NEW SCHEME

CS64

USN ☐☐☐☐☐☐☐☐☐☐

Sixth Semester B.E. Degree Examination, July/August 2005

Computer Science

Computer Networks - I
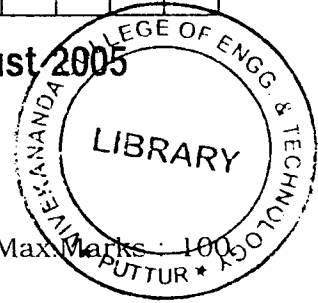
Time: 3 hrs.]

[Max. Marks: 100

Note: *Answer any FIVE full questions.*

1. (a) Briefly describe

    i) Service primitives   ii) Multicasting   iii) SAP.   (6 Marks)

   (b) Illustrate, with a diagram, the layered architecture and how communication takes place in a typical computer network. What is the purpose of adding headers at the layers. (8 Marks)

   (c) Suppose a network comprises 5 layers at each end of the users A and B. Suppose A sends a message of length 128 K. bytes to B. At each of the layers, other than the top layer, the system attaches a header of uniform size of k bytes. If the ratio of the header bandwidth to the message size for transmission is 25% what is the value of k? (6 Marks)

2. (a) What are the desirable characteristics of routing algorithms. Distinguish between the terms 'Adaptive' and 'Nonadaptive' algorithms. (6 Marks)

   (b) Describe the steps involved in registering a new host under a mobile network. (6 Marks)

   (c) Take a typical case of a wide area network comprising six nodes. Describe how a new routing table is created for anyone of the nodes in this network making use of Distance Vector routing. (8 Marks)

3. (a) Give a brief description of the following under congestion :

    i) Load shedding   ii) Jitter control. (6 Marks)

   (b) What do you understand by quality of service (Q oS) in Computer networks? Suggest at least two techniques to achieve good quality of service. (8 Marks)

   (c) Token bucket algorithm is employed to prevent congestion. The capacity of the bucket is 250K bytes. Arriving rate of the token is 2 MB/sec. If the maximum output rate is 25 MB/sec, calculate the burst length in time. (6 Marks)

4. (a) Describe the three principles, out of the top 10, considered in the design of network layer in the internet. (6 Marks)

   (b) Illustrate with a diagram the five address formats used in internet. (8 Marks)

   (c) A network on the internet has a subnet mask 255.255. 240.0. What is the maximum No. of hosts it can handle? (6 Marks)

5. (a) What are the basic differences between IPv4 and IP v6? (8 Marks)

   (b) Illustrate with a diagram the principle of address resolution protocol. (8 Marks)

   (c) Distinguish between Interior gateway protocol and Exterior gateway protocol. (4 Marks)

6. (a) Under the topic of transport service, what is meant by nesting the TPDU's? Illustrate with a diagram the 'connection establishment' between a client and a server using TPDU's.
(6 Marks)

(b) What is delayed duplicate problem? How does Tomlinson's three-way handshake methodology solves this problem? (8 Marks)

(c) Illustrate the phenomenon of silly window syndrome in TCP. (6 Marks)

7. (a) Illustrate with a diagram how the LAN functions are placed within the two lower layers of the OSI reference model and briefly explain the functions of the LAN layers. (6 Marks)

(b) The original IEEE 802.3 was designed to operate at 10 Mbps. And the minimum frame length was decided as 64 bytes. How was this achieved? (6 Marks)

(c) Explain how unicast addresses, multicast addresses and broadcast addresses are taken care of using the 802.3 MAC frame. (8 Marks)

8. (a) Draw the diagram of the ATM cell header format and give a brief description of the various fields. (8 Marks)

(b) Take any two QoS parameters, under the ATM standard, and describe. (6 Marks)

(c) Describe the function of ATM adaptation layer. (6 Marks)

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NEW SCHEME

CS64

Reg. No. ☐☐☐☐☐☐☐☐☐☐

Sixth Semester B.E. Degree Examination, January/February 2006
Computer Science and Information Science & Engineering
Computer Networks I

(Max.Marks : 100

Time: 3 hrs.)

