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06EC71

Seventh Semester B.E. Degree Examination, December 2012
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. Describe the ISO OSI reference model of a computer Network. Discuss the function of each layer. (10 Marks)
- b. Describe the SS7 service and its relation to the telephone network. (05 Marks)
- c. Distinguish between a DSL modem and a DSLAM. (05 Marks)
- 2 a. Differentiate between character stuffing and bit stuffing with examples. (05 Marks)
- b. Explain different HDLC frames. (05 Marks)
- c. What are sliding window protocols? Explain Go-Back-N protocol for Noisy channel. (10 Marks)
- 3 a. Compare pure ALOHA with slotted ALOHA. What are the reasons for poor channel utilization in ALOHA systems? How the same is improved in CSMA. (08 Marks)
- b. Discuss the concepts of
i) 1 – persistent CSMA ii) Non-persistent CSMA. (06 Marks)
- c. Explain the working of CSMA/CD. Suppose a point to point link is set up between earth and a rover on MARS. The distance from earth to mars is approximately 55 Gm and data travels over the link at a speed of light 3×10^8 m/s. calculate the minimum round trip propagation time. (06 Marks)
- 4 a. Compare the data rates for standard Ethernet, fast Ethernet, Gigabit Ethernet and Ten Gigabit Ethernet. (04 Marks)
- b. What is the difference between a unicast, multicast, and broad cast address? Define the type of the following destination addresses:
i) 4A : 30 : 10 : 21 : 10 : 1A
ii) 47 : 20 : 1B : 2E : 08 : EE
iii) FF : FF : FF : FF : FF : FF (08 Marks)
- c. Explain the following with respect to FAST Ethernet:
i) Implementation ii) Encoding iii) 100 BASE-TX iv) 100 BASE-FX. (08 Marks)

PART – B

- 5 a. Explain the following connecting devices:
i) Repeater ii) Bridge iii) Router iv) Gateway. (08 Marks)
- b. What is spanning tree? Explain with suitable example. (08 Marks)
- c. What is VLAN? Explain. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 6 a. Explain the address formats for IPV4 and IPV6 address? (08 Marks)
- b. List the classes in classful addressing and define the application of each class. (08 Marks)
- c. What is NAT? How can NAT help in address depletion? (04 Marks)

- 7 a. What is the difference between a direct and an indirect delivery? (04 Marks)
- b. List and explain three forwarding techniques. (08 Marks)
- c. Explain dynamic routing table. (08 Marks)

- 8 a. Compare the TCP header and the UDP header. List the fields in the TCP header that are missing from UDP header. Give the reason for their absence. (08 Marks)
- b. What are the three domains of domain name space? Explain. (08 Marks)
- c. How does recursion resolution differ from iterative resolution? (04 Marks)

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SKIT LIBRARY

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06EC72

Seventh Semester B.E. Degree Examination, December 2012
Optical Fiber Communication

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. List the disadvantages of copper wire at the optical frequency range. (06 Marks)
 b. Explain the ray theory of the optical fiber, with the help of a neat sketch. (08 Marks)
 c. A silica glass fiber has a core refractive index of 1.5 and the cladding refractive index of 1.45. Calculate (i) critical angle for the core-cladding interface, (ii) the NA of the fiber and (iii) percentage of light collected by the fiber. (06 Marks)
- 2 a. Describe the attenuation mechanisms in an optical fiber. (10 Marks)
 b. Derive the equation for material dispersion in the optical fiber. (06 Marks)
 c. An optical signal at a specific wavelength has lost 55% of its power, after traversing 7 km of fiber. What is the attenuation in dB/km of this fiber. (04 Marks)
- 3 a. What are the characteristic requirements of an optical source? With the help of diagram, describe the operation of surface emitting LED. (10 Marks)
 b. Which are the noise types affecting the optical detector. (03 Marks)
 c. Describe the PIN diode performance, using the diagram. (07 Marks)
- 4 a. Derive an equation for power coupling to the step index fiber and graded index fiber. (10 Marks)
 b. What is equilibrium numerical aperture of a fiber? With the help of diagrams, explain the lensing schemes for coupling improvement. (10 Marks)

