

USN

--	--	--	--	--	--	--	--	--	--

06EC71

Seventh Semester B.E. Degree Examination, December 2011
Computer Communication Networks

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain the differences between OSI reference model and TCP /IP reference model. (05 Marks)
- b. Match the following to one or more layers in OSI model : (05 Marks)
 - i) Route determination
 - ii) Flow control
 - iii) Interface to transmission media
 - iv) Provides access for the end user
 - v) Format and code conversion services. (05 Marks)
- c. What is DSL technology? What are the services provided by the telephone companies using DSL? Distinguish between DSL and DSLAM. (10 Marks)
- 2 a. In stop and wait ARQ system, the bandwidth of the line is 1Mbps and it takes 20 ms to make round trip. What is the bandwidth delay product? If the system data frames are of 1000 bit length, what is the utilization percentage of link? What is the channel utilization percentage of link if the protocol that can send up to 15 k mes before stopping and worrying about the acknowledgement? Write the comment. (05 Marks)
- b. Explain briefly the bit and charter stuffing. (05 Marks)
- c. With a neat diagram, explain the HDLC frame form. (10 Marks)
- 3 a. Write the different physical topologies used in the logical ring method and explain briefly. (10 Marks)
- b. In CSMA/ CD, the data rate is 10 Mbps, the distance between the stations 'A' and 'C' is 2000 m and propagation is 2×10^8 mts. Station A starts sending a long frame at time $t_1 = 0$; station C starts sending a long frame at $t_2 = 3$ micro sec. The size of the frame is long enough to guarantee the detection of collision by the stations.
Find : (10 Marks)
 - i) The time when station 'C' hears the collision (t_3)
 - ii) The time when station 'A' hears the collision (t_4)
 - iii) The number of bits station A has sent before detecting the collision
 - iv) The number of bits station C has sent before detecting the collision.
- 4 a. Mention the four different types of Ethernet format. Explain the same briefly. (10 Marks)
- b. List the different goals of giga bit Ethernet and explain the different implementation of same. (10 Marks)

PART – B

- 5 a. Why spanning tree algorithm is used? Explain the same, with a graphical representation. (10 Marks)
- b. Mention the different characteristics of VLAN and explain briefly. (10 Marks)

Important Note : i. 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. Find the range of address in the following blocks
- 123.56.77.32/29
 - 200.17.21.128/27
 - 17.34.16.0/23
 - 180.34.64.64/30.
- (10 Marks)
- b. Explain the IPV4 datagram format. (10 Marks)
- 7 a. Explain the Dijkstra algorithm for the example shown in Fig. Q7(a). (10 Marks)

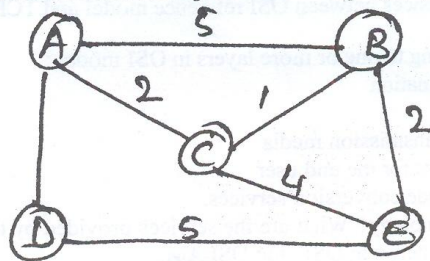


Fig. Q7(a)

- b. Explain the different forwarding techniques used to forward the packet from source to destination. (10 Marks)
- 8 a. Explain the user datagram format. (05 Marks)
- b. Explain the features of TCP. (10 Marks)
- c. Suppose a TCP connection is transferring a file of 5000 bytes, the 1st byte is numbered 10,001. What are the sequence nos of each segment, if data are sent in 5 segments each carrying 1000 bytes? (05 Marks)

USN

--	--	--	--	--	--	--	--	--	--

06EC72

Seventh Semester B.E. Degree Examination, December 2011
Optical Fiber 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. Enlist the advantages of optical fibers, compared to the usage of a copper cables in the communication. (06 Marks)
- b. With relevant diagrams, explain the different types of optical fibers, considering the number of the modes and material composition of the core. (08 Marks)
- c. Light traveling in air strikes a glass plate at an angle $\theta_1 = 33^\circ$, where θ_1 is measured between the incoming ray and glass surface. If the refracted and reflected beams make an angle of 90° with each other, what is the refractive index of the glass? What is the critical angle? (06 Marks)