Note: *Answer any FIVE full questions.*

1. (a) What is a computer network? How is it different from a distributed system? Distinguish between LAN and WAN. **(8 Marks)**

   (b) What are the different types of services provided by layers? **(6 Marks)**

   (c) What are service primitives? Distinguish between services and protocols. **(6 Marks)**

2. (a) Explain LAN structure and functioning of network interface card. **(6 Marks)**

   (b) What is the minimum size of IEEE 802.3 frame? How is it fixed? What provision has been made in the frame format to achiev the minimum size? **(6 Marks)**

   (c) What are fast Ethernet and Gigabit ethernet? How are they realized? **(8 Marks)**

3. (a) What is the function of frame status field in the IEEE 802.5 frame? How is priority access provided in token ring LANs? **(8 Marks)**

   (b) Five LANs are interconnected by source routing bridges as shown in the figure below. Assume that bridges 3 and 4 are not a part of the initial spanning tree. Suppose S1 wants to send a frame to S2, sketch the routes followed by all routes broadcast frames during the route discovery. **(6 Marks)**

L – LAN
B – Bridge
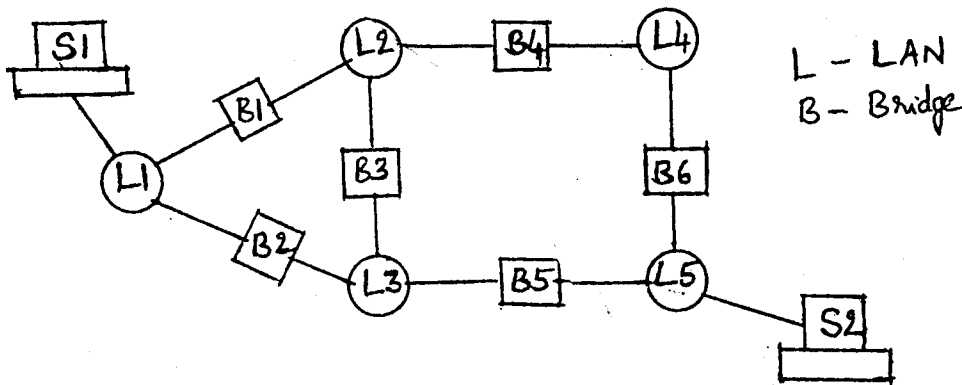
   (c) Compare virtual circuit and datagram subnets. **(6 Marks)**

4. **(a)** Using Dijkstra's algorithm find the shortest path between A and D.   **(6 Marks)**
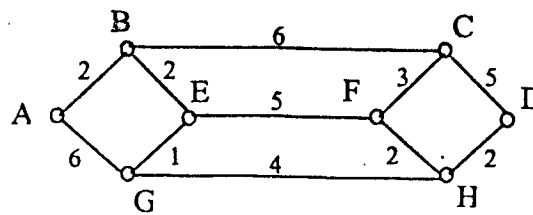
(b) Explain the count to infinity problem.   **(6 Marks)**

(c) How is routing done in mobile networks?   **(8 Marks)**

5. **(a)** How is congestion control different from flow control? Explain the random early detection algorithm.   **(6 Marks)**

(b) What is traffic shaping? A computer on a 6-Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1 Mbps. It is initially filled to capacity with 8 megabits. How long can the computer transmit at the full 6 Mbps? **(6 Marks)**

(c) Compare transparent and non-transparent fragmentation. Suggest a good numbering scheme for the fragments.   **(8 Marks)**

6. **(a)** Explain the following fields in the IP packet header.   **(6 Marks)**

   I)   Time to live

   ii) Fragment offset

   iii) Header checksum.

(b) Perform the following :

   i)   Convert 194.47.21.130 in to hexadecimal format

   II) If a subnet mask is 255.255.252.0 find the maximum number of hosts it can handle.   **(6 Marks)**

(c) What is the need of transport layer? Briefly explain the TCP socket primitives.   **(8 Marks)**

7. **(a)** Describe the transport connection release procedure considering all possible scenarios.   **(8 Marks)**

(b) Explain multiplexing of connections in transport layer.   **(6 Marks)**

(c) What is remote procedure call? What are the steps in making an RPC?   **(6 Marks)**

8. **(a)** Describe UDP. What are its applications?   **(6 Marks)**

(b) Explain the B-ISDN reference model.   **(6 Marks)**

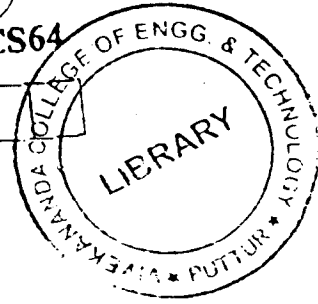**(c)** Explain the ATM cell structure.   **(8 Marks)**

