

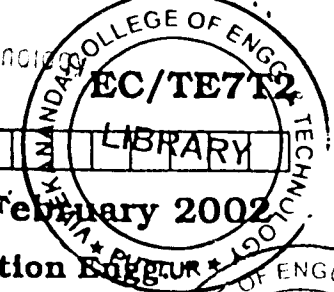
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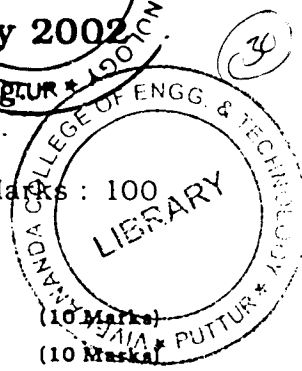
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**Seventh Semester B.E. Degree Examination, February 2002**

**Electronics & Communication/Telecommunication Engineering**

**Computer Communication Networks**



(Max. Marks : 100)

Time: 3 hrs.]

**Note:** Answer any FIVE full questions.  
All questions carry equal marks.

1. (a) Explain the OSI reference model. (10 Marks)  
(b) Compare STDM and ATDM. (10 Marks)
2. (a) With the help of timing of events diagram, compare the circuit switching, message switching and packet switching. (10 Marks)  
(b) Describe the working of ISDN. (5 Marks)  
(c) Bring out the standards used in ISDN. (5 Marks)
3. (a) Explain pure ALOHA and slotted ALOHA systems. Show that channel utilisation of slotted ALOHA is more than that of pure ALOHA. (10 Marks)  
(b) A group of N stations share 56 kbps pure ALOHA channel. Each station output a 1000 bits frame on an average of every 100 sec. What is the maximum value of N? (5 Marks)  
(c) What are the five key assumptions made during the dynamic channel allocation in LANs and MANs. (5 Marks)
4. (a) Give the salient features of IEEE 802.4 IEEE 802.5 standards for LAN. (10 Marks)  
(b) Explain the data link layer design issues. (10 Marks)
5. (a) Find CRC information and the transmitted information for the message.  
 $M(x) = 1101011011$ , the generator polynomial  $G(x) = x^4 + x + 1$  (4 Marks)  
(b) Explain in brief the elementary data link protocols. (10 Marks)  
(c) Describe the principle of sliding window protocols. (6 Marks)
6. (a) What are the desired properties of routing algorithm. (8 Marks)  
(b) Illustrate with a quantitative example routing in a two-level hierarchy. (6 Marks)  
(c) Find the shortest path from node A to H using Dijkstra algorithm for the network shown in-figure 6(c). (6 Marks)

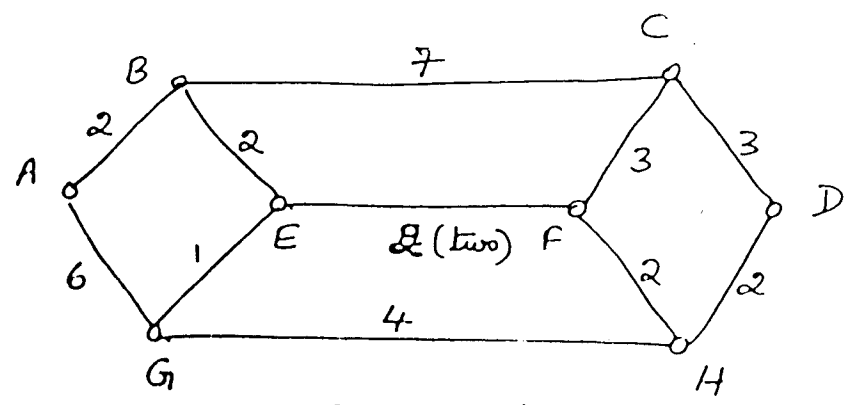


Fig. 6(c)

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(c) Consider an error free 64Kbps satellite channel to send 512 byte data frames in one direction, with very short acknowledgement coming back the other way. What is the maximum throughput for window sizes of 1,7 and 15? The round trip propagation time is 540m sec. (5 Marks)

6. (a) Differentiate between:  
 i) Adaptive and non-adaptive routing. (3+3 Marks)  
 ii) Broadcast and multicast routing. (1+7 Marks)

(b) What is the necessity of hierarchical routing? Explain how such networks are organized with an example. (6 Marks)

(c) How is subnet mask useful in IP addressing? Explain with an illustration. (6 Marks)

7. (a) A class B network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet? (4 Marks)

(b) Differentiate between  
 i) Interior gateway protocol and exterior gateway protocol. (3+3 Marks)  
 ii) IPv4 and IPv6.

(c) How does traffic policing differ from traffic shaping? Explain with suitable illustrations. (5+5 Marks)

8. (a) How is connection established and released in a transport layer? Discuss with timing diagrams. (4+4 Marks)

(b) Consider the effect of using slow start on a line with a 10m sec round trip time and no congestion. The receiver window is 24KB and the maximum segment size is 2KB. How long does it take before the first full window can be sent? (5 Marks)

(c) Draw the UDP header format and brief the function of each field. (3+4 Marks)

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Seventh Semester B.E. Degree Examination, July/August

Electronics &amp; Communication/Telecommunication Engg.

Computer Communication Networks

Time: \_\_\_\_\_

[Max. Marks : 100]

- Note: 1. Answer any FIVE full questions.  
2. Answers must be brief and to the point.  
3. Assume the missing data suitably.

1. (a) Draw and explain the structure of a computer network. (3+3 Marks)
- (b) Describe the ISO OSI reference model of a computer network. Discuss the function of each layer. (2+7 Marks)
- (c) What is network standardization? What are its advantages and disadvantages? (1+4 Marks)
2. (a) With the help of schematics, give a scheme for synchronous TDM and statistical TDM. (4+4 Marks)
- (b) Let  $x$  bits of user data are to be sent over a  $k$  hop path in a packet switched network as a series of packets, each containing  $p$  data bits and  $h$  header bits, with  $x \gg (p + h)$ . The line bit rate is  $b$  bps and the propagation delay is neglected. What value of  $p$  minimizes the total delay? (7 Marks)
- (c) What is a digital pipe? Discuss the ISDN channels standardized. (1+4 Marks)
3. (a) Explain the need for protocols and standards in computer networks. (5 Marks)
- (b) Explain CSMA/CD protocol as applied to LAN network with relevant diagrams and frame format. (3+3+3 Marks)
- (c) A 1km long, 10 Mbps CSMA/CD LAN has a propagation speed of  $200m/\mu\text{sec}$  data frames are 256 bits long, including 32 bits of overhead. The first bit slot after a successful transmission is reserved for the receiver to capture the channel to send a 32 bit ACK frame. What is the effective data rate (excluding overhead), assuming that there are no collisions? (6 Marks)
4. (a) Prove that for a slotted ALOHA system, the maximum throughput happens at  $G=1$  where  $G$  is the number of attempts per packet time. (8 Marks)
- (b) A group of  $N$  stations share a 56Kbps pure ALOHA channel. Each station outputs a 1000 bit frame on an average of once every 100sec, even if the previous one has not yet been sent. What is the maximum value of  $N$ ? (6 Marks)
- (c) Discuss the framing method used in systems using ASCII characters as transmission units. (6 Marks)
5. (a) What is pipelining? Explain Goback- $n$  protocol. (2+6 Marks)
- (b) Describe how finite state machine model is used for specifying and verifying protocols. (7 Marks)

