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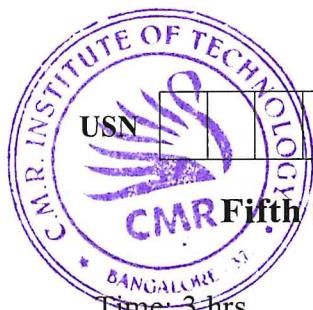
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CBCS SCHEME

17CS52

CMR Fifth Semester B.E. Degree Examination, July/August 2022

Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Describe HTTP with persistent and non-persistent connections. (10 Marks)
- b. Compare client server and Peer-to-Peer architecture. (05 Marks)
- c. Explain the working of Bit Torrent for file distribution. (05 Marks)

OR

2. a. Describe in detail the services provided by DNS and explain the DNS message format. (10 Marks)
- b. Define a Socket. Describe the socket programming with a help of diagram for TCP. (10 Marks)

Module-2

3. a. With the help of FSM, describe the two states of the sender side and one state of the receiver side rdt2.0. (07 Marks)
- b. Explain selective repeat ARQ protocol. (06 Marks)
- c. Draw TCP segment structure and explain its fields. (07 Marks)

OR

4. a. Explain in brief, TCP congestion control mechanisms. (10 Marks)
- b. Explain the concept of transport layer multiplexing and demultiplexing. (10 Marks)

Module-3

5. a. What is routing? Explain the structure of a router with a neat diagram. (10 Marks)
- b. Explain Dijkstra's algorithm with example. (10 Marks)

OR

6. a. Explain IPV6 datagram format with neat diagram. (10 Marks)
- b. Explain the spanning tree algorithm and give its advantages and disadvantages. (10 Marks)

Module-4

7. a. Explain 3G system architecture. (08 Marks)
- b. Explain the two different routing approaches to mobile node. (12 Marks)

OR

8. a. What is hand off? What are the steps in accomplishing hand off? (10 Marks)
- b. Compare mobile IP and GSM mobility. (05 Marks)
- c. Explain Agent Discovery with diagram. (05 Marks)

Module-5

9. a. List and explain the types of multimedia networking application. (10 Marks)
- b. Describe the DiffServ Internet Architecture. (05 Marks)
- c. Explain CDN operation. (05 Marks)

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OR

10. a. Write a short notes on: (i) Netflix video streaming platform. (ii) VOIP with skype. (10 Marks)
- b. Explain briefly the QoS Guarantees Resource reservation and call admission process with neat diagram. (10 Marks)

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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.



CBCS SCHEME

USN

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17CS52

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022

Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the working of HTTP along with its required and response message format. (10 Marks)
 b. Explain the P2P architecture for file sharing. (10 Marks)

OR

- 2 a. Explain the working of SMTP. Also explain mail access protocols. (10 Marks)
 b. Explain the services offered by DNS along with DNS record and message format. (10 Marks)

Module-2

- 3 a. Explain the working of Go – Back – N protocol. (08 Marks)
 b. Draw and explain the FSM for sender site and receiver site of rdt 2.0 protocol. (08 Marks)
 c. Explain UDP segment structure. (04 Marks)

OR

- 4 a. Draw TCP segment structure and explain its field. (07 Marks)
 b. Explain three way handshaking procedure used by TCP. (05 Marks)
 c. Explain how TCP handles congestion. (08 Marks)

Module-3

- 5 a. Explain IPv6 packet format. (06 Marks)
 b. Explain the working of OSPF routing protocol. (07 Marks)
 c. Explain any two broadcast routing algorithms. (07 Marks)

OR

- 6 a. Explain the structure of a router. (10 Marks)
 b. Write link state algorithm, consider the following networks with the indicated link costs. Apply link state routing algorithm to compute the shortest path from 'u' to all other nodes in the network. (10 Marks)

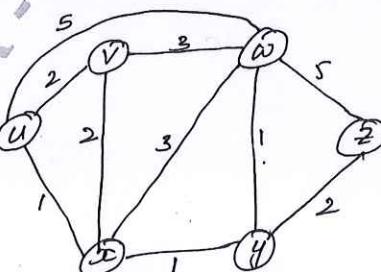


Fig.Q6(b)

(10 Marks)

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Module-4

- 7 a. Explain three phases of mobile IP. (10 Marks)
b. Illustrate the two different approaches for routing to a mobile node. (10 Marks)

OR

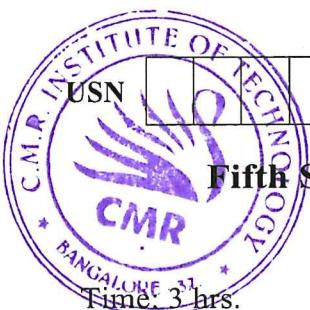
- 8 a. Explain 3G cellular networks architecture. (10 Marks)
b. What is handoff? Explain the steps involved in accomplishing handoff. (10 Marks)

Module-5

- 9 a. Explain the working of CDN. (10 Marks)
b. Explain three different ways of streaming stored video. (10 Marks)

OR

- 10 a. Explain the various packet scheduling mechanism. (08 Marks)
b. Explain the leaky bucket policing mechanism. (08 Marks)
c. Explain the properties of audio. (04 Marks)



CBCS SCHEME

15CS52

Fifth Semester B.E. Degree Examination, July/August 2022 Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. List the major challenges that future P2P applications are facing. (03 Marks)
- b. List some common HTTP response status codes and associated phrases. (05 Marks)
- c. Discuss with example how HTTP allows a cache to verify that its objects are up-to-date. (04 Marks)
- d. Suppose that institutional LAN is 100Mbps link and a router in the institutional network and router in the Internet are connected by a 15Mbps link.
 - i) Calculate traffic intensity on the LAN.
 - ii) Calculate traffic intensity on the access link (from the internet router to institutional router). (04 Marks)

OR

2. a. Compare SMTP and HTTP. (03 Marks)
- b. Discuss DNS message format. (08 Marks)
- c. Design and develop a client-server application using TCP to implement that server converts string to uppercase. (05 Marks)

Module-2

3. a. Explain the connectionless multiplexing and demultiplexing. (04 Marks)
- b. Design RDT 2.1 sender and receiver protocol (reliable data transfer). (08 Marks)
- c. Assume that RTT is approximately 30 milliseconds. Suppose that two systems are connected by a channel, supporting stop and wait protocol with a transmission rate of 1Gbps with a packet size of 1000 bytes per packet including both header fields and data.
 - i) Calculate the time needed to actually transmit the packet into the 1Gbps link.
 - ii) Calculate sender utilization. (04 Marks)

OR

4. a. Explain in brief selective repeat operation. (08 Marks)
- b. Explain the congestion scenario that two connections sharing a single hop with infinite buffers. (08 Marks)

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Module-3

- 5 a. Explain different ways of switching. (06 Marks)
 b. Consider the following network and compute the shortest path from 'x' to all network nodes using link-state algorithm. (10 Marks)

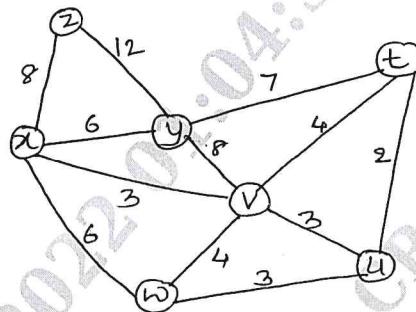


Fig.Q.5(b)