PART – B

- 5 a. Discuss the error sources in the optical signal detection. (07 Marks)
 b. Derive an equation for optical receiver sensitivity. (10 Marks)
 c. Calculate the PIN diode receiver sensitivity, if the gain of the photo detector is 1, its noise figure is 1 and bandwidth of the receiver is assumed to be half of the bit rate. Note the BER is 10^{-12} and data rate is 100 Mb/s. (03 Marks)
- 6 a. Write the diagram and explain the radio over fiber links. (10 Marks)
 b. What is link power budget? With an example, explain the link power budget calculation. (10 Marks)
- 7 a. With the help of neat diagram, explain the operation of WDM. (08 Marks)
 b. Describe the principles of working of isolators, circulator and ADM using suitable diagrams. (12 Marks)
- 8 a. What are the optical amplifiers? Describe with the help of a sketch the semiconductor laser amplifier. (10 Marks)
 b. Describe the SONET optical network working with reference to suitable diagram. (10 Marks)

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Seventh Semester B.E. Degree Examination, December 2012
Power Electronics

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. What is power electronics? Give two applications of P.E. (06 Marks)
- b. What is the difference between thyristor and a TRIAC? (04 Marks)
- c. What are the peripheral effects of power electronics equipments? (10 Marks)
- 2 a. What is a bipolar transistor and explain how many types are there and what are their three region operations? (10 Marks)
- b. What are pinch of voltage, threshold voltage and transconductance of MOSFET? (06 Marks)
- c. Compare BJT, MOSFET and IGBTs. (04 Marks)
- 3 a. What is the difference between SCR and a TRIAC? Explain its characteristics? (08 Marks)
- b. The input voltage of Fig.Q3(b) is $V_s = 200V$ with load resistance of $R = 5\Omega$. The load and stray inductance are negligible and the thyristor is operated at a frequency of $f_s = 2$ kHz. If the required dV/dt is 100 V/ μ s and the discharge current is to be limited to 100 A. Determine i) the value of R_s and C_s , ii) the scrubber loss and iii) the power rating of scrubber resistor. (08 Marks)

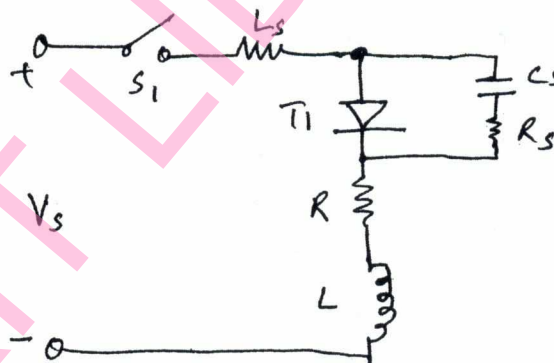


Fig.Q3(b)

- c. What is the common technique for voltage sharing and serial connected thyristor? (04 Marks)
- 4 a. With a neat diagram and waveforms, explain the principle of single phase full converters purely resistive load. Derive the expression for voltage o/p voltage and rms o/p voltage. (10 Marks)
- b. What are the advantages and disadvantages of series converters? (06 Marks)
- c. How do you classify phase control converters? Explain. (04 Marks)

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PART – B

- 5 a. Draw a circuit diagram and associated waveforms, explain the operation of a single phase bi-directional AC voltage controller with resistive load, obtain the rms output voltage. (10 Marks)
- b. An ac voltage controller in Fig.Q5(b) has a resistive load of $R = 10\Omega$ and the root-mean-square (rms) input voltage is $V_s = 120V$, 60 Hz. The thyristor switch is on for $n = 25$ cycles and is off for $m = 75$ cycles. Determine i) the rms output voltage V_o , ii) the input power factor (PF) and iii) the average and rms current of thyristors. (07 Marks)