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CS / IS 64

NEW SCHEME

Sixth Semester B.E. Degree Examination, July 2006
CS / IS
Computer Networks - I

Time: 3 hrs.]   [Max. Marks:100

Note: *Answer any FIVE full questions.*

1   a. Clearly bring out the differences between LAN, WAN and MAN. Give examples.
                                                                          (05 Marks)
    b. Distinguish between Connection Oriented and Connectionless Services. (05 Marks)
    c. What is multi path fading? Explain the 802.11 standard for WLAN.   (10 Marks)

2   a. Explain the following with examples :
        i) UniCasting   ii) MultiCasting   iii) BroadCasting.   (08 Marks)
    b. List and explain different design issues for the layer – 2.   (08 Marks)
    c. Write a note on X.25.   (04 Marks)

3   a. Explain the functional units of a Network interface card.   (05 Marks)
    b. Discuss the functions of   i) MAC Sublayer   ii) LLC Sublayer.   (12 Marks)
    c. What is the minimum and maximum packets that can be encapsulated into Ethernet frame?   (03 Marks)

4   a. Explain ethernet protocol. Show that the fraction of the time the channel is busy transmitting the frame is given by $\dfrac{1}{1+6.44a}$, where $a = \dfrac{R}{L} \, t_{prop}$. How does "a" affect the average transfer delay and through put?   (12 Marks)
    b. Discuss the structure of Ieee 802.3 MAC frame?   (04 Marks)
    c. Discuss the differences between a HUB and a switch.   (04 Marks)

5   a. Explain different issues related to Network layer design.   (10 Marks)
    b. Discuss the principle of optimality and hence explain shortest path routing?
                                                                          (08 Marks)
    c. What are the drawbacks of Flooding?   (02 Marks)

6   a. Explain Bellman-Ford routing algorithm with necessary illustration. What are the draw backs of this algorithm ?   (10 Marks)
    b. What is congestion? Discuss the general principles of congestion control? Mention at least 3 policies in data link, network layer that can prevent congestion. (10 Marks)

7   a. Explain briefly the following with respect to Transport layer,   i) Addressing
       ii) Connection establishment   iii) Connection release   iv) Flow control and Buffering   (12 Marks)
    b. Discuss the functions of UDP. How is it different fro m IP ? Give examples.
                                                                          (04 Marks)
    c. Briefly explain TCP congestion control.   (04 Marks)

8   Write short notes on :
    a) IP Protocol   b) QOS   c) OSPF   d) ATM Networks.

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CS64

NEW SCHEME

Sixth Semester B.E. Degree Examination, Dec. 06 / Jan. 07
CSE/ISE
Computer Networks - I

[Max. Marks:100

Time: 3 hrs.]

Note : Answer any FIVE full questions.

1 a. Illustrate with a diagram, the layered architecture and design issues in typical computer network. What is the purpose of adding headers at the layers? (08 Marks)
   b. Discuss different applications of computer networks. (05 Marks)
   c. In a Given Ethernet LAN if the operating speed is increased from 10 Mbps to 100 Mbps, Find the minimum data length. (03 Marks)
   d. Explain the use of following devices in networking : (04 Marks)
      i) Repeater ii)Bridge iii) Router iv) Gateways.

2 a. Why is data link layer divided into two sub-layers? Explain with a diagram IEEE 802.3 MAC frame structure. (06 Marks)
   b. Calculate the Delay bandwidth product and the maximum throughput for a Gigabit Ethernet switch with stations at 100 meters distance and average frame size of 512 bytes, 1500 bytes and 64000 bytes. (05 Marks)
   c. Explain briefly the function of transparent bridge. (04 Marks)
   d. Explain with a block diagram ATM reference model. (05 Marks)

3 a. Explain the hidden station and exposed station problem, discuss how they are solved. (06 Marks)
   b. Suppose that a 11 Mbps 802.11 LAN transmitting 64-byte frame back-to-back over a radio channel with bit error rate of 10^{-7}. How many frames per second will be damaged on average? (05 Marks)
   c. Explain FDDI token ring Network. (05 Marks)
   d. What are the desirable characteristics of routing algorithm? What is adaptive and non – adaptive routing. Give example. (04 Marks)