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5. (a) Derive an expression for throughput of a slotted ALOHA system and compare this with pure ALOHA system. (8 Marks)
- (b) Measurements on a slotted ALOHA systems show that the throughput is 0.25. Is the channel overloaded or under loaded? What is the load on the network? (6 Marks)
- (c) What are the characteristics and properties of satellite communication link? (6 Marks)
6. (a) Explain the shortest path routing, with suitable illustrations. (4+4 Marks)
- (b) What are the advantages of adaptive algorithms? Explain link state routing with an example. (2+6 Marks)
- (c) For hierarchical routing with 4800 routers, what region and cluster sizes should be chosen to minimize the size of the routing table for a three layer hierarchy? (4 Marks)
7. (a) What is meant by traffic shaping? Discuss the leaky bucket algorithm with diagrams. (1+6 Marks)
- (b) What are the different classes of IP addressing? Explain, subnet addressing with an example. (2+6 Marks)
- (c) An ATM network uses a token bucket scheme for traffic shaping. A new token is put into the bucket every  $5 \mu\text{sec}$ . What is the maximum sustainable net data rate excluding header bits. (5 Marks)
8. (a) Describe the format of an ATM cell (4 Marks)
- (b) Explain the following issues of a transport protocol  
i) Addressing ii) Multiplexing (4+4 Marks)
- (c) What are the three phases of the TCP congestion control algorithm? Explain with a suitable diagram. (8 Marks)

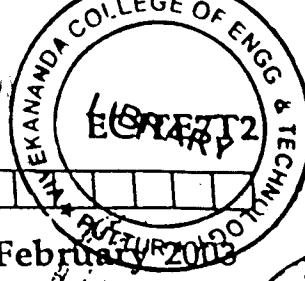
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Seventh Semester B.E. Degree Examination, January/February 2003

Electronics & Communication/Telecommunication Engg.  
Computer Communication Networks

Time: 3 hrs.]

Note: 1. Answer any FIVE full questions.  
2. Assume the missing data suitably.

1. (a) Explain the need for computer networking ; what are its advantages ? (2+4 Marks)  
(b) Differentiate between
  - i) Services and protocols
  - ii) Connection-oriented and connectionless service
  - iii) Confirmed and unconfirmed service (3+3+3 Marks)
- (c) Compare OSI reference model with TCP / IP reference model. (5 Marks)
2. (a) With suitable diagrams and data organized in time slots, explain how ATDM is superior to STDM. (4+3 Marks)  
(b) Compare the delay in sending an  $x$ -bit message over a  $k$ -hop path in a circuit switched network and in a packet switched network. The circuit setup time is  $s$  sec, the propagation delay is  $d$  sec per hop, the packet size is  $p$  bits & the data rate is  $b$  bps. Under what conditions the packet switching is better ? (7 Marks)  
(c) What are reference points in ISDN ? Explain with a suitable ISDN setup. (1+5 Marks)
3. (a) Discuss the various issues that are to be considered while designing the data link layer. (8 Marks)  
(b) Generate a CRC code for the data word 110101010 using the divisor 10101. Check if there are errors in the code word obtained. (5 Marks)  
(c) What are sliding window protocols ? Explain one - bit sliding window protocol. (1+6 Marks)
4. (a) A 1 Mbps satellite link is used to transfer packets 10,000 bits long. This includes 500 bits header. If the channel is error free and 270 m sec is the signal propagation time, obtain the efficiency for
  - i. Stop and wait protocol. (3+3 Marks)
  - ii. Sliding window protocol with window size 10.
- (b) After fifth collision, what is the probability that the node chooses 4 ? For this selection what will be the delay on 10 Mbps Ethernet ? (5 Marks)
- (c) Explain MAC sub layer protocol of Token ring network giving the details of frame format and ring maintenance. (9 Marks)

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- (c) An error free 64 kbps satellite channel is used to send 512 byte data frames with very short ACK frames coming back the other way. Find the maximum throughput for window sizes of 1 and 7. (5 Marks)
6. (a) What are the requirements of routing algorithms? Discuss hierarchical routing systems. Design two level and three level hierarchical systems for a network of 7200 nodes. Write the routing table size in each case. (10 Marks)
- (b) What is congestion in networks? Briefly describe any two methods to control congestion. (10 Marks)
7. (a) Discuss the problems involved in internet working. In this context, discuss  
i) Tunnelling ii) Fragmentation. (10 Marks)
- (b) Describe the IP header in IPV4. What is the maximum number of stations that can be addressed in IPV4 and IPV6. (10 Marks)
8. (a) With reference to transport layer, discuss the connection establishment and release protocols. (10 Marks)
- (b) Discuss the TCP transmission policy. In this context describe  
i) Nagle's algorithm ii) Silly window syndrome. (10 Marks)

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Seventh Semester B.E. Degree Examination, June 2003

Electronics & Communication/Telecommunication Engg.

**Computer Communication Networks**

Time: 3 hrs

(Max. Marks

Note: 1. Answer any FIVE full questions.