- 2 a. Explain the mechanisms which cause absorption in the optical fibers. Mention the measures which can reduce this type of signal degradation. (06 Marks)
- b. Prove that, delay difference between the axial ray and extreme meridional ray is
$$\delta T_s \cong \frac{Ln_1\Delta}{c}$$
 (08 Marks)
- c. A 6 Km optical link consists of multimode step-index fiber, with a core RI of 1.5 and relative index difference of 1%. Estimate, (06 Marks)
 - i) Delay difference between slowest and fastest modes at the fiber output
 - ii) rms pulse broadening due to intermodal dispersion on the link
 - iii) Maximum bit rate that may be obtained without substantial errors on the link assuming only intermodal dispersion.

- 3 a. Draw and explain the cross – sectional view of a typical GaAlAs double heterostructure LED, along with the energy band diagrams and variations in RI profile. (10 Marks)
- b. What is quantum efficiency? How are the ‘responsivity’ and ‘quantum efficiency’ related? (04 Marks)
- c. A given silicon avalanche photodiode has a quantum efficiency of 65% at a wavelength of 900nm. Suppose $0.5\mu\text{W}$ of optical power produces a multiplied photocurrent of $10\mu\text{A}$, find the primary photocurrent and the multiplication factor. (06 Marks)

- 4 a. List and sketch the different types of splicing techniques and connectors. (08 Marks)
- b. What are the principal requirements of a good connector design? (06 Marks)
- c. A single mode fiber has a normalized frequency $V = 2.40$, a core RI $n_1 = 1.47$, a cladding RI of $n_2 = 1.465$ and a core diameter of $9\mu\text{m}$. Find the insertion loss of a fiber joint, if the lateral offset is $1\mu\text{m}$. Also find the loss, if there is an angular misalignment of 1° at a 1300nm wavelength. (06 Marks)

PART – B

- 5 a. Explain with a neat diagram, the basic sections and operations of an optical receiver. (06 Marks)
- b. Briefly explain the ‘quantum limit’. (04 Marks)
- c. Derive the equation for the performance fidelity of an analog receiver. Substantiate that for large optical signals, SNR represents the quantum limit for receiver sensitivity. (10 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. With a relevant diagram, discuss the subcarrier multiplexing technique. (06 Marks)
b. Discuss the various parameters involved in optical link power budget, with the relevant equations. (06 Marks)
c. Write short notes on:
i) Mode – partition noise
ii) Chirping. (08 Marks)
- 7 a. Describe the operational principles of WDM, depicting the implementation of a typical WDM network containing various types of optical amplifiers. (08 Marks)
b. Explain briefly the working of thin – film resonant cavity filter. What is the application? (06 Marks)
c. What is MEMS technology? With an example, explain a MEMS actuation method. (06 Marks)
- 8 a. With relevant schematic diagrams, explain the three possible configurations of a EDFA. (06 Marks)
b. Discuss the physical layer aspects of SONET, explaining the basic structure of an STS–L SONET frame. (06 Marks)
c. What is the difference between fixed OADM and ROADM? List the features of ROADM. (08 Marks)

* * * * *

06EC73

- 6 a. With the help of circuit diagram, explain the operation of single phase AC regulator using ON-OFF control. Derive the expression for rms value of load voltage. (10 Marks)
b. Explain the single phase bidirectional AC voltage controller with resistive load with waveform. (10 Marks)
- 7 a. With neat circuit diagram and explain the four quadrant chopper. (08 Marks)
b. With neat circuit diagram, explain the principle of operation of step up chopper. (08 Marks)
c. A chopper circuit is operating on Time Ration Control (TRC) at a frequency of 2 kHz on a 460 V supply of the load voltage of 350 V. Calculate the conduction period of the thyristors in each cycle. (04 Marks)
- 8 a. Explain the performance of inverters. (06 Marks)
b. With a neat circuit diagram, explain the principle of variable DC link. (08 Marks)
Write a short note on CSI (Current Source Inverter). (06 Marks)

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

06EC756

Seventh Semester B.E. Degree Examination, December 2011
Image Processing

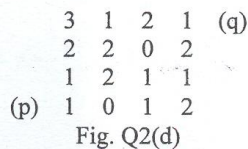
Time: 3 hrs.