4 a. Explain the steps in link state routing algorithm with an example. (06 Marks)
   b. Discuss count to infinity problem. (04 Marks)
   c. Discuss Network Address Translation(NAT). (04 Marks)
   d. Using Bellman – Ford algorithm find the set of shortest paths from all nodes to destination node 6 for the network shown in fig. 4.(c). (06 Marks)
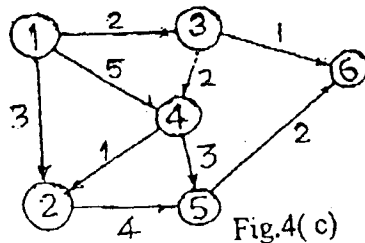

Fig.4(c)

5 a. How is congestion control different from flow control? Explain load shedding. (06 Marks)
   b. Explain token bucket algorithm. List its differences with leaky bucket algorithm. (08 Marks)

　　c. A university has 150 LANs with 100 hosts in each LAN. Suppose the university has one Class B address. Design an appropriate subnet-addressing scheme.　　　(06 Marks)

6　a. What are the differences between IPV4 and IPV6?　　　(06 Marks)
　　b. Write a note on the following : i) BGP　ii) Mobile IP.　　　(06 Marks)
　　c. A large number of consecutive IP address are available starting at 198.16.0.0. Suppose that four organizations, A, B, C and D request for 4000, 2000, 4000 and 8000 addresses, respectively. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.　　　(04 Marks)
　　d. What is a port? What are well known ports, give example?　　　(04 Marks)

7　a. What is a TPDU? Give the format of TPDU?　　　(04 Marks)
　　b. What is delayed duplicate problem? How does three way handshake solve this problem?　　　(06 Marks)
　　c. What is Remote Procedure Call (RPC)? Explain the steps in making RPC.　　　(05 Marks)
　　d. Explain silly window syndrome in TCP.　　　(05 Marks)

8　a. Discuss how crash recovery is done in transport layer?　　　(05 Marks)
　　b. Discuss features of RTP that has made it suitable for multimedia transport.　　　(05 Marks)
　　c. A TCP machine is sending full windows of 65535 bytes over 1 Gbps channel. That has 10 ms one way delay. What is the maximum throughput achievable? What is the line efficiency?　　　(05 Marks)
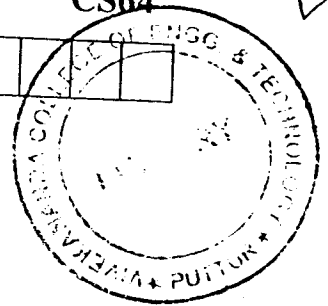　　d. Explain ATM header format.　　　(05 Marks)

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CS64

Sixth Semester B.E. Degree Examination, July 2007
Computer Science and Engineering
Computer Networks - I

Time: 3 hrs.]

[Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. An image is 1024×768 pixels with 3 bytes/pixel. Assume image is uncompressed. How long does it take to transmit it over 1 Mbps cable modem? **(05 Marks)**

   b. A system has n – layer protocol hierarchy. Applications generate messages of length M bytes. At each of the layers, an N-byte header is added. What fraction of network bandwidth is filled with headers? **(05 Marks)**

   c. Why is error control included in the MAC layer in IEEE 802.11 and not in IEEE 802.3? **(05 Marks)**

   d. Explain the bridge learning process with an example. **(05 Marks)**

        Why CSMA – CD cannot be used in wireless networks?

   b. How FDDI MAC protocol handles different types of traffic? **(05 Marks)**

   c. Which are the different token re-insertion strategies used in IEEE 802.5? **(05 Marks)**

   d. Explain the responsibilities of LAN adapter card. **(05 Marks)**

   a. Explain the frame structure of IEEE 802.3 MAC frame. **(05 Marks)**

   b. Compute a multicast spanning tree for router C in the following subnet for a group with members at routers A, B, C, D, E, F, I and K. **(05 Marks)**
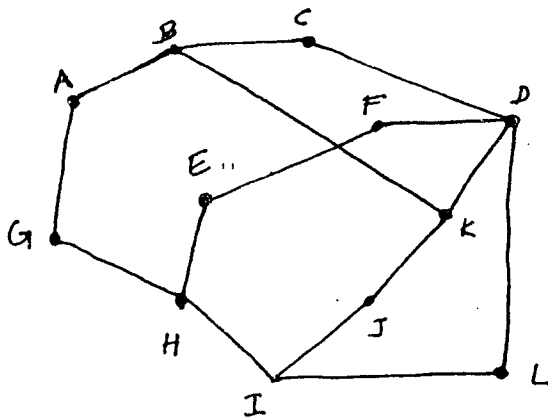