1. (a) Discuss the advantages of having layered architecture in communication networks. Describe the TCP/IP model. (3+7 Marks)
- (b) Identify and briefly describe the layers in the OSI model, that carry out the following functions.
  - i) Packetizing    ii) Framing    iii) Routing
  - iv) Encryption    v) Multiplexing (10 Marks)
2. (a) Compare circuit switching, packet switching and message switching methods with reference to delay, throughput, overhead etc. (6 Marks)
- (b) Suppose that  $x$  bits of data are to be sent over a  $K$  hop path with bit rate  $b$  bps, with propagation delay  $d$  sec/hop. The Circuit set up time is  $S$  sec, disconnection time is negligible. If packetized, the size of the packet is  $P$  bits plus  $h$  overhead bits. Find the total time required in circuit switching and packet switching. (8 Marks)
- (c) Write the  $T_1$  frame format. What is the percentage overhead in the frame? Explain how  $T_2$ ,  $T_3$ , and  $T_4$  streams are derived from  $T_1$  stream. (6 Marks)
3. (a) Compare pure ALOHA with slotted Aloha. What are the reasons for poor channel utilisation in ALOHA systems? Mention the possible alternatives to improve the channel utilisation. (8 Marks)
- (b) Discuss the concepts of
  - i) P-persistent CSMA    ii) Non-persistent CSMA systems. (6 Marks)
- (c) A 3000 kms long  $T_1$  trunk is used to transmit 64 byte data frames using sliding window protocol. If the propagation speed is  $5 \mu s/km$ , find the maximum possible window size. Assume very short ACK frames. (6 Marks)
4. (a) For the IEEE 8023 protocol, write the frame format and explain the different fields. Derive the equation for channel efficiency. (8 Marks)
- (b) A heavily loaded 1 km long, 10mbps token ring network has 50 uniformly spaced stations and uses a cable with  $5 \mu s/km$  propagation delay. Data frames are 256 bits long including 32 bits overhead. There are no ACK frames. Token has 8 bits. Find the effective data rate. (7 Marks)
- (c) A communication system uses CRC for error detection. The generator polynomial is  $x^4 + x + 1$ . The data string to be transmitted is 1101011011. Find the frame to be transmitted after CRC processing. (5 Marks)
5. (a) Discuss the stop and wait protocol. Derive an equation for its channel utilization. What are its disadvantages? (10 Marks)
- (b) Discuss one term "selective repeat" in sliding window protocols. (5 Marks)

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6. (a) Discuss the various issues that are to be considered in the design of network layer. (6)
- (b) Explain the shortest path routing with suitable illustrations. (4+4)
- (c) Consider the network shown in Fig 6.c.

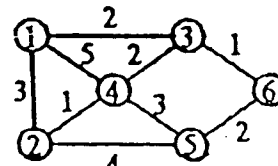


Fig 6.c.

Use the shortest path algorithm to find

- i) The shortest path from node 2 to node 6.
  - ii) The shortest path from node 2 to node 6. when the link between node 2 and node 4 goes down. (3+3)
7. (a) What do you mean by the term congestion? Discuss the various types of congestion and flow control algorithms. (2+6)
  - (b) What are the different classes of IP addressing? Explain subnet addressing with an example. (7)
  - (c) A class B network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet? (5)
8. (a) Explain the following issues of a transport protocol. (4+4)
    - i) Addressing
    - ii) Crash recovery.
  - (b) The maximum payload of a TCP segment is 65,515 bytes : Give reason. (4)
  - (c) What are the three phases of the TCP congestion control algorithm? Explain with a suitable diagram. (4+4)

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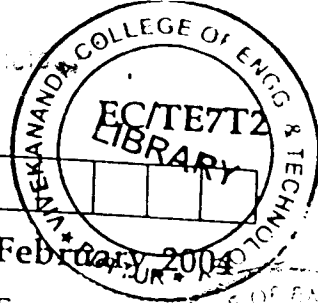
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Seventh Semester B.E. Degree Examination, January/February 2004

Electronics & Communication/Telecommunication Engg.

**Computer Communication Networks**

Time: 3 hrs.]

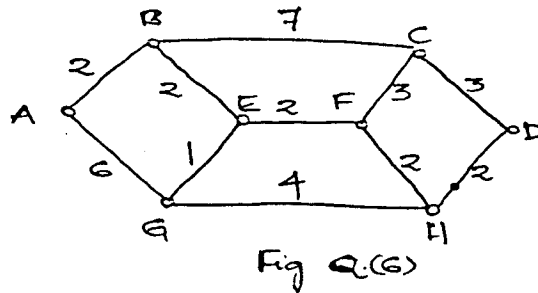
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- Note: 1. Answer any FIVE full questions.  
 2. Answers must be brief and to the point.  
 3. Assume missing data suitably.

1. (a) Explain the need for computer networking ; what are its advantages? (2+4 Marks)  
 (b) Explain with an example how data can be transmitted using OSI model. (9 Marks)  
 (c) Internet users are assumed to double every 18 months. If the number of users is 7 million in the year 2000, what will be the number of users in 2012? (5 Marks)
2. (a) What do you mean by statistical multiplexers? Explain with suitable diagrams. (1+6 Marks)  
 (b) What is the fundamental difference between circuit switching and virtual circuit switching? Explain with suitable timing diagrams. (2+5 Marks)  
 (c) 30 voice signals are to be multiplexed and transmitted over twisted pair. What is the bandwidth required for FDM? What is the data rate required for TDM using PCM when the frame contains 30 slots for voice information and two for signaling? (2+4 Marks)
3. (a) How is bit stuffing used in framing? Explain with an example. (3+3 Marks)  
 (b) If the CRC code is 10100010111100 and the generating polynomial is  $X^4 + X^3 + X^2 + 1$ , check if there is any error in the code word. (6 Marks)  
 (c) With suitable illustrations, explain selective repeat sliding window protocol. (4+4 Marks)
4. (a) Explain the typical characteristics of a LAN in terms of network type, bit rate, geographical extent, delay bandwidth product, addressing and cost. (6 Marks)  
 (b) Explain MAC sub layer protocol of Token ring network giving the details of frame format and ring maintenance. (8 Marks)  
 (c) After fifth collision, what is the probability that the node chooses 4? For this selection what will be the delay on a 10Mbps Ethernet? (6 Marks)
5. (a) Derive an expression for throughput of a slotted ALOHA system and compare this with pure ALOHA system. (8 Marks)  
 (b) Frames of 1000 bits are sent over a 1 Mbps satellite channel. Acknowledgements are always piggy backed onto data frames. The headers are very short. What is the maximum achievable channel utilization for  
 i) Stop and wait protocol  
 ii) Sliding window protocol with window size 26.  
 Given round trip propagation delay =  $270 \times 2$  msec. (6 Marks)  
 (c) Explain the important features of fibre optic networks. (6 Marks)

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5. (a) Explain the concept of sliding window protocol. What are its drawbacks? Explain the various enhancements suggested to overcome those. (10 Marks)
- (b) What is bit stuffing? What is its significance? If the bit string is 011011111011111011111010010 is bit stuffed, what is the output string? (5 Marks)
- (c) Distinguish between virtual circuit and datagram subnets. (5 Marks)
6. Given the following graph representing the network,



- a) Apply shortest path routing algorithm and find the routing table at each node. (10 Marks)
- b) Apply flow based routing algorithm to find the traffic and the routing matrix. (10 Marks)
7. (a) List the transport layer's quality of service parameters and explain them briefly. (10 Marks)
- (b) Under what conditions of delay, bandwidth, load and packet loss will TCP retransmit significant volumes of data unnecessarily? (10 Marks)
8. Write short notes on : (5×4=20 Marks)
- CSMA/CD Protocols
  - ATM header format
  - Satellite networks
  - Network applications.

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Seventh Semester B.E. Degree Examination, January/February 2005

Electronics & Communication/Telecommunication Engineering

**Computer Communication Networks**

[Max. Marks : 100]

Time: 3 hrs.]