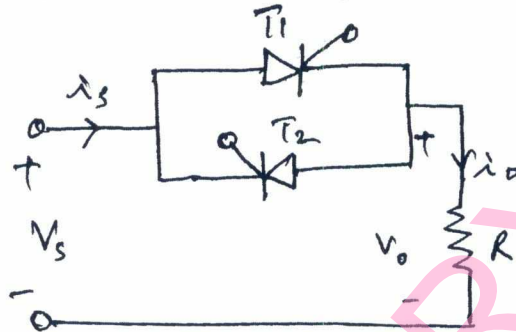


Fig.Q5(b)

- c. What are the advantages and disadvantages of ON-OFF control? (03 Marks)
- 6 a. What is an inverter? Explain its principle of operation (any one) with a neat diagram and waveforms. (08 Marks)
- b. What are the performance parameters of inverters? (06 Marks)
- c. How to differentiate 1ϕ and 3ϕ inverters? (06 Marks)
- 7 a. What is the principle of stepdown operation of chopper? (04 Marks)
- b. The stepdown chopper circuit shown in Fig.Q7b(i) & (ii), having resistive load. Derive an expression for the following:
 i) Average output voltage $V_o(av)$ ii) rms output voltage V_o (rms). (08 Marks)

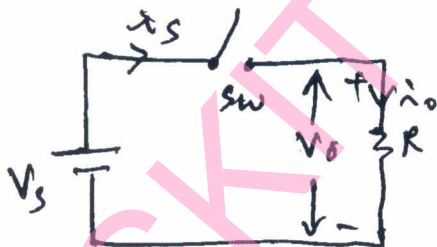


Fig.Q7b(i)

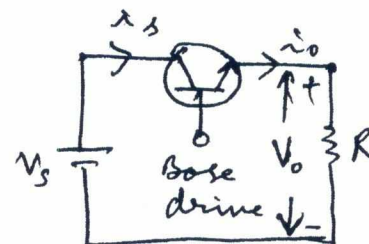


Fig.Q7b(ii)

- c. A chopper circuit is operating on TRC at a frequency of 2 kHz on a 460 V supply of the load voltage of 350V. Calculate the conduction period of the thyristor in each cycle. (08 Marks)
- 8 Write short notes on :
- Communication techniques
 - Difference between ON-OFF control and phase control
 - Static induction transistor (SIT's)
 - Performance parameters of rectifier. (20 Marks)

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Seventh Semester B.E. Degree Examination, December 2012
DSP Algorithms and Architecture

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. What is digital signal processing? What are the important issues to be considered in designing and implementing a DSP system? Explain in detail. (09 Marks)
- b. Why signal sampling is required? Explain the sampling process. (05 Marks)
- c. Define decimation and interpolation process. Explain them using block diagrams and equations. (06 Marks)
- 2 a. Give the structure of a 4×4 Braun multiplier, explain its concept. What modification is required to carry out multiplication of signed numbers? Comment on speed of the multiplier. (10 Marks)
- b. Explain guard bits in a MAC unit of a DSP. Consider a MAC unit whose inputs are 24-bit numbers. How many guard bits should be provided if 512 products have to be added in the accumulator to prevent overflow condition? What is the overall size of the accumulator required? (10 Marks)
- 3 a. What is the function of an address generation unit? Explain with the help of a block diagram. (08 Marks)
- b. Why circular buffers are required in DSP processors? How they are implemented? (02 Marks)
- c. Explain the barrel shifter of the TMS320C54XX processor with the help of a functional diagram. (05 Marks)
- d. Explain the direct addressing mode of the TMS320C54XX processor with the help of a block diagram. (05 Marks)
- 4 a. A digital signal processor has a circular buffer with the start and end addresses as 0200h and 0310h. What is the circular buffer size? What would be the new values of address pointer of the above buffer if, in the course of address computation, it gets updated to, i) 0336h ii) 0192h. (06 Marks)
- b. Show the pipeline operation of the following sequence of instructions if the initial value of AR3 is 80 and the values stored in the memory locations 80, 81, 82 are 1, 2, 3 respectively.
LD *AR3+, A
ADD # 1000h, A
STL A, *AR3+ (08 Marks)
- c. Give the logical block diagram of timer circuit. Explain its operation. (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 as a Q0 number.
 - ii) 4400h as a Q15 number.
 - iii) 4400h as a Q7 number
 - iv) 4400h as a Q1 number. (04 Marks)
- b. With the help of a block diagram explain the implementation of an FIR filter in TMS320C54XX processor. Show the memory organization for the filter implementation. (08 Marks)
- c. What is the drawback of using linear interpolation for implementing interpolation filter? Explain a scheme that overcomes this drawback. (06 Marks)
- d. How do you obtain the product of two 16 bit Q15 numbers in Q15 representation? (02 Marks)

