types of fiber splicing techniques with neat diagram. **(09 Marks)**

c. An optical fiber has a cone RI of 1.5. Two perfectly aligned optical fiber lengths one butted together. Calculate the optical loss in decibels at the joints when there is an air gap between the fiber end faces. **(04 Marks)**

PART – B

5 a. Draw the signal path through an optical digital link showing all the relevant waveforms. **(06 Marks)**

b. Draw and explain the two general heterodyne receiver configurations, along with the relevant expressions for BER. **(08 Marks)**

c. Draw and explain the two types of front end amplifiers in optical fiber communication. **(06 Marks)**

6 a. Draw the block diagram, and explain the multichannel amplitude modulation technique used in fiber optics. **(08 Marks)**

b. Explain the significance of link power budget and system margin. The following optical link parameters are given :

Optical power launched	= 6 dBm
Receiver sensitivity	= –25 dBm
Source 1 detector connector loss	= 1 dB
Fiber cable length	= 100 km
Cable attenuation	= 0.1 dB/km
Jumper cable loss	= 3 dB
Connector loss at each joint	= 1dB

Assume two jumber cables and two cable joints. Compute link power margin. **(06 Marks)**

c. Derive the total system rise time expression for a digital optical link. **(06 Marks)**

7 a. With the help of a diagram, explain the principle of WDM. **(08 Marks)**

b. Draw and explain the operation and design of :

i) Optical isolators

ii) Mems technology

iii) Tunable optical filters. **(12 Marks)**

8 Write short notes on :

a. EDFA amplifier

b. SONET/SDH. **(20 Marks)**

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10EC751

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
DSP Algorithm and Architecture

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is digital signal processing? List the unique architectural features of DSP processor. **(05 Marks)**

b. "FIR filter are linear phase filters". Justify the same with magnitude and phase plots. **(05 Marks)**

c. With the help of block diagram and equations explain decimation and interpolation process. Also find interpolated O/P sequence for x(n) = {0, 3, 6, 9} with b_k = {⅓, ⅔, 1, ⅔, ⅓ } and interpolation factor in 2. **(10 Marks)**

2 a. Give the structure of 4 × 4 drawn multiplier explain its concept. What modification in required to carryout multiplication of signed no's? Comment on the speed of the multiplier. **(08 Marks)**

b. Explain the circular and bit reversed addressing mode, with the help of algorithm. **(08 Marks)**

c. What are the memory address of the operands in each of the following cases of indirect addressing model? In each case what will be the content of address register after the memory access? Assume that the initial contents of address register and the offset register are 0300h and 0020h.
i) ADD *addreg$^-$ ii) ADD $^+$*addreg iii) ADD $^+$*offset, *addreg iv) ADD *addreg, offset$^-$. **(04 Marks)**

3 a. Compare architectural features of TMS320C25 and ADSP2100 fixed point DSPs. **(05 Marks)**

b. Explain the PMST register. Also explain the direct addressing mode of TMS320C54XX processor, with the help of a block diagram. **(09 Marks)**

c. Explain the CPU unit of TMS320C54XX processor with the help of functional diagram. **(06 Marks)**

4 a. Describe the operation of the following instructions of TMS320C54XX processor with example :
i) MAC ii) RPT iii) MPY. **(06 Marks)**

b. Describe the operation of hardware timer with a neat diagram. **(08 Marks)**

c. Write an assembly language program of TMS320C54XX processor to compute the sum of three product terms given by the equation :
$y(n) = h_0x(n) + h_1x(n-1) + h_2x(n-2)$,
using MAC instruction. **(06 Marks)**

PART – B

5 a. Determine the value of each of the following 16 bit numbers represented using the given Q-notation.
i) 4400h or Q_0 ii) 4400h or Q_{15} iii) 4400h or Q_7 iv) 4400h or Q_1. **(06 Marks)**

b. What is an interpolation filter? Explain the implementation of digital interpolation using FIR filter and poly phase subfilter. Write the program. **(08 Marks)**

c. Write a program to multiply two Q_{15} numbers. **(06 Marks)**

6 a. i) Derive the equation to implement a Butterfly structure in DITFFT algorithm
ii) How many add/substract and multiply operations are needed to compute the butterfly structure?
iii) Determine the optimum scaling factor. **(08 Marks)**

b. i) What minimum size FFT must be used to compute a DFT of 40 sample?
ii) How many stages are required for FFT computation?
iii) How many butterflies there per stage?
iv) How many butterflies are needed for the entire computation? **(06 Marks)**

c. Write the subroutine for bit reverse address generation. Explain the same. **(06 Marks)**

7 a. Explain briefly memory space organisation in TMS320C54XX memory. **(04 Marks)**

b. Describe DMA with respect to TMS320C54XX processor. **(08 Marks)**

c. What are Interrupts? How interrupts are handled by the C54XX DPS processors. **(08 Marks)**

8 a. Explain the operation of pulse position modulation (PPM) to encode two biomedical signals. **(06 Marks)**

b. Write a pseudo algorithm for determining heart rate (HR) using the digital signal processor. **(06 Marks)**

c. With the help of a block diagram, explain the image compression and reconstruction using JPEG encoder and decoder. **(08 Marks)**

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10EC/TE762

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Real Time Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define RTS and compare hard and soft real time systems. **(06 Marks)**
b. Explain the classification of RTS based on synchronization between external process and internal tasks of the computer. **(06 Marks)**
c. Explain the classification of programming. **(08 Marks)**

2 a. Compare batch processing and continuous processing with examples. **(06 Marks)**
b. With a neat diagram, explain supervisory control. **(06 Marks)**
c. Explain hierarchical system with an example. **(08 Marks)**

3 a. Explain the different forms of parallel computers with diagrams. **(04 Marks)**
b. Explain analog interface for input and output operations. **(10 Marks)**
c. Explain the various methods of D.M.A. **(06 Marks)**

4 a. Explain the following features of real – time programming languages :
i) Security
ii) Flexibility
iii) Portability. **(06 Marks)**
b. Explain the following with respect to programming languages :
i) Scope and visibility of variables
ii) Exception handling
iii) derived data types
iv) Pointers. **(08 Marks)**
c. Write a note on control structures used in programming languages. **(06 Marks)**

PART – B

5 a. Explain what do you mean by minimal operating system. **(04 Marks)**
b. Explain the structure of a real – time operating system. **(08 Marks)**
c. Explain the priority levels in real – time operating system. **(08 Marks)**

6 a. Explain the general structure of an input/output subsystem. **(06 Marks)**
b. Explain the following with respect to RTOS :
i) Semaphores
ii) Data transfer without synchronization. **(08 Marks)**
c. Write a note on liveness of a RTS. **(06 Marks)**

7 a. Explain the basic software modules with reference to RTS. **(06 Marks)**
b. Explain the multi tasking approach to implement software design of RTS. **(06 Marks)**
c. Explain mutual exclusion using condition flags. **(08 Marks)**

8 a. Summarize the various methodologies used for designing real time systems. **(06 Marks)**
b. Explain the general arrangement of drying over along with the functional specifications. **(08 Marks)**
c. Explain the outline of abstract modeling approach of Ward and Mellor. **(06 Marks)**

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