OR

- 6 a. What is hot-potato routing? Explain with an example. (05 Marks)
 b. Discuss IPv6 packet format. (05 Marks)
 c. Explain different controlled flooding mechanisms. (06 Marks)

Module-4

- 7 a. Explain 3G system architecture. (08 Marks)
 b. Bring out the mechanism of indirect routing to a mobile node in mobility management. (08 Marks)

OR

- 8 a. What is agent discovery in mobile node? Illustrate some of the key fields in the agent advertisement message. (08 Marks)
 b. Define handoff. Explain the steps in accomplishing a handoff between base stations with a common MSC. (08 Marks)

Module-5

- 9 a. Discuss the properties of video and audio. (04 Marks)
 b. Discuss the following
 i) UDP streaming
 ii) HTTP streaming. (06 Marks)
 c. Explain the steps involved in operations of Content Distribution Networks (CDN). (06 Marks)

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OR

- 10 a. Discuss FIFO and priority queuing scheduling mechanism. (08 Marks)
 b. Explain the Diffserv internet architecture. (08 Marks)

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CBCS SCHEME



15CS52

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022

Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Discuss the two application architectures. (08 Marks)
 b. Distinguish between non-persistent HTTP and persistent HTTP. (08 Marks)
- OR**
- 2 a. Discuss the File Transfer Protocol (FTP). (08 Marks)
 b. Explain DNS name resolution, with an example. (08 Marks)

Module-2

- 3 a. Explain the reliable data transfer 2.0 (rdt 2.0). (08 Marks)
 b. Explain Go-Back N protocol. (08 Marks)
- OR**
- 4 a. Explain the flow control mechanism in TCP. (08 Marks)
 b. Explain the TCP Tahoe Congestion Control mechanism. (08 Marks)

Module-3

- 5 a. Explain the architecture of router. (08 Marks)
 b. Apply the link state routing protocol algorithm to find shortest path from source node A to all other nodes on the following Fig.Q.5(b). (08 Marks)

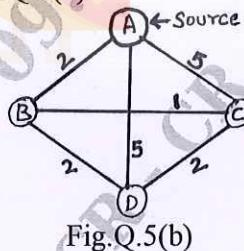


Fig.Q.5(b)

OR

- 6 a. Discuss hierarchical routing protocol. (08 Marks)
 b. Apply the distance vector routing protocol algorithm to find the shortest path from source node A to all other nodes on the following Fig.Q.6(b). (08 Marks)

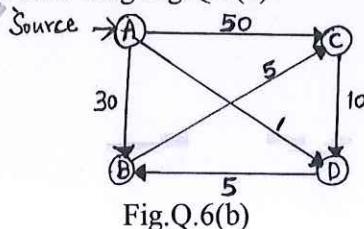


Fig.Q.6(b)

Module-4

- 7 a. Explain 3G (voice and data) cellular network architecture. (08 Marks)
b. Explain the vocabulary of Mobile-IP networks. (08 Marks)

OR

- 8 a. Discuss any one routing algorithm in Mobile-IP networks. (08 Marks)
b. Discuss the handoff procedure in GSM networks. (08 Marks)

Module-5

- 9 a. Discuss the three types of multimedia networking applications. (08 Marks)
b. Explain the challenges in streaming stored video data. (08 Marks)

OR

- 10 a. Illustrate the content delivery in Netflix. (08 Marks)
b. Explain the differentiated service architecture for QoS. (08 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, July/August 2022

Computer Networks - I

Max. Marks: 100

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

PART – A

1. a. What is Data Communication? What are its important fundamental characteristics? List and explain the five components of a Data Communication system, with examples. (12 Marks)
b. List out the layers in OSI reference model and explain any two layers in detail. (08 Marks)

2. a. For the given string 11011001 represent the unipolar, polar NRZ, Manchester and differential Manchester encoding techniques. (05 Marks)
b. Identify the different transmission impairments observed in data transfer. (05 Marks)
c. A telephone line has a bandwidth of 3000 Hz assigned for data communication. The SNR ratio is 3162. Calculate the capacity of the channel. (SNR refers to signal to noise ratio). (05 Marks)
d. Explain the concept of Shift keying. (05 Marks)

3. a. What is spread spectrum? Explain the following techniques for spread spectrum : FHSS and DSSS. (14 Marks)
b. Briefly discuss about delay in Virtual Circuit Networks. (06 Marks)

4. a. What do you mean by Virtual Circuit Network? Explain the establishment phase of Virtual Circuit Network. (08 Marks)
b. Which are the two types of Transmission errors? Explain. (04 Marks)
c. Discuss the Error detection and Correction techniques in block coding. (08 Marks)

PART – B

5. a. Compare and contrast the Go Back N-ARQ protocol with selective repeat ARQ. (10 Marks)
b. Define Framing and explain its need in Data Link Layer. (05 Marks)
c. Assume that, in a stop and wait ARQ system, the bandwidth of the line is 1 Mbps and 1 bit takes 20 ms to make a round trip. What is the Bandwidth delay product? (05 Marks)

6. a. List out the different channelization protocols. Explain CDMA. (12 Marks)
b. Explain 802.3 frame format and addressing. (08 Marks)

7. a. Explain the Architecture used in IEEE 802.11 Protocol. (10 Marks)
b. How is a Repeater different from Amplifier? (05 Marks)
c. What is GSM and explain its features. (05 Marks)

8. a. Compare IPV4 over IPV6. (04 Marks)
b. What is NAT? Explain with an example. (08 Marks)
c. What is the need IP addressing scheme? Explain IPV4.. (08 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022

Time: 3 hrs

Max. Marks: 100

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

PART - A

- | | | |
|---|---|------------|
| 1 | a. What is data communication? Explain the fundamental characteristics and components of a data communication system. | (10 Marks) |
| | b. With a neat diagram, explain the interaction between layers in the OSI model. | (10 Marks) |
| 2 | a. Explain the causes of transmission impairment. | (07 Marks) |
| | b. With a block diagram, explain the PCM encoder. | (07 Marks) |
| | c. Explain the different serial data transmission modes. | (06 Marks) |
| 3 | a. What is FDM? Explain its multiplexing and demultiplexing process. | (07 Marks) |
| | b. What is spread spectrum? Explain Frequency Hopping Spread Spectrum (FHSS). | (07 Marks) |
| | c. Compare and contrast circuit switched network and packet switched network. | (06 Marks) |
| 4 | a. Explain the process of error detection and error correction in block coding. | (08 Marks) |
| | b. Write a note on Linear Block codes. | (06 Marks) |
| | c. Generate the CRC codeword for dataword = 1001 and divisor = 1011. | (06 Marks) |

PART - B

- | | | |
|---|---|--|
| 5 | a. Explain the importance of framing and Piggybacking techniques.
b. Explain the different frame types in HDLC.
c. Explain stop-and-wait automatic repeat request protocol. | (06 Marks)
(06 Marks)
(08 Marks) |
| 6 | a. With suitable example, explain the working of CDMA.
b. Explain 802.3 MAC frame format.
c. With a flow diagram, explain the working of CSMA/CD. | (06 Marks)
(06 Marks)
(08 Marks) |
| 7 | a. Explain the addressing mechanism in IEEE 802.11.
b. Write a short note on cellular telephony.
c. Explain Piconet and Scatternet. | (06 Marks)
(06 Marks)
(08 Marks) |
| 8 | a. Write a note on IPV6 addresses.
b. Draw the IPV4 datagram format and explain in brief each field. | (10 Marks)
(10 Marks) |

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CBCS SCHEME



15CS52

Fifth Semester B.E. Degree Examination, July/August 2021 Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. Explain the general format of an HTTP request message with a neat diagram. (08 Marks)
b. With a neat diagram, explain the architecture of P2P. What are the major challenges of P2P? (08 Marks)
- 2 a. Explain a client server application over TCP using a socket program. (08 Marks)
b. Explain the working of DNS server. (08 Marks)
- 3 a. Why does an application developer would choose to build an application over UDP rather than over TCP? Give reasons. (08 Marks)
b. Discuss the Go-Back-n protocol and compare with selective repeat. (08 Marks)
- 4 a. With a neat diagram, explain the TCP segment structure. (08 Marks)
b. List the TCP congestion control algorithms. Explain any one method with a neat diagram. (08 Marks)
- 5 a. Explain the various switching techniques used in a router. (08 Marks)
b. What are the various approaches used for transition from IPV4 to IPV6? Explain tunneling. (08 Marks)
- 6 a. Explain Dijkstra's algorithm and find the shortest path for the graph given below using Link State algorithm.