Fig.3(b)

   c. A computer on a 6 – Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1Mbps. It is initially filled to capacity with 8 megabits. How long the computer transmit at the full 6 Mbps? **(05 Marks)**

   d. Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. **(05 Marks)**

   a. Explain IPV6 fixed header. **(05 Marks)**

   b. Briefly explain Address Resolution Protocol. **(05 Marks)**

c. Differentiate between transparent and nontransparent fragmentation. (05 Marks)

d. Explain milk and wine policy with respect to congestion control. (05 Marks)

5 a. What is the advantage of hierarchical routing? Explain. (05 Marks)

b. Good news spreads fast, bad news propagates slowly in distance vector routing algorithm. Explain with an example. (05 Marks)

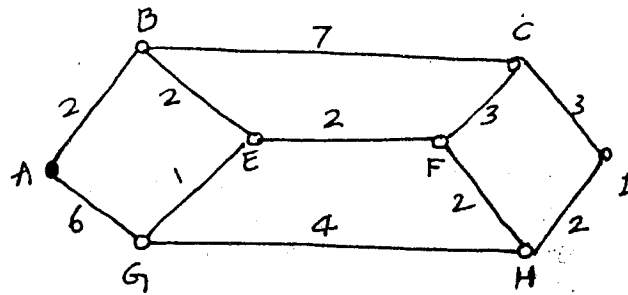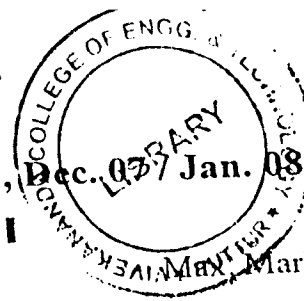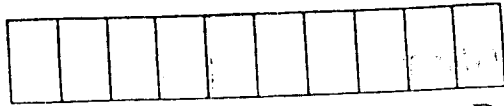c. Find the shortest path from A to D for the network in the figure 5(c). (05 Marks)

Fig.5(c)

d. Compare datagram and virtual circuit subnet. (05 Marks)

6 a. List the socket primitives for TCP and briefly explain each primitive. (05 Marks)

b. "The function of name server is analogous to the directory assistance operator". Do you agree? Explain. (05 Marks)

c. Which are the two types of multiplexing? Explain with figures. (05 Marks)

d. Explain TCP connection establishment. (05 Marks)

7 a. Explain silly window problem. How this problem can be solved? (05 Marks)

b. If the TCP round-trip-time, RTT, is currently 30 msec and following acknowledgements come in after 26,32 and 24 msec, respectively, what is the new RTT estimate Jacobson's algorithm? Use $\alpha = 0.9$. (05 Marks)

c. Discuss some rules for designing better performing systems. (05 Marks)

d. Draw TCP Header. (05 Marks)

8 Write short notes on the following :

a. Pitfalls in Networks performance measurement. (05 Marks)

b. Token Bucket Algorithm. (05 Marks)

c. Quality of service requirements for different applications. (05 Marks)

d. LAN topologies. (05 Marks)

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Sixth Semester B.E. Degree Examination, Dec. 07 / Jan. 08
○ Computer Networks - I

Time: 3 hrs.   Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Discuss the key design issues for various layers in computer networks. (10 Marks)
   b. Distinguish between broadcast networks and point-to-point networks. (04 Marks)
   c. Differentiate connection-oriented service from connection-less service. (06 Marks)

2 a. Explain the frame structure of IEEE 802.3 MAC frame along with its fields. (08 Marks)
   b. Explain the working of Token Ring Protocol and derive equation for performance. (08 Marks)
   c. For a given Ethernet LAN, the operating speed has been increased from 10 Mbps to 100 Mbps. Find the minimum length of the data. (04 Marks)

3 a. An end system sends 50 packets per second using User Datagram protocol (UDP) over a full duplex 100 Mbps Ethernet LAN connection. Each packet consists of 1500 bytes of Ethernet frame payload data. What is the throughput when measured at the UDP layer? (06 Marks)
   b. Explain the CSMA/CA protocol along with its operation. (08 Marks)
   c. What are virtual LAN's? What are its advantages? Explain. (06 Marks)