- 6 a. Why zero padding is done before computing the DFT? (02 Marks)
b. What minimum size FFT must be used to compute a DFT of 220 points in radix-2 algorithm? Determine the number of butterfly structures needed for this algorithm and thereby determine number of complex multiplications and additions needed. (04 Marks)
c. What do you mean by bit-reversed index generation and how it is implemented in TMS320C54XX DSP assembly language? (08 Marks)
d. Write a subroutine program to find the spectrum of the transformed data using TMS320C54XXDSP. (06 Marks)
- 7 a. Design a data memory system with address range 7FF800-7FFFFFFh for a C5416 processor. Use 2K×8 SRAM memory chip. (10 Marks)
b. Discuss in detail the interrupt handling in the C54XX processor. (10 Marks)
- 8 a. Explain briefly the building blocks of a PCM3002 CODEC device. (08 Marks)
b. What do you understand by a DSP based biotelemetry receiver? (04 Marks)
c. With the help of block diagram, explain JPEG algorithm. (08 Marks)

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Seventh Semester B.E. Degree Examination, January 2013
Operating Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain the goals of an operating system. (06 Marks)
- b. List the common task performed by operating system. (06 Marks)
- c. Explain the features and special techniques of distributed operating system. (08 Marks)
- 2 a. What are the problems surfaced in operating system with monolithic structure. (04 Marks)
- b. Explain:
 - i) Layered structure of O.S.
 - ii) Kernel based O.S. (16 Marks)
- 3 a. List the different types of process interaction and explain them in brief. (08 Marks)
- b. Describe the components of the process environment. (06 Marks)
- c. List the events that occur during the operation of operating system. (06 Marks)
- 4 a. Describe the features of static and dynamic memory allocation. (05 Marks)
- b. Write a note on contiguous memory allocation. (07 Marks)
- c. Explain about slab allocator of solaris 2.4 system. (08 Marks)

PART – B

- 5 a. Explain the important concepts in the operation of demand paging. (12 Marks)
- b. Write a note on page replacement policies. (08 Marks)
- 6 a. Describe the different operations performed on files. (10 Marks)
- b. Explain UNIX file system. (10 Marks)
- 7 a. With neat block diagram, explain about the event handling and scheduling. (08 Marks)
- b. Explain the scheduling in UNIX. (08 Marks)
- c. Summarize the main approaches to real time scheduling. (04 Marks)
- 8 Write short notes on:
 - a. Buffering of interprocess messages. (08 Marks)
 - b. Mail boxes. (07 Marks)
 - c. Interprocess communication in UNIX. (05 Marks)

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06EC762

Seventh Semester B.E. Degree Examination, January 2013
Real Time Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Differentiate:
 - i) Real time and non real time programming. (09 Marks)
 - ii) Hard and soft real time with example. (08 Marks)
 - iii) Clock based and event based tasks. (03 Marks)
- b. Define the term “time constraint”. How are RTS classified based on time constraint? Explain them with appropriate equations. (08 Marks)
- c. Why real time programming is more difficult to verify than non-real time programming? (03 Marks)
- 2 a. What is a DDC? What are the advantages of DDC over analog control? Discuss PID control algorithm. (10 Marks)
- b. Compare batch processing and continuous processing. (04 Marks)
- c. List out the responsibilities of a control engineer in designing the suitable computer system. (06 Marks)
- 3 a. Consider a printer interfaced for polling data from the computer. Assuming the data is being transferred to a printer at 40 character/sec. The computer finds the device is ready once every 25 msec. The 3 instructions involved in performing the test will take approximately 5 μ sec. Find the time for each character transfer and percentage of spending time of computer for checking the device is ready for every character. (05 Marks)
- b. Why is memory protection important in real time system? What methods can be used to provide memory protection? (05 Marks)
- c. Mention the features of specialized processors and explain MIMD, with a neat diagram. (10 Marks)
- 4 a. What are the major requirements of CVTCLASS? Explain. (08 Marks)
- b. List and explain the various requirements in programming languages used for real time applications. (12 Marks)