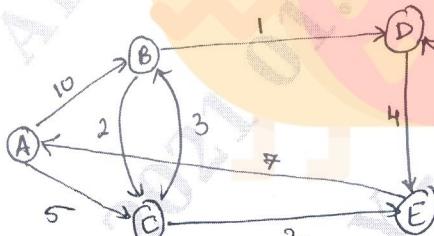


Fig.Q6(a) (08 Marks)

- b. How does BGP use the Next-Hop attribute? How does it use the AS-PATH attribute? (08 Marks)
- 7 a. Explain the 3G System Architecture with a neat diagram. (08 Marks)
b. List the approaches used in Routing to a Mobile node. Explain Direct routing to a Mobile Node. (08 Marks)
- 8 a. Discuss the Agent advertisement and mobile IP registration with a neat diagram. (08 Marks)
b. Explain Handoffs in GSM between base stations. (08 Marks)
- 9 Write short notes on:
a. Content Distribution Network (08 Marks)
b. HTTP Streaming (08 Marks)
- 10 a. Write a note on Diffserv architecture. (08 Marks)
b. Discuss Resource Reservation and Call Admission in Multimedia Network. (08 Marks)

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CBCS SCHEME

17CS52



Time: 3 hrs.

Fifth Semester B.E. Degree Examination, July/August 2021 Computer Networks

Max. Marks: 100

Note: Answer any FIVE full questions.

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2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.
1. a. Explain the interface between the process and the computer Network socket with diagram. (10 Marks)
b. Describe persistent and non-persistent connections of HTTP. (10 Marks)
 2. a. Explain the services offered by DNS and also explain the DNS record and message format. (10 Marks)
b. Define File Transfer Protocol, its connections and working. Writ about FTP commands and replies also. (10 Marks)
 3. a. Explain connection oriented multiplexing and de-multiplexing. (08 Marks)
b. Alice wants to communicate Bob over a TCP connection. Design a model showing different stat transition they undergo during i) Connection establishment ii) Data transfer iii) Connection termination. (08 Marks)
c. Define rdt_send() and rdt_recv(). (04 Marks)
 4. a. Explain TCP segment and its services with a diagram. (10 Marks)
b. What is congestion in a network? How TCP handles congestion. (10 Marks)
 5. a. What is routing? Explain the structure of router with a neat diagram. (10 Marks)
b. Explain the spanning tree algorithm and give its advantages and disadvantages. (10 Marks)
 6. a. Discuss the IPV6 packet format. (08 Marks)
b. Describe Network layer services briefly. (06 Marks)
c. How does router determine the replacement VC number for a packet traversing the router? (06 Marks)
 7. a. Define 5 elements of mobile network architecture. (10 Marks)
b. Explain Indirect and Direct Routing to Mobile node. (10 Marks)
 8. a. What is hand off? What are the steps in accomplishing hand off? (10 Marks)
b. Compare mobile IP and GSM mobility. (05 Marks)
c. Explain Agent Discovery with diagram. (05 Marks)
 9. a. Explain PCM Encoder and PCM Decoder. (07 Marks)
b. Briefly explain properties of Video and Audio. (07 Marks)
c. Describe the DiffServ Internet Architecture. (06 Marks)
 10. a. Illustrate the interaction between Client and Server for HTTP streaming for Audio and Video. (08 Marks)
b. Explain content Distribution Network. (08 Marks)
c. Mention limitations of Best – Effort IP service. (04 Marks)

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Time: 3 hrs.

10CS55

Fifth Semester B.E. Degree Examination, July/August 2021 Computer Networks – I

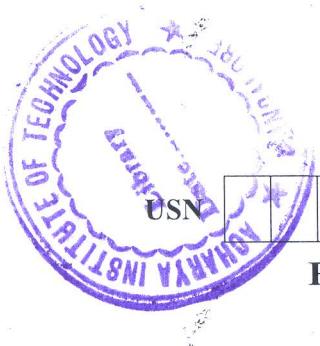
Max. Marks: 100

Note: Answer any FIVE full questions.

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2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.

- 1 a. Define protocol. List and explain key elements of a protocol. (05 Marks)
b. With a necessary diagram correlate TCP/IP with layers of OSI model. (10 Marks)
c. List and explain different addresses in TCP/IP. (05 Marks)
 - 2 a. For the given string 11011001 represent the unipolar, polar NRZ, Manchester and differential Manchester encoding techniques. (05 Marks)
b. Identify the different transmission impairments observed in data transfer. (05 Marks)
c. A telephone line has a bandwidth of 3000 Hz assigned for data communication. The SNR ratio is 3162. Calculate the capacity of the channel. (SNR refers to signal to noise ratio). (05 Marks)
d. Explain the concept of shift keying. (05 Marks)
 - 3 a. Why does multiplexing significant in data transmission? (02 Marks)
b. What is synchronous TDM? Explain. (04 Marks)
c. What is the main purpose of spread spectrum? Explain FHSS. (08 Marks)
d. What do you mean by datagram network? Explain its working principle. (06 Marks)
 - 4 a. Given dataword "1010" and divisor "1011". Using CRC find the codeword. (06 Marks)
b. With a necessary diagram, explain structure of the encoder and decoder for Hamming code with 4 bit dataword. (10 Marks)
c. Consider the table shown to represent code.
- | Dataword | Codeword |
|----------|----------|
| 0 | 00000 |
| 1 | 01011 |
| 2 | 10111 |
| 3 | 11111 |
- Check whether the code is linear code or non-linear code. (04 Marks)
- 5 a. Compare and contrast the Go Back N-ARQ protocol with selective repeat ARQ. (10 Marks)
b. Define framing and explain its need in data link layer. (05 Marks)
c. Assume that, in a stop and wait ARQ system, the bandwidth of the line is 1 Mbps and 1 bit takes 20 ms to make a round trip. What is the bandwidth delay product? (05 Marks)
 - 6 a. Explain slotted ALOHA. (08 Marks)
b. Write the chip sequence for 2-stations and for 4-stations using Walsh table. (04 Marks)
c. What is the role of MAC sublayer? Explain 802.3 MAC-frame. (08 Marks)
 - 7 a. Explain different kinds of services defined by IEEE 802.11 architecture. (10 Marks)
b. With a neat diagram, explain different categories of connecting devices. (10 Marks)
 - 8 a. What is NAT and how can NAT help in address depletion? (05 Marks)
b. Compare and contrast the fields in the main headers of IPV4 and IPV6 protocols. (10 Marks)
c. Change the following IPV4 addresses from dotted decimal notation to binary notation:
i) 111.56.45.78 ii) 221.34.7.82 (05 Marks)

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USN

CBCS SCHEME

15CS52

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021 Computer Networks

Time: 3 hrs.