Max. Marks:100

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

PART – A

1.
 - a. Explain the fundamental steps in digital image processing. (10 Marks)
 - b. Explain the brightness adaptation, with the help of the related graph. (04 Marks)
 - c. Define spatial and gray level resolution. Briefly discuss the effects resulting from a reduction in number of pixels and gray levels. (06 Marks)
2.
 - a. With a suitable diagram, explain how an image is acquired using a circular sensor strip. (06 Marks)
 - b. Explain the zooming. (04 Marks)
 - c. Define 4 – adjacency, 8 – adjacency and m – adjacency. (04 Marks)
 - d. Consider the image segment shown in Fig. Q2(d).
 - i) Let $V = \{0, 1\}$. Compute the lengths of shortest 4 – , 8 – and m – paths between p and q. (06 Marks)
 - ii) Repeat for $V = \{1, 2\}$. (06 Marks)



3.
 - a. Define two – dimensional DFT. Explain the following properties of 2 – DFT.
 - i) Translation ii) Rotation iii) Distributivity and scaling iv) Separability (10 Marks)
 - b. What are basis vectors? (04 Marks)
 - c. For the given orthogonal matrix A and image u, obtain the transformed image and basis images. (06 Marks)

$$A = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, u = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}.$$
4.
 - a. Define discrete cosine transform and its inverse transformation. Discuss any three properties of discrete cosine transform. (10 Marks)
 - b. Develop Hadamard transform for $n = 3$. Discuss the properties of the Hadamard transform. (any two). (10 Marks)

PART – B

5.
 - a. Explain the following image enhancement techniques, highlighting their area of application.
 - i) Intensity level slicing
 - ii) Power – law transformation
 - iii) Bit – plane slicing. (10 Marks)
 - b. What is histogram matching? Explain the development and implementation of the method. (10 Marks)

- 6 a. Explain the smoothing of images in frequency domain using :
- i) Ideal lowpass filter
 - ii) Butterworth lowpass filter. (10 Marks)
- b. With a block diagram and equations, explain the homomorphic filtering. How dynamic range compression and contrast enhancement is simultaneously achieved? (10 Marks)
- 7 a. With a block diagram, briefly explain the image model of degradation – restoration process. (06 Marks)
- b. Explain the notch reject filters. How can we obtain the notch filter that pass rather than suppressing the frequency in the notch area? (08 Marks)
- c. Explain the Weiner – filtering method of restoring images. (06 Marks)
- 8 a. Explain the following order – statistics filters, indicating their uses.
- i) median filter
 - ii) max filter
 - iii) min filter. (06 Marks)
- b. Explain the RGB color model. (06 Marks)
- c. Write a note on the following pseudo image processing techniques :
- i) Intensity slicing
 - ii) Graylevel to color transformations. (08 Marks)