4 a. Distinguish between virtual circuit subnet and datagram subnet. (08 Marks)
   b. Explain the routing procedure for mobile hosts. (06 Marks)
   c. Consider the subnet in Fig.4(c) below :
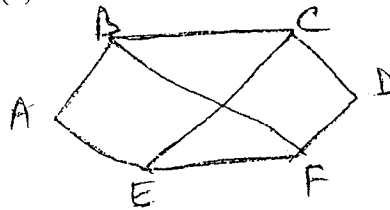

Fig.4(c)

   Distance vector routing is used and following vectors have just come to router C. From B : (5,0,10,12,6,2), from D :(16,12,6,0,9,10) and from E : (7,6,3,9,0,4). Measured delays to B, D and E are 6, 3 and 5 respectively. Compute C's routing table giving both outgoing line and expected delay. (06 Marks)

5 a. Explain ay two techniques of controlling congestion in Datagram subnets. (06 Marks)
   b. What is QOS? What parameters typically characterize QOS? Explain each of them. (06 Marks)
   c. Explain the implementation of Token bucket algorithm and give its advantages and disadvantages. (08 Marks)

6 a. Suppose that instead of using 16 bits for network part of a class B address, 20 bits had been used. How many class B networks would there have been? (04 Marks)
   b. Explain the IPV4 header format along with various fields. (10 Marks)
   c. What is NAT? Explain its operation along with an example. (06 Marks)

7 a. List and explain the socket primitives of TCP. (10 Marks)
   b. Distinguish between upward and down word multiplexing with examples. (04 Marks)
   c. Illustrate the phenomenon of silly window syndrome in TCP. (06 Marks)

8 a. Explain the User Datagram Protocol in detail. (06 Marks)
   b. Describe the structure and function of ATM adaptation layer. (10 Marks)
   c. In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of 30 seconds, and an 8 bit sequence number, what is the maximum data rate per connection? (04 Marks)

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Fifth Semester B.E. Degree Examination, Dec.08/Jan.09
Computer Networks - I

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. What is data communications? What are its characteristics? Explain. **(06 Marks)**
   b. Define following terms: (i) Protocol   (ii) Internet **(04 Marks)**
   c. Describe with neat diagram the functionalities of each layer in the OSI model. **(10 Marks)**

2 a. Calculate the Shannon channel capacity in following cases: **(06 Marks)**
      (i) Bandwidth = 20 kHz $SNR_{dB} = 40$ (ii) Bandwidth = 200 kHz $SNR_{dB} = 6$
   b. A file contains 3 million bytes. How long does it take to download this file using a 100 kbps channel? **(04 Marks)**
   c. Define line coding. Describe Unipolar NRZ., Polar NRZ-L, Bipolar AMI & Manchester encoding by applying on the information sequence 101011100. **(10 Marks)**

3 a. We have four sources, each creating 250 characters/sec. If the interleaved unit is one character and 1 synchronising bit is added to each frame, find
      (i)   The data rate of each source.
      (ii)   The duration of each character in each source.
      (iii) The frame rate
      (iv)   The duration of each frame
      (v)   The no. of bits in each frame, and
      (vi)   The data rate of the link. **(12 Marks)**
   b. Define synchronous TDM. **(02 Marks)**
   c. Describe ASL, FSK and PSK mechanisms and apply them over the digital data 101101. **(06 Marks)**

4 a. Briefly explain the coaxial cable and optical fiber with their applications. **(10 Marks)**
   b. Explain how CRC is used in detecting errors for the following polynomial, $g(x)=x^4 + x + 1$. Consider the information sequence 1101011011.
      (i)   Find the codeword corresponding to this sequence.
      (ii)   If the codeword has error in third bit, what does receiver obtain when it does its error checking? **(10 Marks)**

PART – B

5 a. Explain selective repeat ARQ. Justify how selective repeat ARQ outperforms Go-back-N and Stop-and-wait ARQ. **(10 Marks)**
   b. Explain point-to-point protocol frame format. Also briefly describe different transition phases of PPP in establishing a connection from home PC to ISP. **(10 Marks)**

6 a. Explain the following random access protocols: (i) CSMA   (ii) CSMA/CD **(10 Marks)**
   b. Discuss 802.3 MAC frame format. Mention the restrictions imposed on minimum and maximum lengths of a 802.3 frame. **(10 Marks)**

7 a. Discuss Bluetooth technology. **(10 Marks)**
   b. Explain the working mechanism of following devices used to connect LANs. **(10 Marks)**
      (i) Bridge   (ii) Router.