Max. Marks: 80

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Explain the following terms : Reliable Data Transfer , Loss tolerant applications , Bandwidth sensitive applications , Elastic applications. (08 Marks)
- b. Explain how recursive queries are resolved in Domain Name System. Illustrate DNS record structure and list any two types of records. (08 Marks)

OR

2. a. Discuss Socket Communication between two processes that communicate over Internet with a block diagram. (08 Marks)
- b. Explain (HTTP) Hyper Text Transfer Protocol request – response behavior. (08 Marks)

Module-2

3. a. Describe why an application developer might choose to run an application over UDP rather than TCP. (08 Marks)
- b. Draw finite state machines for both sender side and receiver side of Go – back – N protocol and explain. (08 Marks)

OR

4. a. Explain the structure of UDP and illustrate with an example the checksum calculation. (08 Marks)
- b. Explain TCP connection management with time line diagrams. (08 Marks)

Module-3

5. a. Describe a high level view of a generic router architecture. (08 Marks)
- b. Find the least cost path using Link – State Routing Algorithm in the network given in Fig.Q5(b). Assume node 'u' as the source node. Also state the algorithm. (08 Marks)

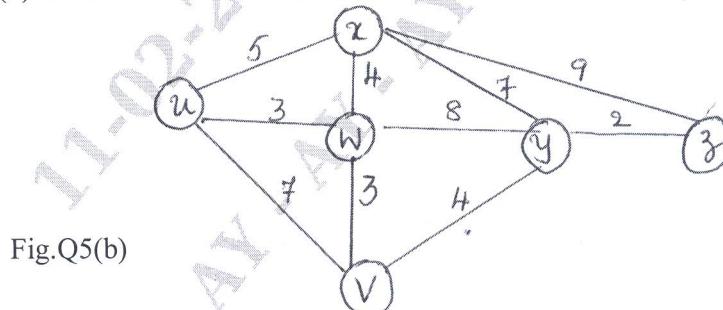
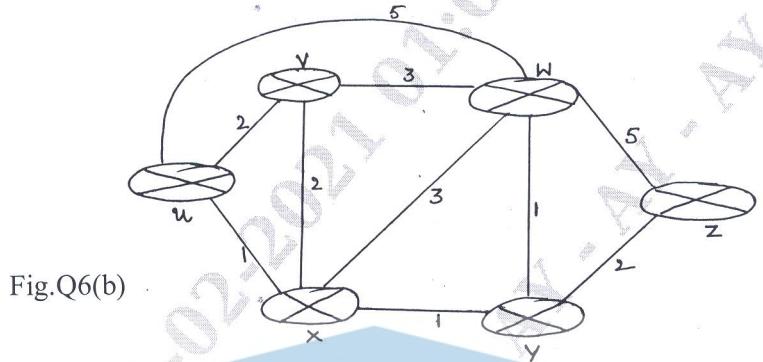


Fig.Q5(b)

OR

- 6 a. Explain the IPV4 datagram format. (08 Marks)
 b. Discuss Distance Vector Routing algorithm. Find the least cost by using Distance Vector algorithm with 'u' as the source node in the network given in Fig. Q6(b). Show the routing table for node 'W'. (08 Marks)



Module-4

- 7 a. Explain 2G Cellular Architecture. (08 Marks)
 b. What are the initial elements of a Mobile Network Architecture? Bring out the role of Care – of – address, permanent address and foreign address. (08 Marks)

OR

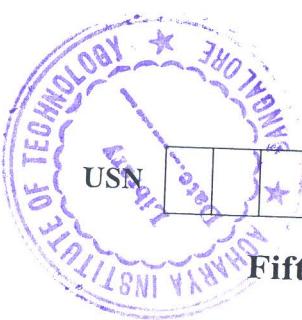
- 8 a. Describe how a call is placed to a mobile GSM user in a visited network. (08 Marks)
 b. Explain Indirect routing to a mobile node. (08 Marks)

Module-5

- 9 a. Explain the service requirements and design issues in multimedia network applications. (08 Marks)
 b. Explain Streaming of Stored video over HTTP/TCP. (08 Marks)

OR

- 10 a. What is a Content Distribution Network (CDN)? Explain how DNS is involved in CDN operation. (08 Marks)
 b. Explain any two scheduling mechanisms as applicable to networks. (08 Marks)



CBCS SCHEME

USN

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17CS52

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021 Computer Networks

Time: 3 hrs.

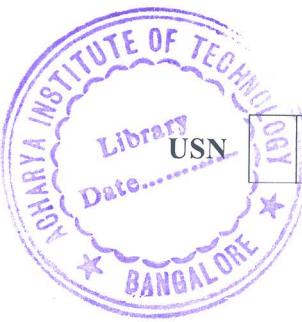
Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Many networks, including internet, provide more than one transport layer protocol. When you develop an application you need to choose one of the available transport layer protocol and consider various parameters. Explain the parameters and protocols to be considered while designing an application. (08 Marks)
- b. True or False :
- Processes on two different systems communicate with each other by exchanging messages across the computer networks
 - A client server architecture achieves perfect security
 - Socket is a hardware interface through which a process sends message into, and receives messages from the network
 - No data loss is tolerated in multimedia applications such as conversational audio/video
 - Developing a new network application for the internet often requires one to decide whether to choose UDP or TCP.
- c. With a simple sketch, explain how SMTP operate when A send mail to B where mail server of A and B are different. Show the sequence of events. (05 Marks)
- (07 Marks)
- 2 a. HTTPRequest message
GET/somedir/page.html HTTP/1.1
HOST : www.someschool.edu
Connection : close
User_agent: Mozilla/5.0
Accept_language : fr
Interpret the meaning of each line in few sentences. (05 Marks)
- b. Explain meaning of each line of
HTTPResponse message given below :
HTTP/1.1 200 ok
Connection : close
Date : Tue, 09 Aug 2011 15 : 44 : 04 GMT
Server : Apache/2.2.3
Last modified : Tue, 09 Aug 2011 15 : 11 : 03 GMT
Content_Length : 6821
Content_type : text/html
(data data - - - -). (07 Marks)
- c. What is the service provided by DNS system? Explain the meaning of root DNS server, Top Level Domain Servers (TLD), Authoritative DNS servers. Explain the meaning of the following DNS records
(relay1.bar.foo.com, 145.37.93.126, A)
(foo.com, mail.bar.foo.com, MX). (08 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. $42 \cdot 8 = 50$, will be treated as malpractice.



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10CS55

Fifth Semester B.E. Degree Examination, Aug./Sept. 2020

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

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.