Note: 1. Answer any FIVE full questions.  
2. All questions carry equal marks.

1. (a) What are the two reasons for using layered protocol? List the functions of each layer in TCP/IP reference model. (10 Marks)
- (b) State and explain the significance of Shannon's theorem. What signal to noise ratio is needed to put a T1 carrier on a 50 KHz line? (10 Marks)
2. (a) Distinguish between circuit switched and packet switched networks. For an application like FTP what is the preferred type network - comment. (5 Marks)
- (b) Describe the ISDN system architecture. (5 Marks)
- (c) Give the salient features of both TDM and FDM. (10 Marks)
3. (a) Give the 802.3 frame format. Comment on the length field. (5 Marks)
- (b) Sketch Manchester and differential Manchester encoding for the data stream 1000101111. (5 Marks)
- (c) A 10 Base 5 Ethernet has a 250m bus. Calculate the following parameters for the network
  - i) Maximum medium length
  - ii) Medium propagation speed.
  - iii) Maximum propagation delay.
  - iv) Capacity = number of Bits a station can transmit per second.
  - v) Average frame bit length
  - vi) Average frame transmission time
  - vii) Bit length of the frame
  - viii) Value of parameter  $a = \frac{\text{Maximum propagation delay}}{\text{Average transmission time}}$ . (10 Marks)
4. (a) Give the frame structure of FDDI. Briefly explain each field. (5 Marks)
- (b) Given the message bit stream to be 1101011011 and the generator bit stream to be 10011, compute the actual bit stream transmitted. If the received stream is 11000110111010, what is the remainder at the receiver end and what is your conclusion about this transmission? (10 Marks)
- (c) Where are hamming codes used and how? (5 Marks)

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(6 Marks)

(8 Marks)

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5. (a) Compare virtual-circuit and datagram types of subnets. (6 Marks)
  - (b) Explain hierarchical routing with an example. (8 Marks)
  - (c) A network on the internet has a subnet mask of 255.255.240.0. What is maximum number of hosts that it can handle? (3 Marks)
  - (d) Convert IP address whose hexa decimal representation is C22F1582 to dotted decimal notation. (3 Marks)
6. (a) Mention the techniques for achieving good quality of service (QOS). Explain how leaky bucket algorithm is used to achieve QOS. (8 Marks)
  - (b) If delays are recorded as 8 bit numbers in a 50 router network, and delay vectors are exchanged twice a second, how much band width per line is consumed by distributed routing algorithm? Assume that each router has three lines to other routers. (6 Marks)
  - (c) Differentiate between IPV4 and IPV6. (6 Marks)
7. (a) Explain the different fields in the TCP header and mention the fields that are used for addressing, error control and flow control. (8 Marks)
  - (b) Explain three way handshake based connection establishment in TCP. (8 Marks)
  - (c) Suppose that the TCP congestion window size is set to 18kB and a time out occurs. How big will the window be if next four transmission bursts are all successful? Assume that maximum segment size is 1kB. (4 Marks)
8. Write notes any FOUR :
    - a) Address resolver in DNS
    - b) www
    - c) SMTP
    - d) Congestion control
    - e) Broadcast routing

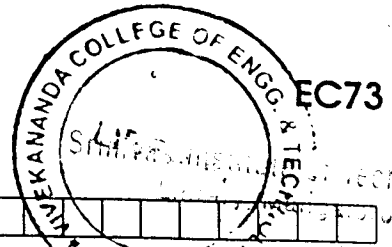
(4 x 5 = 20 Marks)

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NEW SCHEME

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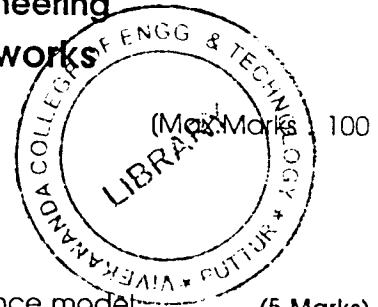


## Seventh Semester B.E. Degree Examination, January/February 2006

### Electronics and Communication Engineering

### Computer Communication Networks

Time: 3 hrs.)



- Note:** 1. Answer any FIVE full questions.  
2. All questions carry equal marks.

1. (a) Differentiate between OSI and TCP/IP network reference model. (5 Marks)
- (b) What is Peer-to-Peer communication? Give an example. (5 Marks)
- (c) Describe the Internet architecture. (5 Marks)
- (d) Five routers are to be connected in a point-to-point subnet. Between each pair of routers, the designer may put a high, medium, low speed line or no line. If it takes 200ms of computer time to generate and inspect each of topology, how long will it take to inspect all of them? (5 Marks)
2. (a) If a binary signal is sent over a 3 kHz channel whose S/N ratio is 30dB, what is maximum achievable data rate? (4 Marks)
- (b) Differentiate between circuit switching and packet switching. (5 Marks)
- (c) Ten signals of 4000 Hz each are multiplexed on to a single channel using FDM. Find out the minimum band width required for the multiplexed channel. Assume guard bands are 400Hz wide (6 Marks)
- (c) Differentiate between character stuffing and bit stuffing with examples. (5 Marks)
3. (a) A bit stream 100 111 01 is transmitted using CRC method. The generator polynomial is  $x^3 + 1$ . Show the actual bit string transmitted. (6 Marks)
- (b) A channel has a bit rate of 4 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop and wait protocol give an efficiency of atleast 50%? (4 Marks)
- (d) Differentiate between pure ALOHA and slotted ALOHA. (10 Marks)
4. (a) What is need of using Manchester encoding in 802.3 Ethernet? Give example of Manchester coding. (5 Marks)
- (b) Describe functioning of an ethernet switch. (5 Marks)
- (c) Explain DCF & PCF modes of 802.11 MAC protocol. (5 Marks)
- (d) Define the following :
  - i) Repeater ii) Hub
  - iii) Switch iv) Router
  - iv) Gateway

(5 Marks)

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- 5 a. Describe i. Why wireless LAN is becoming popular. (10Marks)  
ii. CSMA / CA and its modes of operation. (06Marks)
- b. Write a note on virtual LAN.
- c. A receiver that uses CRC receives the message bits 11110000 11 00 and uses the generator polynomial  $x^4 + x^3 + 1$ . Find out whether the message has encountered error during transmission. (04Marks)
- 6 a. Describe the principle of i. Link state routing ii. Hierarchical routing. (08Marks)
- b. Discuss the need for a Bridge in interconnecting LANS. With a diagram explain the connectivity of wireless LAN with Ethernet, using suitable bridge circuit. (06Marks)
- c. Consider a subnet of 720 routers. Discuss how this can be partitioned into three hierarchical regions and find out the routing table entries in each region. Assume data suitably in making the partition. (06Marks)
- 7 a. Describe the structure and various fields of i. TCP header ii. UDP header. (08Marks)
- b. What is congestion in network? Discuss. Briefly describe the methods of congestion control. (06Marks)
- c. Discuss Class - A and class - B methods of Internet addressing. Mention minimum and maximum range possible with these types of addressing. (06Marks)
- 8 a. What is meant by QOS? Discuss the Leaky Bucket algorithm to ensure quality of service. (10Marks)
- b. Write short notes on : i. Blue Tooth technology. (10Marks)  
ii. Giga - bit Ethernet.