8 a. What are the design goals of ATM? Briefly describe ATM layers. **(12 Marks)**
   b. What is bit stuffing and unstuffing? Apply bit stuffing to the sequence: 0110111111111100
      Apply unstuffing: 0111111000011101111101111101100111110 **(08 Marks)**

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Fifth Semester B.E. Degree Examination, June-July 2009
Computer Networks - I

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 neat diagram explain mesh topology and star topology with application of each. **(06 Marks)**
   b. What are standards? Name any four standard organizations. **(06 Marks)**
   c. Explain OSI reference model with functions of following layers
      i) Physical layer;   ii) Data link layer;   iii) Network layer. **(08 Marks)**

2 a. Explain three causes for transmission impairments. **(06 Marks)**
   b. Describe with neat waveform any two polar line coding schemes. **(06 Marks)**
   c. Give data rate formula suggested by Nyquist and Shannon. Low pass communication has BW of 1 MHz. What is Shannon capacity of channel if SNR is 40 db? What bit rate is attainable using 8-level pulses? **(08 Marks)**

3 a. With neat waveform, explain three methods of digital to analog conversion. Draw waveform with input data 110100. **(06 Marks)**
   b. What is multiplexing? With neat diagram explain FDM. **(06 Marks)**
   c. What is TDM? Four sources create 250 characters per second. The frame contains one character from each source and one extra bit for synchronization. Find: i) The data rate of each source; ii) Duration of each character in each source; iii) The frame rate; iv) Duration of output frame; v) Frame size in bits; vi) Data rate of link. **(08 Marks)**

4 a. Describe the physical and transmission characteristic of following:
      i)   Twisted pair cable; ii) Fiber optic cable. **(06 Marks)**
   b. What is hamming distance? Explain simple parity check code C (5, 4) with d min = 2. How many bits can be corrected? **(06 Marks)**
   c. What is CRC? If the generating polynomial for CRC code is $x^4 + x^3 + 1$ and message word is 11110000, determine check bits and coded word. **(08 Marks)**

PART - B

   a. Differentiate between character oriented and bit oriented format for framing. **(06 Marks)**
   b. Explain salient features of
      i)   Stop – and – wait protocol;   ii) Stop – and – wait ARQ protocol. **(08 Marks)**
   c. Explain briefly about point-to-point protocol. **(06 Marks)**

6 a. What is Random Access? Explain following Random access protocols.
      i)   Slotted ALOHA; ii) CSMA / CD. **(06 Marks)**
   b. What is channelization? Explain CDMA. **(06 Marks)**
   c. Describe frame format for IEEE 802.3 MAC frame. What are salient features of fast Ethernet? **(08 Marks)**

7 a. Describe the MAC layers in IEEE 802.11 standard. **(06 Marks)**
   b. In brief explain blue tooth layers. **(06 Marks)**
   c. Bring out differences between Repeaters, Bridges, Routers and Gateways. **(08 Marks)**

8 a. Explain SONET multiplexing. **(06 Marks)**
   b. With neat diagram describe ATM architecture. **(06 Marks)**
   c. Discuss SONET STS – 1 frame format. Find data rate of an STS – 3 signals. **(08 Marks)**

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Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
Computer Networks - I

Time: 3 hrs.

Max. Marks:100

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

PART – A

1 a. What is data communication? What are its four important fundamental characteristics?
(06 Marks)

 b. What is a protocol? What are its key elements? **(02 Marks)**

 c. Explain OSI reference model, with a neat figure. **(08 Marks)**

 d. Differentiate between:
  i)   ARP and RARP
  ii)   ICMP and IGMP
  iii) UDP and TCP
(04 Marks)