PART – A

1. a. Explain the five components of data communication system with simple diagram. (06 Marks)
b. List the 3 criteria necessary for an effective and efficient network. (04 Marks)
c. Write and explain OSI reference model. (10 Marks)

2. a. Explain the causes of transmission impairment. (08 Marks)
b. Define : i) Bandwidth ii) Latency iii) Transmission time. (06 Marks)
c. Represent the given sequence 010011 in
i) Unipolar ii) Manchester iii) AMI schemes. (06 Marks)

3. a. Explain FDM technique with a simple diagram. (08 Marks)
b. Explain omnidirectional and unidirectional antenna with 2 applications. (08 Marks)
c. List the 3 phases of a circuit switched network. (04 Marks)

4. a. Explain the working of encoder and decoder for hamming code, with a neat diagram. (10 Marks)
b. Find the codeword, using CRC given dataword ‘1001’ and generator ‘1011’. (10 Marks)

PART – B

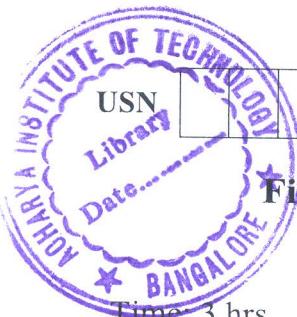
5. a. Explain stop and wait protocol with sender and receiver algorithm. (10 Marks)
b. Explain frame format and transition phases of point – to – point protocol. (10 Marks)

6. a. Explain :
i) Reservation controlled access
ii) FDMA. (12 Marks)
b. Explain 802.3 MAC frame format. (08 Marks)

7. a. Write short note on :
i) IEEE 802.11 architecture
ii) Bluetooth. (10 Marks)
b. With respect to the functionality define repeaters, bridges, routers, gateways. (10 Marks)

8. a. Draw IPv4 address format and explain. (10 Marks)
b. Briefly discuss the advantages of IPv6. (06 Marks)
c. Find the class of each address.
i) 00000001 00001011 00001011 11101111
ii) 11000001 10000011 00011011 11111111
iii) 14.23.120.8
iv) 252.5.15.111 (04 Marks)

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CBCS SCHEME

17CS52

Fifth Semester B.E. Degree Examination, Aug./Sept.2020

Computer Networks

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Compare client-server and peer-to-peer architecture. (06 Marks)
 b. What are the different types of transport services provided by the internet? (08 Marks)
 c. With a general format, explain the HTTP Request and HTTP Response messages. (06 Marks)

OR

- 2 a. Explain FTP commands and replies. (08 Marks)
 b. What are the services provided by DNS? (04 Marks)
 c. Write a short note on :
 i) Web caching
 ii) SMTP. (08 Marks)

Module-2

- 3 a. Explain UDP segment structure. (06 Marks)
 b. With the help of FSM, describe the sender side and receiver side of rdt 2.0. (08 Marks)
 c. Explain Selective Repeat Protocol. (06 Marks)

OR

- 4 a. With a neat diagram, explain TCP segment structure and its fields. (08 Marks)
 b. Explain the way handshake and closing a TCP connection. (08 Marks)
 c. Define the following :
 i) Multiplexing
 ii) Demultiplexing
 iii) TCP
 iv) UDP. (04 Marks)

Module-3

- 5 a. List and explain three switching techniques with a neat diagram. (10 Marks)
 b. With the help of FSM, describe the sender side and receiver side of rdt 2.0. (10 Marks)

OR

- 6 a. Write the algorithm for the following :
 i) Link-state
 ii) Distance vector. (08 Marks)
 b. Write a short note on :
 i) Broadcast routing
 ii) Multicast routing. (12 Marks)

Module-4

- 7 a. Explain 3G system architecture. (08 Marks)
b. Explain the two different routing approaches to mobile node. (12 Marks)

OR

- 8 a. Define handoff. List the steps involved when a base station does decide to handoff a mobile user. (10 Marks)
b. Write a short note on :
i) Agent discovery in mobile IP
ii) Registration with the home agent in mobile IP. (10 Marks)

Module-5

- 9 a. List and explain the types of multimedia networking application. (10 Marks)
b. Briefly explain the following :
i) RTP
ii) SIP. (10 Marks)

OR

- 10 Write a short note on:
a. FIFO scheduling mechanism
b. Priority queueing scheduling mechanism
c. Round robin and weighted fair queuing scheduling mechanism. (20 Marks)

CBCS SCHEME

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15CS52

Fifth Semester B.E. Degree Examination, Aug./Sept. 2020

Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Explain how interaction occurs between web browser and web server using HTTP message.
Explain HTTP request message format. (06 Marks)
- b. Give the importance of SMTP in the internet mail system. (05 Marks)
- c. Explain how client requesting object through web cache. (05 Marks)

OR

2. a. How FTP moves files between local and remote file system? List the commands used in FTP. (06 Marks)
- b. Explain POP3 (Post Office Protocol Version 3). (04 Marks)
- c. Explain the steps involved in interaction of various DNS servers. (06 Marks)

Module-2

3. a. Explain stop wait protocol with FSM representation rdt 2.0. (06 Marks)
- b. Explain TCP segment structure. (06 Marks)
- c. With a neat diagram, explain GO – BACK – N protocol. (04 Marks)

OR

4. a. Explain the steps involved in TCP connection establishment using three way hand shaking. (06 Marks)
- b. What do you mean by congestion control? Explain slow start mechanism. (05 Marks)
- c. Define flow control. Explain how flow is controlled by receiver window and receiver buffer. (05 Marks)

Module-3

5. a. Define routing. What are the goals of routing algorithm? (05 Marks)
- b. A host in an organization has an IP address 200.45.34.56 and subnet address mask 200.45.240.0. What is subnet address? (04 Marks)
- c. Explain the format of IPv6 headers. (07 Marks)

OR

6. a. Explain OSPF. (06 Marks)
- b. Find shortest path from node 1 using link state algorithm. (06 Marks)

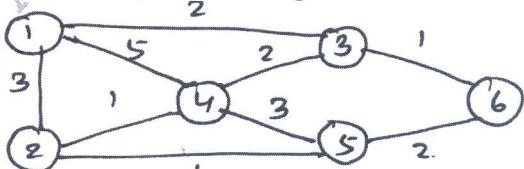


Fig.Q6(b)

- c. Explain RIP(Routing Information Protocol) with its message format. (05 Marks)

1 of 2

15CS52

Module-4

- 7 a. Explain 3G cellular data network. (06 Marks)
b. Write a note on mobile IP. (06 Marks)
c. Explain in brief how mobility is managed in cellular networks. (04 Marks)

OR

- 8 a. What is handoffs? Explain steps involved when a base station does decide to handoff a mobile user. (06 Marks)
b. With neat diagram, explain agent advertisement and mobile IP registration. (05 Marks)
c. Write a note on indirect routing to mobile node. (05 Marks)

Module-5

- 9 a. Give the classification of multimedia application. Explain in brief. (04 Marks)
b. Explain Content Distribution Networks (CDN) and its operation. (06 Marks)
c. Explain how interaction takes place between client and server for HTTP streaming. (06 Marks)

OR

- 10 a. Define policing. Mention 3 important policing criterias. (05 Marks)
b. Explain weighted fair queuing. (05 Marks)
c. Write a note on Diffserv. (06 Marks)

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17CS52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 **Computer Networks**

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Which protocol can be used for fetching web pager? Explain its working with request and response message formats. (10 Marks)
 b. Explain the services offered by DNS and also explain the DNS record and message formal. (10 Marks)

OR

- 2 a. Explain the working FTP along with its commands. (08 Marks)
 b. Compare HTTP and SMTP. (04 Marks)
 c. Illustrate how P2P architecture can be adopted in file Sharing application like bit torrentz. (08 Marks)

Module-2

- 3 a. Draw and explain the FSM for sender site and receiver site of rdt 2.0 protocol. (07 Marks)
 b. Explain selective repeat ARQ protocol. (06 Marks)
 c. Draw TCP segment structure and explain its fields. (07 Marks)