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**NEW SCHEME**

**Seventh Semester B.E. Degree Examination, May - June 2006**  
**EC / TE**

**Computer Communication Networks**

Time: 3 hrs.]

[Max. Marks:100

*Note: Answer any FIVE questions.*

- 1 a. Differentiate between :
  - i. Hub and Web.
  - ii. Service and protocol.
  - iii. Connectionless and connection oriented service.
  - iv. Confirmed and unconfirmed service. (08Marks)
- b. Explain TCP / IP model and compare it with OSI model. (08Marks)
- c. Identify the specific OSI layers which are responsible for the following:
  - i. Routing of packets.
  - ii. Compression of data.
  - iii. Providing end to end reliable services.
  - iv. Providing node to node reliable services. (04Marks)
- 2 a. Compare
  - i. Coaxial and optical medium.
  - ii. Wired and wireless communication. (08Marks)
- b. Describe the salient aspects of a Telephone system, indicating a typical circuit route for a maximum distance call. Explain local loop-wired as well as wireless. (08Marks)
- c. Calculate the channel capacity of a telephone channel having a Band width of 3.4 kHz and SNR of 40 dB. (04Marks)
- 3 a. Discuss the design issues related to data link layer. (04Marks)
- b. What is ARQ? Discuss in detail
  - i. Pipe lining.
  - ii. Go-back-N protocol. (10Marks)
- c. A sending station lends frames of 1 k byte length at a rate of 4 Mbps over a link, with a round trip time of 40 ms. Calculate the minimum value of time out time. Calculate effective line rate and efficiency of the algorithm. (06Marks)
- 4 a. Describe the various versions of CSMA protocol and CSMA / CD. (08Marks)
- b. Differentiate between :
  - i. IEEE 802.3 and DIX frame format.
  - ii. Thick and thin Ethernet (08Marks)
- c. Sketch
  - i. Manchester
  - ii. Differential Manchester
 Encoding for bit pattern 10011. (04Marks)

Contd...2

- 6 a. What are the general principles of congestion control algorithms? Explain the leaky bucket algorithm. (10 Marks)
- b. Explain shortest path routing with suitable illustrations. (10 Marks)
- 7 a. Explain the different fields in TCP header and mention the fields that are used for addressing, error control and flow control. (08 Marks)
- b. Explain three way hand shake based connection establishment in TCP. (08 Marks)
- c. A TCP connection has a 65, 535 bytes windows sent over 1 Gbps channel. Round trip time is 20 m. Determine maximum achievable throughput. (04 Marks)
- 8 Write short notes on any four :
  - a. Blue tooth technology.
  - b. Gigabit Ethernet.
  - c. QOS parameters with respect to transport layer.
  - d. SMTP.
  - e. IPV6.

(20 Marks)

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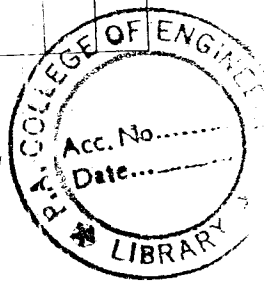
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**NEW SCHEME**



Seventh Semester B.E. Degree Examination, Dec.06 / Jan.07  
Electronics & Communication Engineering  
**Computer Communication Networks**

[Max. Marks:100]

[Time: 3 hrs.]

Note: 1. Answer any FIVE full questions.  
2. Assume missing data suitably.

- 1 a. Explain the need for computer networking. What are the uses of computer network? (06 Marks)
- b. Differentiate between :
  - i) Services and protocols.
  - ii) Connection oriented and connectionless services. (09 Marks)
  - iii) Broad cast and point to point communication. (09 Marks)
- c. Compare OSI reference model with TCP/IP reference model.
- 2 a. Compare circuit switching, packet switching and message switching methods with reference to delay, throughput and overhead. (08 Marks)
- b. If a binary signal is sent over a 3 kHz channel whose S/N ratio is 30 dB, find the maximum achievable data rate? (06 Marks)
- c. Ten signals of 4000 Hz each are multiplexed, on to a single channel using FDM. Find out the minimum bandwidth required for multiplexed channels. Assume guard bands are 400 Hz wide. (09 Marks)
- 3 a. What is framing? Mention various framing techniques. Explain how bit stuffing is used in framing? (04 Marks)
- b. If the CRC code is 10100010111100 and generator polynomial is  $x^4 + x^3 + x^2 + 1$ , check if there is any error in the code word. (06 Marks)
- c. What are sliding window protocols? Explain Go-back-n protocol. (09 Marks)
- 4 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. (06 Marks)
  - ii) Non-persistent CSMA.
- c. Explain working of CSMA/CD. Compare throughput as a function of load for different random access protocols with a graph. (06 Marks)
- 5 a. Compare virtual circuit and datagrams of subnets. (06 Marks)
- b. Explain hierarchical routing with example. (07 Marks)
- c. Find the subnet address for the following : (04 Marks)

IP address	Mask
125.54.12.56	255.255.0.0
141.181.80.16	255.255.224.0

d. Convert IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. (03 Marks)

Contd.....2



- 6 a. What are the general principles of congestion control algorithms? Explain the leaky bucket algorithm. (10 Marks)
- b. Explain shortest path routing with suitable illustrations. (10 Marks)
- 7 a. Explain the different fields in TCP header and mention the fields that are used for addressing, error control and flow control. (08 Marks)
- b. Explain three way hand shake based connection establishment in TCP. (08 Marks)
- c. A TCP connection has a 65, 535 bytes windows sent over 1 Gbps channel. Round trip time is 20 m. Determine maximum achievable throughput. (04 Marks)
- 8 Write short notes on any four :
  - a. Blue tooth technology.
  - b. Gigabit Ethernet.
  - c. QOS parameters with respect to transport layer.
  - d. SMTP.
  - e. IPV6.(20 Marks)

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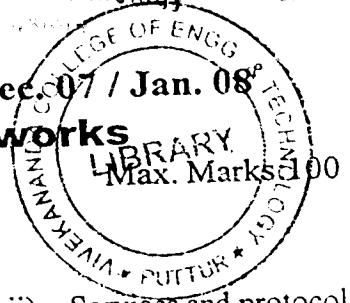


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Seventh Semester B.E. Degree Examination, Dec. 07 / Jan. 08

Computer Communication Networks



22

Time: 3 hrs.