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

06EC761

Seventh Semester B.E. Degree Examination, December 2011

Data Structures Using C++

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 recursive function using definitions of mathematical functions and proofs by induction. Write C++ non-recursive and recursive function to compute Fibonacci number. (06 Marks)
- b. Explain testing and debugging of C++ code and the methods. (06 Marks)
- c. Define C++ class for 'Linear List' using formula based representation. Define 'Insert' and 'Sort' member function for the same. Write required constructor and destructor. (08 Marks)
- 2 a. Explain the concept of indirect addressing. Provide an implementation of the 'Indirect List' member function 'Output'. Then use this member function to overload the operator '<<'. Test your code. (08 Marks)
- b. Give ADT specification for 'Array 2D'. Write a C++ code for : (06 Marks)
 - i) Array 2D multiplication
 - ii) Overloading [] for array 2D.
- c. Develop C++ class that maps 'symmetric matrix' of order $n \times n$ into single dimensional array. Write C++ member function 'Store'. (06 Marks)
- 3 a. Explain stack as data structure. Give ADT specification for stack. Develop a C++ class Stack using formula based representation. Write member function 'add' or 'push' operation. (08 Marks)
- b. Develop C++ program to fix switch box routing problem. (06 Marks)
- c. Compare formula based representation and linked representation. (06 Marks)
- 4 a. A 'Deque' is an ordered list to/from with we can make additions and deletions at/from either end. Therefore, we can call it a double ended queue.
 - i) Define the 'ADT Dequeue'. Include the operations : Create, Iempty, Isfull, Left, Right, Addleft, Addrigh, Deleteleft, Deleteright.
 - ii) Develop C++ class 'Deque' that corresponds to the 'ADT Dequeue' and write code for all class member. (12 Marks)
- b. Explain how queue is used for Railroad car rearrangement problem, with the help of a C++ program. (08 Marks)

PART - B

- 5 a. Give 'ADT specification' for dictionary. Develop the C++ class sorted list that uses a formula based representation to perform following operations :
 - i) To Search an element with a key
 - ii) DistinctInsert ensure that all elements in dictionary have distinct key.
 Write required constructor and destructor. (08 Marks)
- b. What is 'Hash function'? Describe the collision and overflow processing using linear open addressing technique. Write C++ class implementation of 'chained hash table'. (12 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. Define binary tree. What is the difference between a binary tree and general tree? State binary tree properties. (08 Marks)
- b. Write ADT specification for binary tree. Implement C++ member function :
- i) Compare (X) : which compare a binary tree with binary tree X. It returns true if two binary tree are identical and false otherwise.
 - ii) Height : which returns height of tree. (12 Marks)
- 7 a. What are priority queues? Explain MaxHeap initialization concept using input array as : $a[1 : 10] = [20, 12, 35, 15, 10, 80, 30, 17, 2, 1]$ as key. Write C++ functions :
- i) Inserting an element into MaxHeap. (12 Marks)
 - ii) Deleting an element from a MaxHeap. (12 Marks)
- b. What is extended binary tree? Explain the concept HBLT and WBLT. Write C++ member function to delete maximum element from a MaxHBLT. (08 Marks)
- 8 a. Define binary search tree. Construct a binary search tree for the following list of integers 20, 15, 25, 12, 10, 22 and determine rank of each node. Write C++ function :
- i) Search an element with key k (12 Marks)
 - ii) Insert element e into search tree. (12 Marks)
- b. Explain m-way search tree with the help of an example. (08 Marks)

USN

1K50EEC081

06EC762

Seventh Semester B.E. Degree Examination, December 2011
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 real time systems. Explain different types of real time systems. (04 Marks)
 b. Describe the elements of a computer control system. (08 Marks)
 c. Discuss the different types of programs in system design. (06 Marks)
 d. Classify RTS, based on time constraints. (02 Marks)
- 2 a. With an example, explain sequence control in field application. (10 Marks)
 b. Explain supervisory control, with an example. (05 Marks)
 c. Write a note on Hierarchical systems. (05 Marks)
- 3 a. Explain digital signal interference, with a neat diagram. (08 Marks)
 b. Describe multi - level interrupts. (06 Marks)
 c. Write an explanatory note on pulse input and output interfaces. (06 Marks)
- 4 a. Discuss the requirements that a user should look for, in a programming language. (08 Marks)
 b. Define the following with respect to real time programming languages :
 i) Scope and visibility ii) Global and local variables iii) Modularity
 iv) Data types v) Derived types vi) Exception handling. (12 Marks)

PART - B

- 5 a. Discuss the two methods of code sharing, in detail. (08 Marks)
 b. Briefly explain mutual exclusion. (06 Marks)
 c. What are the two scheduling strategies? Explain briefly. (06 Marks)
- 6 a. Explain data transfer without synchronization. (08 Marks)
 b. What do you mean by semaphores? Explain. (06 Marks)
 c. List and explain the three levels of priority structures. (06 Marks)
- 7 a. Explain mutual exclusion, using conditional flags. (06 Marks)
 b. With a neat flow chart, describe the single program approach, with reference to RTS design. (08 Marks)
 c. Write a note on the basic software module, with respect to RTS. (06 Marks)
- 8 Write explanatory notes on the following :
 a. Hatley and Pirbhai method. (10 Marks)
 b. Ward and Mellar method. (10 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.