OR

- 4 a. Suppose that two measured sample RTT values are 106ms and 120ms.
 i) Compute Estimated RTT after each of these Sample RTT value is obtained. Assume $\alpha = 0.125$ and Estimated RTT is 100ms. Just before first of the samples obtained.
 ii) Compute DeVRTT. Assume $\beta = 0.25$ and DeVRTT is 5ms before first of the samples obtained. (06 Marks)
 b. Explain how connection establishment and termination is handled by TCP. (07 Marks)
 c. What is congestion in network? Explain how TCP handles congestion. (07 Marks)

Module-3

- 5 a. What is routing? With a neat diagram, explain the structure of a router. (10 Marks)
 b. Write link state routing algorithm, consider the following network with the indicated link costs. Apply link state routing algorithm to compute the shortest path from 'u' to all other nodes in the network. [Refer Fig.Q5(b)]. (10 Marks)

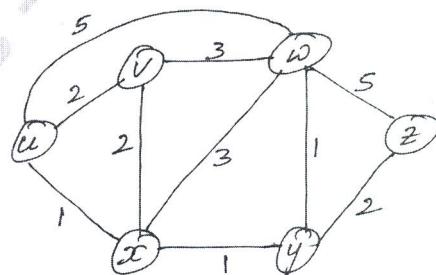


Fig.Q5(b)
 1 of 2

OR

- 6 a. Draw IPV6 datagram format. Explain its fields. (06 Marks)
b. Illustrate the working of RIP protocol. (07 Marks)
c. List the broadcast routing algorithm. Explain any one of them. (07 Marks)

Module-4

- 7 a. With a neat diagram, explain the components of 3G cellular network architecture. (10 Marks)
b. Explain two different types of routing approaches to mobile nodes. (10 Marks)

OR

- 8 a. Explain the three phases of mobile IP. (10 Marks)
b. What is handoff? What are the steps involved in accomplishing handoff. (10 Marks)

Module-5

- 9 a. Explain three different types of streaming stored video. (10 Marks)
b. Explain the working of CDN. (10 Marks)

OR

- 10 a. Describe the leaky bucket policing mechanism. (06 Marks)
b. Explain the various packet scheduling mechanism. (08 Marks)
c. Explain the properties of Video. (06 Marks)

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15CS52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain client server and peer-to-peer architecture. (08 Marks)
b. Describe HTTP with persistent and non-persistent connections. (08 Marks)

OR

- 2 a. Discuss how files are distributed in peer-to-peer application. (08 Marks)
b. Demonstrate socket implementation using TCP. (08 Marks)

Module-2

- 3 a. With a diagram, explain the connection-oriented multiplexing and de-multiplexing. (06 Marks)
b. Elaborate the three way handshaking in TCP. (05 Marks)
c. Discuss Go-Back N protocol. (05 Marks)

OR

- 4 a. With a neat sketch, explain the TCP segment and its services. (08 Marks)
b. Design rdt 2.0 protocol. (08 Marks)

Module-3

- 5 a. With general format, explain various fields of IPV6. (08 Marks)
b. Define routing algorithm. List the broadcast routing algorithms. Explain any one of them. (08 Marks)

OR

- 6 a. Illustrate Routing Information Protocol (RIP) with suitable diagram. (08 Marks)
b. Explain the spanning tree algorithm and give its advantages and disadvantages. (08 Marks)

Module-4

QR

- 8 a. Illustrate the steps involved when a base station does decide to hand-off a mobile user. (08 Marks)
b. Compare mobile IP and GSM mobility. (04 Marks)
c. With a diagram, explain the problem and its solution in direct routing. (04 Marks)

Module-5

- 9 a. With a neat diagram, explain the CDN operation. (08 Marks)
b. Briefly explain the properties of Video and Audio. (08 Marks)

OR

- 10 a. Explain the working procedure of leaky bucket algorithm. (08 Marks)
b. Discuss the followings: (i) Adaptive streaming (ii) DASH (08 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2019

Computer Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Describe in detail the services offered by DNS and explain the DNS message format. (08 Marks)
 b. Illustrate the basic operation of SMTP and FTP. (08 Marks)

OR

- 2 a. Explain the persistent and non-persistent connection of HTTP. (08 Marks)
 b. Define a socket. Describe the socket programming using TCP. (08 Marks)

Module-2

- 3 a. Draw and explain the FSM for sender and receiver side of rdt 2.1 protocol. (08 Marks)
 b. Elaborate the three-way handshaking procedure used in TCP. (04 Marks)
 c. Suppose that 2 measured sample RTT values are 106 ms and 120 ms. Compute
 (i) Estimated RTT after each of these sample RTT value is obtained. Assume $\alpha = 0.125$ and estimated RTT is 100 ms just before first of the sample obtained.
 (ii) Compute DevRTT, Assume $\beta = 0.25$ and DevRTT was 5 msec before first of these samples are obtained. (04 Marks)

OR

- 4 a. With an FSM, explain the three phases of congestion control. (08 Marks)
 b. Write the TCP segment structure and explain its fields. (04 Marks)
 c. Elaborate the working of Go-Back N protocol. (04 Marks)

Module-3

- 5 a. Give the format of IPV6 datagram and explain the fields. (06 Marks)
 b. What are the message types used in IGMP? (03 Marks)
 c. Write the link state routing algorithm and apply it to the following graph with source node [Refer Fig.Q5(c)] is 'u'. (07 Marks)

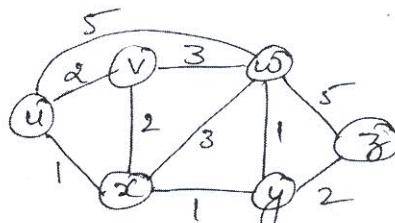


Fig.Q5(c)

OR

- 6 a. What is routing? Write the structure of a router. (07 Marks)
 b. List the broadcast routing algorithms? Explain any one of them. (04 Marks)
 c. Describe the intra-AS routing protocols in detail (05 Marks)

Module-4

- 7 a. Illustrate the two different approaches for routing to a mobile node. (08 Marks)
b. With a neat diagram, bring out the steps for mobile node registration to home agent. (08 Marks)

OR

- 8 a. Bring out the components of 3G Cellular Network architecture. (08 Marks)
b. State handoff? What are the steps involved in accomplishing handoff. (05 Marks)
c. Explain the three phases of mobile IP. (03 Marks)

Module-5

- 9 a. Bring out the leaky bucket mechanism for traffic policing. (07 Marks)
b. Classify the multimedia network applications. (03 Marks)
c. Describe the link scheduling mechanisms. (06 Marks)

OR

- 10 a. List the categories of streaming stored video. Explain any one of them. (08 Marks)
b. Explain the working of CDN. (08 Marks)

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15CS/IS52

**Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Computer Networks**

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.***Module-1**

- 1 a. Explain HTTP messages. (08 Marks)
 b. Explain web caching with diagram. (08 Marks)

OR

- 2 a. Explain FTP with its commands and replies. (08 Marks)
 b. Explain SMTP. (04 Marks)
 c. Explain DNS resource record. (04 Marks)

Module-2

- 3 a. Explain Sender's view of sequence numbers and its operation in Goback N protocol. (08 Marks)
 b. Draw TCP segment structure and explain. (08 Marks)

OR

- 4 a. Explain 3 way handshake and closing a TCP connection. (08 Marks)
 b. Explain the causes and costs of congestion. (08 Marks)

Module-3

- 5 a. With diagram explain router architecture. (08 Marks)
 b. Explain IP fragmentation. (08 Marks)

OR

- 6 a. Explain distance vector algorithm. (08 Marks)
 b. Explain 4 types of hierarchical OSPF routers. (04 Marks)
 c. Compare link state with distance vector algorithm. (04 Marks)