Note : Answer any FIVE full questions.

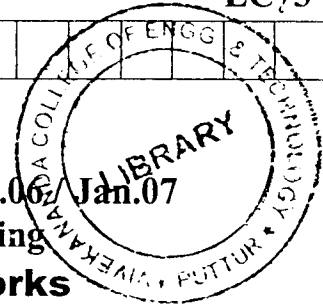
- 1 a. List the differences between:
  - i) Connection oriented and connectionless communication. (05 Marks)
  - ii) Services and protocols. (05 Marks)
  - iii) OSI and TCP/IP (04 Marks)
- b. What are the principles that were applied to arrive at the seven layers? (06 Marks)
- c. Explain in brief the four main applications of Internet and its predecessors. (04 Marks)
- d. Explain the ATM reference model. (06 Marks)
  
- 2 a. Explain the following:
  - i) Twisted pair (05 Marks)
  - ii) Radio transmission. (05 Marks)
- b. State the advantages of fiber optics over copper wires. (06 Marks)
- c. Compare circuit switched network with packet switched network. (06 Marks)
- d. A telephone system consists of two end offices and a single toll office to which each end office is connected by a 1 MHz full-duplex trunk. The average telephone is used to make four calls per 8-hour workday. The mean call duration is 6 min. Ten percent of the calls are long-distance (i.e. pass through the toll office). What is the maximum number of telephones an end office can support? (Assume 4 kHz per circuit). (04 Marks)
  
- 3 a. List the methods of framing. Explain Byte stuffing and Bit stuffing. (07 Marks)
- b. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is  $x^3 + 1$ . Show the actual bit string transmitted. Assume that the third bit from the left is inverted during transmission. Show that this error is detected at receiver's end. (05 Marks)
- c. Explain the effect of pipelining on error recovery.
  - i) When receiver's window size is one. (08 Marks)
  - ii) When receiver's window size is large. (10 Marks)
  
- 4 a. Give the frame format for bit oriented protocols. Explain. (05 Marks)
- b. Explain the five key assumptions for dynamic channel allocation in LANS and MANS. (05 Marks)
- c. Explain the five distribution services that are provided by the base stations according to 802.11 standard. (05 Marks)
  
- 5 a. Explain how store and forward switches have an advantage over cut-through switches with respect to damaged frames. (02 Marks)
- b. Compare virtual circuit subnet with the datagram subnet. (06 Marks)
- c. Mention the types of routing algorithm. Explain the link state routing. (12 Marks)
  
- 6 a. Explain the policies that affect congestion in the network layer. (04 Marks)
- b. List the techniques, the system designers use to achieve good quality of service. Explain the leaky bucket algorithm. (10 Marks)
- c. Explain the IPV4 header format. (06 Marks)
  
- 7 a. Explain (CIDR) Classless Inter Domain Routing. (05 Marks)
- b. Explain the five primitives for a simple transport service. (05 Marks)
- c. Explain the UDP and TCP header. (10 Marks)
  
- 8 a. Explain the connection establishment and connection release in TCP. (05 Marks)
- b. Explain the five basic functions that email system support. (05 Marks)
- c. List the principal header fields related to message transport. Explain. (10 Marks)

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<b>NEW SCHEME</b>
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**Seventh Semester B.E. Degree Examination, Dec.06/Jan.07**  
**Electronics & Communication Engineering**  
**Computer Communication Networks**



Time: 3 hrs.]

[Max. Marks:100

**Note: 1. Answer any FIVE full questions.**  
**2. Assume missing data suitably.**

- 1
  - a. Explain the need for computer networking. What are the uses of computer network? (06 Marks)
  - b. Differentiate between :
    - i) Services and protocols.
    - ii) Connection oriented and connectionless services.
    - iii) Broad cast and point to point communication. (09 Marks)
  - c. Compare OSI reference model with TCP/IP reference model. (05 Marks)
  
- 2
  - a. Compare circuit switching, packet switching and message switching methods with reference to delay, throughput and overhead. (08 Marks)
  - b. If a binary signal is sent over a 3 kHz channel whose S/N ratio is 30 dB, what is maximum achievable data rate? (05 Marks)
  - c. Ten signals of 4000 Hz each are multiplexed, on to a single channel using FDM. Find out the minimum bandwidth required for multiplexed channels. Assume guardbands are 400 Hz wide. (07 Marks)
  
- 3
  - a. What is framing? Mention various framing techniques. Explain how bit stuffing is used in framing? (06 Marks)
  - b. If the CRC code is 10100010111100 and generator polynomial is  $x^4 + x^3 + x^2 + 1$ , check if there is any error in the code word. (06 Marks)
  - c. What are sliding window protocols? Explain Go-back-n protocol. (08 Marks)
  
- 4
  - 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 working of CSMA/CD. Compare throughput as a function of load for different random access protocols with a graph. (06 Marks)
  
- 5
  - a. Compare virtual circuit and datagrams of subnets. (06 Marks)
  - b. Explain hierarchical routing with example. (07 Marks)
  - c. Find the subnet address for the following : (04 Marks)

IP address	Mask
125.54.12.56	255.255.0.0
141.181.80.16	255.255.224.0

- d. Convert IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. (03 Marks)

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EC73

**Seventh Semester B.E. Degree Examination, May / June 08**  
**Computer Communication Networks**

Time: 3 hrs.

Note : Answer any FIVE full questions.

Max. Marks:100

- 1
  - a. Differentiate between TCP /IP and OSI model. (04 Marks)
  - b. Explain the working of internet by using a neat diagram of internet architecture. (08 Marks)
  - c. A dog is trained to carry a box of five 8 mm tapes. Each tape contains 10 gigabytes. The dog can travel to your side, wherever you are at 20 km /hour. For what range of distance does dog have a higher data rate than a transmission line whose data rate is 150 Mbps? (08 Marks)
- 2
  - a. Define the following with examples :
    - i) Bit rate
    - ii) Baud rate
    - iii) Nyquist maximum data rate
    - iv) Shannon's data rate.
  - b. Differentiate between circuit and packet switching. (08 Marks)
  - c. Ten signals, each requiring 4000 Hz are multiplexed on to a single channel using FDM. How much minimum band width is required for multiplexed channel? Assume Guard bands are 400 Hz wide. (06 Marks)
- 3
  - a. Why bit stuffing is needed in bit oriented protocols? Explain with an example. (06 Marks)
  - b. Explain one bit sliding window protocol with neat illustrations. (06 Marks)
  - c. Frames of 1000 bits are sent over a 1 Mbps channel using a geostationary satellite whose propagation time from earth is 270 m sec. Acknowledgements are always piggybacked into data frames. Headers are very short. 3 bit sequence numbers are used. What is minimum achievable channel utilization for stop – and – wait and window protocol? (08 Marks)
- 4
  - a. Derive an expression for through put of pure and slotted ALOHA. (06 Marks)
  - b. Explain binary exponential backoff algorithm used in Ethernet. (06 Marks)
  - c. Describe distributed and centralized MAC access in 802.11 WLANS. (08 Marks)
- 5
  - a. Describe Bellman –ford routing algorithm using an example. (08 Marks)
  - b. Explain leaky bucket algorithm used for traffic shaping. (06 Marks)
  - c. What is subnetting? Why is it required? Explain with an example. (06 Marks)
- 6
  - a. Explain connection establishment in TCP. (06 Marks)
  - b. A TCP machine is sending full windows of 65, 535 bytes over a 1 Gbps channel that has 10 m sec one way delay. What is maximum achievable throughput? What is line efficiency? (06 Marks)
  - c. Explain window management in TCP. Describe Nagle's algorithm when byte by byte transfer is done over the network. (08 Marks)
- 7
  - a. Describe DNS name space. (08 Marks)
  - b. Describe the web model. (08 Marks)
  - c. What is bit rate for transmitting uncompressed 800 × 600 pixel color frames with 8 bits /pixel at 40 frames /sec. (08 Marks)
- 8
 