2 a. Suppose an application layer wants to send L-bytes message to its peer process using the existing TCP connection. The TCP consists of message plus 20 bytes of header. The segment is encapsulated into IP packet that has an additional 20 bytes of header. The IP packet in turn goes inside the ethernet frame that has 18 bytes of header and trailer. What percentage of the transmitted byte in the physical layer correspond to the message information? L = 100 byte. **(06 Marks)**

 b. Define bandwidth. A periodic signal has bandwidth of 20 Hz. The highest frequency is 60Hz. What is the lowest frequency? Draw the spectrum, if the signal contains all frequencies of the same amplitude. **(04 Marks)**

 c. Explain briefly, with neat figures, the two approaches for digital transmission. **(08 Marks)**

 d. A signal travels through an amplifier and the power is increased 10 times. Calculate the power gained. **(02 Marks)**

3 a. A voice grade channel of a telephone network has a bandwidth of 3.4kHz.
  i)   Calculate channel capacity for S/N = 30 dB.
  ii)   Calculate S/N required to support information transfer at 4800 bps. **(06 Marks)**

 b. What is FDM? Briefly explain its multiplexing and demultiplexing process. **(06 Marks)**

 c. Explain briefly the two spread spectrum techniques. **(08 Marks)**

4 a. Explain briefly the fiber optic cable, with a neat figure. **(08 Marks)**

 b. Find the codeword $C(x)$ for the information $d(x) = x^3 + 1$ with the generator polynomial $t(x)= x^3 + x + 1$. **(06 Marks)**

 c. What is internet checksum? With an example list the steps undertaken by the sender and receiver for error detection. **(06 Marks)**

PART – B

5 a. Explain briefly, with neat figures, stop-and-wait ARQ and Go-Back N ARQ. (12 Marks)

   b. Explain the frame format and transitional phases of point-to-point protocol. (08 Marks)

6 a. A network transmits 200 bit frame on a shared channel of 200 kbps. For aloha and slotted aloha, what is the

       i) requirement to make the frame collision free?

       ii) throughput if the system produces 1000 frames/sec? (08 Marks)

   b. Define channelization and list its three protocols. (10 Marks)

   c. How does p-persistent method improve efficiency? (02 Marks)

7 a. Explain with a neat figure, 802.3 MAC frame format. (08 Marks)

   b. Explain the hidden and exposed station problems in IEEE 802.11. (12 Marks)

8 a. Explain briefly the three categories of satellites. (10 Marks)

   b. Explain briefly STS-1 frame format. (10 Marks)

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USN ☐☐☐☐☐☐☐☐☐☐   **06CS55**

Fifth Semester B.E. Degree Examination, May/June 2010
Computer Networks - I

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. What is data communication? What are its characteristics and components? Explain.
                                                                                    (06 Marks)
   b. Give the comparison between LAN, MAN and WAN, with an example.   **(06 Marks)**
   c. Describe with a neat diagram, the functionalities of each layer in the TCP/IP model.
                                                                                    (08 Marks)

2 a. Explain the transmission modes.   **(06 Marks)**
   b. We want to digitalize the human voice. What is the bit rate, assuming 8 bits per sample?
                                                                                    (04 Marks)
   c. Discuss 8 B/10 B coding scheme.   **(04 Marks)**
   d. Explain the delta modulation.   **(06 Marks)**

3 a. An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data
       elements are carried by each signal element? How many signal elements do we need?
                                                                                    (04 Marks)
   b. Define synchronous TDM.   **(12 Marks)**
   c. Explain the amplitude modulation.   **(04 Marks)**

4 a. Briefly explain twisted pair cable and optical fibre cable, with their applications. **(10 Marks)**
   b. Explain the check sum, with an example.   **(06 Marks)**
   c. Explain the types of error.   **(04 Marks)**

PART – B

5 a. Explain the selective repeat and stop and wait ARQ.   **(10 Marks)**
   b. Discuss HDLC protocol.   **(10 Marks)**

6 a. Explain: i) CSMA ii) CSMA/CD.   **(10 Marks)**
   b. What do you mean by channelization? Explain the protocols used for channelization.
                                                                                    (10 Marks)

7 a. Explain the IEEE 802.11 architecture.   **(08 Marks)**
   b. How does a virtual LAN helpful in providing (security and reduce the network traffic)?
                                                                                    (08 Marks)
   c. Explain the bridges.   **(04 Marks)**

8 a. Explain the SONET/ SDH layers and frames.   **(12 Marks)**
   b. Find the data rate and duration of an STS-1 signal.   **(04 Marks)**
   c. Explain the AMPS.   **(04 Marks)**

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