Module-4

- 7 a. Explain components of a cellular network architecture. (08 Marks)
 b. Explain direct routing of a mobile node. (08 Marks)

OR

- 8 a. Explain steps of handoff a mobile user. (08 Marks)
 b. Explain HLR, VLR, home address, care-of-address. (08 Marks)

Module-5

- 9 a. With diagram, explain naïve architecture for audio/video streaming. (08 Marks)
 b. Explain audio compression in internet. (08 Marks)

OR

- 10 a. With diagram, explain interaction between client and server using RTSP. (08 Marks)
 b. Explain how streaming from streaming server to a media player is done. (08 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. With a neat diagram, explain the functionalities of each layers of OSI – reference model. (10 Marks)
b. Define networks what are the three criteria necessary for an effective and efficient network. (04 Marks)
c. Differentiate between :
 - i) TCP and UDP
 - ii) Half duplex and full duplex
 - iii) ICMP and IGMP.(06 Marks)

2. a. Discuss the three causes of transmission impairments. (06 Marks)
b. Define line coding. Explain the characteristics of line coding. (10 Marks)
c. Consider a channel with 1MHz bandwidth, the SNR for this channel is 63. What is appropriate bit rate and signal level? (04 Marks)

3. a. Explain how statistical TDM overcomes the disadvantages of synchronous TDM. (04 Marks)
b. Discuss the three phases in virtual circuit network with suitable illustration. (10 Marks)
c. Four sources create 250 characters per sec. The frame contains one-character from each source and one extra bit for synchronization find :
 - i) Data rate of each sources
 - 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.(06 Marks)

4. a. What are the different types of errors? Explain in brief. (04 Marks)
b. What is block coding? Explain error detection, and error correction. (09 Marks)
c. Find the codeword $c(x)$ for the transformation $d(x) = x^3 + 1$, with the generator polynomial $t(x) = x^3 + x + 1$. (07 Marks)

PART – B

5. a. Compare and contrast byte-oriented and bit-oriented protocols. (06 Marks)
b. Explain briefly with a neat figures :
 - i) Stop and wait protocol
 - ii) Stop and wait ARQ protocol.(08 Marks)
c. Describe the different transition phases in Point-to-Point Protocol(PPP). (06 Marks)

- 6 a. Write a note on :
i) Slotted ALOHA
ii) 802.3 MAC frame format. (10 Marks)
- b. What is channelization? Explain FDMA and TDMA protocols used for channelization. (07 Marks)
- c. A pure ALOHA network transmits 200 bits frames on a shared channel of 200 kbps. What are the requirements to make this frame collision free. (03 Marks)
- 7 a. Explain the hidden and exposed station problem in IEEE 802.11 MAC layer. (10 Marks)
- b. Explain two different types of networks used in Bluetooth. (06 Marks)
- c. Calculate the maximum number of simultaneous calls in each cell in IS-136(D-AMPS) system. Assume there are no analog control channels. (04 Marks)
- 8 a. Find the class of each address :
i) 00000001 00001011 00001011 11101111
ii) 11000001 10000011 00011011 11111111
iii) 14.23.120.8
iv) 252.5.15.111. (04 Marks)
- b. Discuss the IPv4 header format, with a neat diagram. (10 Marks)
- c. What are the advantages of IPv6 over IPv4? (06 Marks)

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15CS/IS52

**Fifth Semester B.E. Degree Examination, June/July 2018
Computer Networks**

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.****Module-1**

- 1 a. What are the different types of transport services provided by the internet? (08 Marks)
 b. Compose logical note on proxy-server with suitable diagram. (08 Marks)

OR

- 2 a. Discuss how files are distributed in peer-to-peer application. (08 Marks)
 b. Design network application using socket programming with UDP. (08 Marks)

Module-2

- 3 a. Describe the various fields of UDP segment. Explain how Checksum is calculated. (08 Marks)
 b. Design rdt 2.0 protocol. (08 Marks)

OR

- 4 a. With a neat sketch, explain the TCP segment and its services. (08 Marks)
 b. Explain how connection is established and tear down in TCP. (08 Marks)

Module-3

- 5 a. Draw IPv6 datagram format, mention the significance of each fields. (08 Marks)
 b. Apply distance –vector algorithm for the following Fig.Q5(b). (08 Marks)

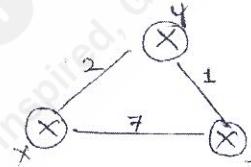


Fig.Q5(b)

OR

- 6 a. Illustrate Routing Information Protocol (RIP) with suitable diagram. (08 Marks)
 b. Explain the spanning tree algorithm. (08 Marks)

Module-4

- 7 a. Define cellular network. Give the overview of GSM cellular network architecture. (08 Marks)
 b. Explain the two different types of routing approaches to mobile node. (08 Marks)

OR

- 8 a. Explain the following concepts of mobile-IP : i) Agent discovery ii) Registration with home agent. (08 Marks)
 b. Illustrate the steps involved when a base station does decide to hand-off a mobile user. (08 Marks)

Module-5

- 9 a. Brief out three broad categories of multimedia network applications. (08 Marks)
 b. Discuss the followings : i) Adaptive streaming ii) DASH. (08 Marks)

OR

- 10 a. With general format, explain the various fields of RTP. (08 Marks)
 b. Explain the working procedure of leaky bucket algorithm. (08 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

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. Discuss in detail about the layers in OSI model with a neat diagram. (10 Marks)
b. Briefly explain different addressing modes used in TCP/IP protocol suite. (05 Marks)
c. Define protocol and identify the different elements of a protocol. (05 Marks)
2. a. For the given string 11011001 represent the unipolar, polar NRZ, Manchester and differential Manchester encoding techniques. (05 Marks)
b. Identify the different transmission impairments observed in data transfer. (05 Marks)
c. A telephone line has a bandwidth of 3000 Hz assigned for data communication. The SNR ratio is 3162. Calculate the capacity of the channel. (SNR refers to signal to noise ratio). (05 Marks)
d. Explain the concept of shift keying. (05 Marks)
3. a. Define multiplexing and elaborate it in the context of time division multiplexing. (05 Marks)
b. Elaborate the concept of circuit switches, datagram networks and virtual circuit networks with block diagrams. (10 Marks)
c. The advanced mobile phone system uses two bands. The first band of 824 to 849 MHz is used for sending and 869 to 894 MHz is used for receiving. Each user has a bandwidth of 30 kHz in each direction. The 3 kHz voice is modulated using FM, creating 30 kHz of modulated signal. How many people can use their cellular phones simultaneously? (05 Marks)
4. a. Discuss about Hamming distance used in error control. (05 Marks)
b. Briefly explain about linear block codes with emphasis on parity check code. (05 Marks)
c. For a Augmented data word of $x^6 + x^3$, and the divisor 1011 which is represented as $x^3 + x + 1$. Calculate the code word, by using cyclic code encoder using polynomials. (10 Marks)