Write short notes on any FOUR :

  - a. Classful addressing
  - b. Bluetooth
  - c. Link state routing
  - d. QOS
  - e. SMTP.

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(20 Marks)

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# 2002 SCHEME

EC74

## Seventh Semester B.E. Degree Examination, Dec.08/Jan.09

### VLSI Circuits

Time: 3 hrs.

Max. Marks:100

- Note:1. Answer any FIVE full questions.  
2. Missing data if any may be assumed.  
3. Standard notations are used.**

- 1
  - a. Explain the complexity of VLSI design using design funnel. (06 Marks)
  - b. State and explain Moores law. (04 Marks)
  - c. Explain in detail the general overview of design hierarchy. (10 Marks)
  
- 2
  - a. Explain how pFET can act as pass transistor. (04 Marks)
  - b. Design a CMOS logic gate for the function:  $f = (a.b + a.c + b.d)$ . (06 Marks)
  - c. Design a NORZ gate using 4:1 MUX. (05 Marks)
  - d. Apply the bubble pushing to obtain PFET logic in figure Q2 (d), (05 Marks)

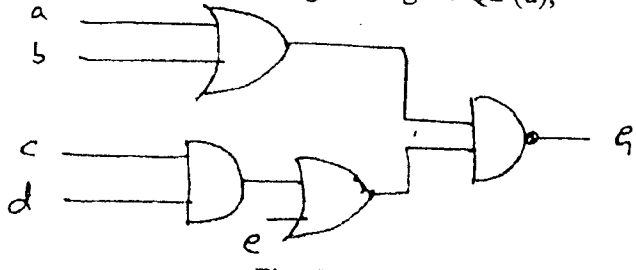


Fig. Q2 (d)

- 3
  - a. Derive an expression for line resistance and line capacitance. (08 Marks)
  - b. Derive an expression for current and linear resistance  $R_n$  of nFET. (06 Marks)
  - c. Consider a gateoxide which has a thickness of  $t_{OX} = 50\text{\AA}$ . Calculate oxide capacitance and gate capacitance, if dimensions of gate is  $1 \times 10^{-4}$  cm and  $0.4 \times 10^{-4}$  cm respectively. (06 Marks)
  
- 4
  - a. List out the layout of basic structure and define the design specification for active area, pFET, metal line with active contact. (08 Marks)
  - b. Consider a nFET with an aspect ratio of  $(\frac{w}{L})_r = 4$  that is constructed in a process, where  $r = 2.4$ . What is the aspect ratio of pFET with the same resistance as nFET? Find the gate capacitance of pFET. (06 Marks)
  - c. Explain the cell design concept along with the rules in detail. (06 Marks)
  
- 5
  - a. Derive an expression for midpoint voltage of an inverter. (08 Marks)
  - b. Consider a CMOS process with the following parameters  $k'_n = 100\mu\text{A}/\text{V}^2$ ,  $V_{Tn} = +0.70\text{V}$ , Power supply  $V_{DD} = 3.3\text{V}$ ,  $k'_p = 42\mu\text{A}/\text{V}^2$ ;  $V_{Tp} = -0.80\text{V}$ ,  $(\frac{w}{L})_n = 10$ ,  $(\frac{w}{L})_p = 14$ . Find the midpoint voltage  $V_M$ . (06 Marks)
  - c. Derive an expression for total power dissipation of CMOS inverter. (06 Marks)



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Seventh Semester B.E. Degree Examination, Dec.08/Jan.09

**Computer Communication Network**

Time: 3 hrs.