PART – B

- 5 a. 3 tasks A, B and C are required to run at 1ms, 6ms and 25ms intervals [corresponding to 1 tick, 2 tick and 4 tick, if the clock interrupt rate is set at 20 ms]. If the task priority order is set as A, B and C with A has highest priority and also calculate the delay required to invoke task A at every 4th invocation. Consider the tasks are in cyclic manner. (08 Marks)
- b. What are functions of attack management module? Explain various tasks states, with the help of state diagram. (12 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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- 6 a. List the set of functions and primitives for RTOS. (10 Marks)
- b. Consider the system whose outline diagram is shown in Fig.Q.6(b). It is assumed that the "control", "display" and "operator" i/p program are to be run as separate tasks with priorities 1, 10, 20 respectively. The "control" task has to run at 40 ms intervals and the "display" update task at 55 intervals. The system clock is set at 20ms and "control" task has to run every 2 system ticks. The operator run at 10 S intervals. Write the outline structure of the system. (10 Marks)

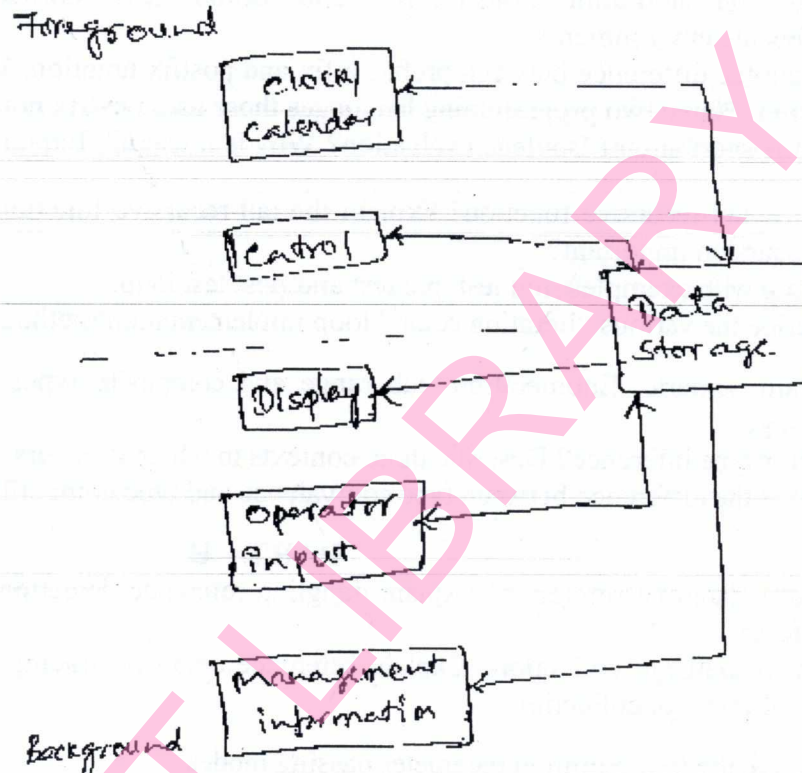


Fig.Q.6(b)

- 7 a. Explain software design for RTS using software module. (10 Marks)
- b. How data will be shared with common memory. (05 Marks)
- c. Mention the importance of conditions flag and binary semaphores. (05 Marks)
- 8 a. Explain Yourdon methodology. (04 Marks)
- b. Write short notes on:
- PSPECs and CSPECs
 - Ward and Mellor method. (16 Marks)