USN

--	--	--	--	--	--	--	--	--	--

06EC767

**Seventh Semester B.E. Degree Examination, December 2011
Human Resource Management**

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define Human Resource Management. What are its functions and objectives? (10 Marks)
b. Define strategic management. Explain the strategic management process. (10 Marks)
- 2 a. What do you understand by human resource planning? Explain the various steps in the HRP process. (10 Marks)
b. Explain the process of job analysis. (10 Marks)
- 3 a. Define recruitment. Bring out the factors which influence recruitment. (10 Marks)
b. What is selection? Explain the process of selection. (10 Marks)
- 4 a. Explain the various inputs required for a training and development programme. (08 Marks)
b. What is performance appraisal? Outline briefly its objectives and appraisal process. (06 Marks)
c. Bring out the components of employee remuneration. (06 Marks)

PART – B

- 5 a. Explain the different types of incentive systems. (10 Marks)
b. Bring out the various employee benefits and services. (10 Marks)
- 6 a. Explain the factors which influence employee remuneration. (10 Marks)
b. Explain the steps to be considered in an industrial safety programme. (10 Marks)
- 7 a. Bring out the parties and their roles in industrial relations. (10 Marks)
b. Explain the strategies and tactics for remaining union – free. (10 Marks)
- 8 a. Explain how human resource management is evaluated. (10 Marks)
b. Write short notes on any TWO of the following :
i) Benefits of HRP.
ii) Campus recruitment.
iii) Job evaluation.
iv) Union legislation act. (10 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.

USN

--	--	--	--	--	--	--	--	--	--

06TE73

Seventh Semester B.E. Degree Examination, December 2011
Wireless 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. With a neat diagram, explain the network elements of the SS7 system. (08 Marks)
b. Explain with a suitable diagram, the AMPS network operations for a mobile-originated call. (08 Marks)
c. Name five different cell types in the cellular hierarchical coverage area. (04 Marks)
- 2 a. Explain with a neat diagram of typical wireless cellular system components. (08 Marks)
b. Explain the 3G mobile terminated call operation from the PSTN. (08 Marks)
c. Explain briefly three important subscriber device identification numbers. (04 Marks)
- 3 a. Explain the different capacity expansion techniques used in cellular system. (10 Marks)
b. Describe the process of power control used by cellular system. (06 Marks)
c. For a mobile system cluster size of 7, determine the frequency reuse distance, if the cell radius is 35 km. Repeat the calculation for a cluster size of 4. (04 Marks)
- 4 a. Explain the GSM protocols and signaling model. (10 Marks)
b. Explain the various logical channels, used in GSM. (06 Marks)
c. Construct the GSM hyperframe from normal burst. (04 Marks)

PART – B

- 5 a. Briefly explain the ten important operations need to be performed for call-setup in a GSM system. (10 Marks)
b. Explain the inter-MSC handover in GSM. (10 Marks)
- 6 a. With a neat block diagram, explain the network nodes found in a CDMA 2000 wireless system. (10 Marks)
b. Describe with a neat block diagram the generation of the CDMA forward / power control channel for 14.4 kbps traffic. (10 Marks)
- 7 a. Describe the steps a CDMA mobile goes through in the initialization/registration state. (08 Marks)
b. Explain with a neat diagram the typical radio base station. (08 Marks)
c. Describe CDMA soft hand off. (04 Marks)
- 8 a. Describe the implementation of a convolutional encoder with $k = 9$ and $R = 1/2$, used in CDMA 2000. (07 Marks)
b. Write a brief note on IEEE 802.11 standard technologies and its evolution. (07 Marks)
c. Explain the bluetooth link controller basics. (06 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.