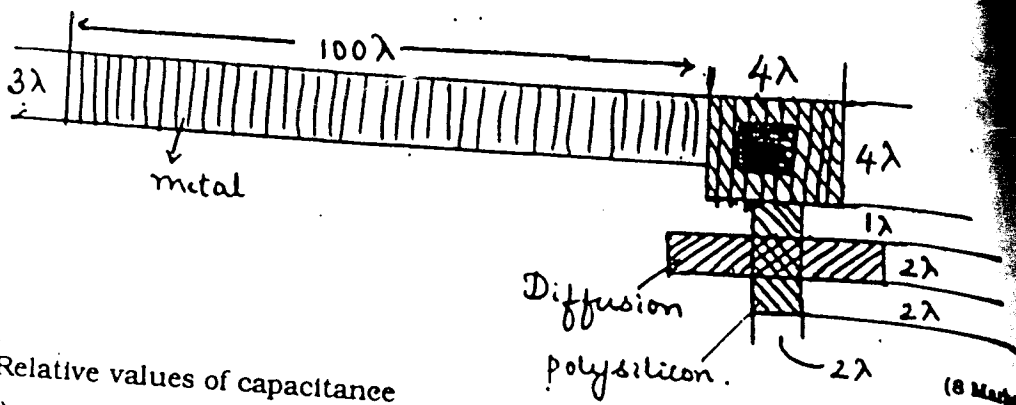
Max. Marks:100

**Note : Answer any FIVE full questions.**

- 1 a. Differentiate between the following :  
 i) Presentation and Application layer.  
 ii) Bus and Ring topologies.  
 iii) LAN and WAN. (06 Marks)
- b. Explain 'Multimedia' transmission over internets. (06 Marks)
- c. Discuss the features of SONET network and advantages offered by it. (08 Marks)
- 2 a. What is meant by 'Ethernet'? Explain its main features. (05 Marks)
- b. Explain ATM reference model. (05 Marks)
- c. Differentiate between FDM, TDM and WDM. (06 Marks)
- d. T<sub>1</sub> carrier transmission is done over a network. What percentage of total bandwidth is used for overhead transmission? (04 Marks)
- 3 a. Describe flow control mechanism adopted in data link layer. (06 Marks)
- b. Explain the frame format of a bit oriented protocol. (10 Marks)
- c. A 12 – bit Hamming code whose hexadecimal value in 0 x B4F arrives at a receiver. What was original data in hexadecimal? (04 Marks)
- 4 a. Explain in detail one bit sliding window protocol. (07 Marks)
- b. Describe the use of pipelining techniques in data link layer protocols for receivers having window size > 1. (08 Marks)
- c. A 3000 km long T<sub>1</sub> trunk is used to transmit 64 byte frames using 'Go back N' protocol. If propagation speed is 6 μ sec/km, how many bits should the sequence number be? (05 Marks)
- 5 a. Describe the different CSMA techniques employed in MAC layer. (06 Marks)
- b. Describe the 802.11 MAC sublayer protocol. (08 Marks)
- c. Define : i) Repeater. ii) Bridges. iii) Gateways. (06 Marks)
- 6 a. Compare and contrast VC and datagram subnets. (06 Marks)
- b. With an example, describe Bellman – Ford routing algorithm. What are its serious drawbacks? (10 Marks)
- c. For hierarchical routing with 4800 routers, what region and cluster sizes should be chosen to minimize the size of the routing table for a three layer hierarchy? (04 Marks)
- 7 a. Define QoS. Describe the QoS parameters defined for computer networks. (06 Marks)
- b. Explain with neat figures, leaky bucket algorithm. (06 Marks)
- c. With a neat diagram, explain IP version 4 header format. (08 Marks)
- 8 a. With neat diagrams, explain and compare the UDP with TCP header. (10 Marks)
- b. Describe transport service primitives used in TCP services. (10 Marks)

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shown below.



Relative values of capacitance

- i) Gate to channel 1.0.
- ii) Poly to substrate 0.1.
- iii) Metal to substrate 0.75.

Standard unit of capacitance for 5 micron technology =  $4 \times 10^{-4}$  pF/micrometre

6. (a) Explain different types of scaling models. Write down the scaling factors used for these models. (5 Marks)
- (b) Bring out the effect of scaling on the following parameters in all 3 models:
- i) Gate capacitance.
  - ii) Maximum operating frequency.
  - iii) Power speed product.
- (c) Discuss the choice of metal, silicide and polysilicon layers in MOS circuits. (10 Marks)
7. (a) Give unstructured block diagram and truth table for bus arbitration logic for n - line bus along with algebraic equations for bus outputs. (5 Marks)
- (b) Explain how the above logic can be implemented with n MOS transistors with relevant stick diagram without using '0' diffusion lines. (10 Marks)
8. Write short notes on the following.
- a) Super buffer.
  - b) Bi CMOS inverter.
  - c) Dynamic CMOS logic.
  - d) VLSI design style and philosophy.

(5 × 4 = 20 Marks)

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## Seventh Semester B.E. Degree Examination, Dec.09/Jan.10 Computer Communication Networks

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.  
choosing at least two full questions from each part.**

### PART-A

- 1 a. Show the layer representation in the TCP/IP model and the OSI model and explain. (10 Marks)  
 b. Give a brief overview of SS7 signaling. (05 Marks)  
 c. Match the following functions to the appropriate layers in the OSI model.  
     i) Dividing the transmitted bit stream into frames.  
     ii) Determining the route to be used through the subnet.  
     iii) Reliable process to process message delivery.  
     iv) Format and code conversion services.  
     v) Accessing the World Wide Web. (05 Marks)
  
- 2 a. Explain the selective repeat sliding window protocol with necessary figures. (10 Marks)  
 b. A channel has a bit rate of 4 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop and wait protocol give an efficiency of at least 50%. (06 Marks)  
 c. Perform bit stuffing on the given bit stream 011011111011111101111111010. Assume flag as 01111110. (04 Marks)
  
- 3 a. Explain CSMA and show the behaviour of the three persistence methods of CSMA. Compare the vulnerable times in CSMA and CSMA/CD. (10 Marks)  
 b. 10,000 stations are competing for the use of a single slotted ALOHA channel. The average station makes 18 requests/hour. A slot is 125 μsec. What is the approximate total channel load? (05 Marks)  
 c. In a CDMA system the four chip sequences are :  
     A = (-1 -1 -1 +1 +1 -1 +1 +1)  
     B = (-1 -1 +1 -1 +1 +1 +1 -1)  
     C = (-1 +1 -1 +1 +1 +1 -1 -1)  
     D = (-1 +1 -1 -1 -1 -1 +1 -1) in bipolar form.  
     If the received sequence is (-1 +1 -3 +3 +1 -1 -1 +1) what is the data transmitted by the four stations. (05 Marks)
  
- 4 a. Give the format for the IEEE 802.3 frame for Ethernet. What are the minimum and maximum frame lengths? (07 Marks)  
 b. Identify if the following 802.3 MAC addresses are unicast, multicast or broadcast.  
     i) 47 : 20 : 1B : 2E : 08 : EE  
     ii) EE : FF : 10 : 01 : 11 : 00  
     iii) FF : FF : FF : FF : FF : FF. (03 Marks)  
 c. What are the hidden and exposed station problems in wireless Lan's. Give solutions for each. (10 Marks)

### PART-B

- 5 a. Explain each of the following in brief.  
     i) passive Hub      ii) repeater      iii) bridge      iv) router      v) gateway. (10 Marks)  
 b. Give the IPV4 datagram format and explain its fields. (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. What are the differences between classful addressing and classless addressing in IPV4. (10 Marks)
- b. An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP needs to distribute these addresses to the group of customers as follows :
  - i) First group has 64 customers, each needs 256 addresses
  - ii) Second group has 128 customers, each needs 128 addresses
  - iii) Third group has 128 customers, each needs 64 addresses. Design the subblocks and find out how many addresses are still available after these allocations. (10 Marks)

- 7 a. Explain the distance vector routing for the following example.

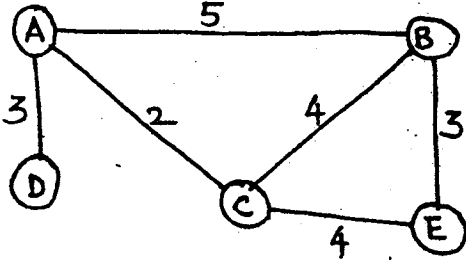


Fig. Q7(a)

- b. Compare multicasting with multiple unicasting. Differentiate between source based tree and group shared tree approach used in multicast routing. (10 Marks)
- 8 a. Describe a TCP connection and explain a TCP connection establishment using three way handshaking. (10 Marks)
  - b. Explain recursive resolution and iterative resolution in name address resolution. (10 Marks)

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