PART – B

5. a. Compare and contrast the Go Back N-ARQ protocol with selective repeat ARQ. (10 Marks)
b. Define framing and explain its need in data link layer. (05 Marks)
c. Assume that, in a stop and wait ARQ system, the bandwidth of the line is 1 Mbps and 1 bit takes 20 ms to make a round trip. What is the bandwidth delay product? (05 Marks)
6. a. Define controlled access in MAC sublayer and explain the three methods in this category. (10 Marks)
b. Define channelization with its supporting protocols. (05 Marks)
c. A pure ALOHA network transmits 200 bit frames on a shared channel of 200 Kbps. What is the throughput if the system produces 1000 frames/sec. (05 Marks)
7. a. Explain the architecture used in IEEE 802.11 protocol. (10 Marks)
b. How is a repeater different from amplifier? (05 Marks)
c. What is GSM and explain its features. (05 Marks)
8. a. What is NAT and how can NAT help in address depletion? (05 Marks)
b. Compare and contrast the fields in the main headers of IPV4 and IPV6 protocols. (10 Marks)
c. Change the following IPV4 addresses from dotted decimal notation to binary notation:
i) 111.56.45.78 ii) 221.34.7.82 (05 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

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. Discuss in detail about the layers in OSI model with a neat diagram. (10 Marks)
b. Briefly explain different addressing modes used in TCP/IP protocol suite. (05 Marks)
c. Define protocol and identify the different elements of a protocol. (05 Marks)
2. a. For the given string 11011001 represent the unipolar, polar NRZ, Manchester and differential Manchester encoding techniques. (05 Marks)
b. Identify the different transmission impairments observed in data transfer. (05 Marks)
c. A telephone line has a bandwidth of 3000 Hz assigned for data communication. The SNR ratio is 3162. Calculate the capacity of the channel. (SNR refers to signal to noise ratio). (05 Marks)
d. Explain the concept of shift keying. (05 Marks)
3. a. Define multiplexing and elaborate it in the context of time division multiplexing. (05 Marks)
b. Elaborate the concept of circuit switches, datagram networks and virtual circuit networks with block diagrams. (10 Marks)
c. The advanced mobile phone system uses two bands. The first band of 824 to 849 MHz is used for sending and 869 to 894 MHz is used for receiving. Each user has a bandwidth of 30 kHz in each direction. The 3 kHz voice is modulated using FM, creating 30 kHz of modulated signal. How many people can use their cellular phones simultaneously? (05 Marks)
4. a. Discuss about Hamming distance used in error control. (05 Marks)
b. Briefly explain about linear block codes with emphasis on parity check code. (05 Marks)
c. For a Augmented data word of $x^6 + x^3$, and the divisor 1011 which is represented as $x^3 + x + 1$. Calculate the code word, by using cyclic code encoder using polynomials. (10 Marks)

PART – B

5. a. Compare and contrast the Go Back N-ARQ protocol with selective repeat ARQ. (10 Marks)
b. Define framing and explain its need in data link layer. (05 Marks)
c. Assume that, in a stop and wait ARQ system, the bandwidth of the line is 1 Mbps and 1 bit takes 20 ms to make a round trip. What is the bandwidth delay product? (05 Marks)
6. a. Define controlled access in MAC sublayer and explain the three methods in this category. (10 Marks)
b. Define channelization with its supporting protocols. (05 Marks)
c. A pure ALOHA network transmits 200 bit frames on a shared channel of 200 Kbps. What is the throughput if the system produces 1000 frames/sec. (05 Marks)
7. a. Explain the architecture used in IEEE 802.11 protocol. (10 Marks)
b. How is a repeater different from amplifier? (05 Marks)
c. What is GSM and explain its features. (05 Marks)
8. a. What is NAT and how can NAT help in address depletion? (05 Marks)
b. Compare and contrast the fields in the main headers of IPV4 and IPV6 protocols. (10 Marks)
c. Change the following IPV4 addresses from dotted decimal notation to binary notation:
i) 111.56.45.78 ii) 221.34.7.82 (05 Marks)

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Fifth Semester B.E. Degree Examination, May 2017
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

- 1 a. What is data communication? What are its important fundamental characteristics? List and explain the five components of a data communication system, with examples. (12 Marks)
 b. List out the layers in OSI reference model and explain any two layers in detail. (08 Marks)
- 2 a. Explain about the causes of transmission impairment. (08 Marks)
 b. Briefly explain the three parameters of the sine wave with waveform and write the units for each. (06 Marks)
 c. An analog signal has a bit rate of 10000 bps and bandwidth of 2000 baud. How many data elements are carried by each signal element? How many signal elements do we need? (06 Marks)
- 3 a. What is spread spectrum? Explain the following techniques for spread spectrum : FHSS and DSSS. (14 Marks)
 b. Briefly discuss about delay in virtual circuit networks. (06 Marks)
- 4 a. What is internet checksum? List the steps undertaken by the sender and the receiver for error detection. (08 Marks)
 b. With a neat diagram, explain CRC encoder and decoder C(7, 4). (12 Marks)

PART – B

- 5 a. Differentiate between character oriented and bit oriented format for framing. (06 Marks)
 b. Explain the frame formats and control fields for different types of HDLC frames. (14 Marks)
- 6 a. List out the different channelization protocols. Explain CDMA. (12 Marks)
 b. Explain 802.3 frame format and addressing. (08 Marks)
- 7 a. Describe Bluetooth architecture. (10 Marks)
 b. List out the connecting devices used in data communication. Explain about repeaters and bridges. (10 Marks)
- 8 a. Explain in detail about classless address. (10 Marks)
 b. Describe the structure of IPv6 address. (06 Marks)
 c. Give any two advantages of IPv6 over IPv4. (04 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Networks – I

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 characteristics and components of a data communication system. (08 Marks)
- b. With a neat diagram explain the TCP/IP protocol suite mentioning the different layers and their functions in TCP/IP. Why is TCP/IP called a defacto standard? (08 Marks)
- c. Explain the different addresses used in TCP/IP and diagrammatically indicate how they are related to different layers in TCP/IP. (04 Marks)

2. a. Mention and explain with reasons the causes of impairment of transmission of signals through transmission media. (08 Marks)
- b. What is pulse code modulation (PCM)? Draw the block schematic of a PCM encoder indicating different components and relevant waveforms for the input voltage $v(t) = 2t$ for $t = 0$ to $t = T/2$ and $v(t) = 0$ for $t = T/2$ to T . (08 Marks)
- c. The human voice normally contains frequencies from 0 to 4000 Hz. What is the minimum sampling rate as per Nyquist theorem? Assuming 8-bits/sample, what is the bit rate? (04 Marks)

3. a. When is the use of multiplexing justified? Mention and explain different types of multiplexing. (08 Marks)
- b. Describe the different switched networks used in computer networks, mentioning specifically which of these need setup, transfer and teardown phase. (08 Marks)
- c. A path in a digital circuit switched network has a data rate of 1 Mbps. Exchange of 1000 bits is required for setup and 1000 bits for teardown. The distance between two parties is 8000 km. calculate the total time required to transfer 2000 bits of data if acknowledgement requires exchange of 500 bits and tearing down of connection is initiated from source assuming no error in data transmission, no processing delay and propagation speed in connecting medium 2×10^8 m/s (Protocol ends with sending of tearing down message from source side). (04 Marks)

4. a. For the following code find the minimum Hamming distance.

Data word	Code word
0 0	0 0 0 0 0
0 1	0 1 0 1 1
1 0	1 0 1 0 1
1 1	1 1 1 1 0

Based on the minimum Hamming distance found, discuss the capabilities of this code. Represent the code in symbolic form. (08 Marks)

- b. Draw the block schematic diagram for encoder and decoder which uses a standard polynomial $CRC-8 = x^8 + x^2 + x + 1$ for coding and decoding. Explain how code words are generated and errors in received code words are detected, if the message length is 8-bits, say 10101010. (08 Marks)

- c. In a system using CRC (Cyclic Redundancy Check) for error detection the generator used is 1011 and codeword received is 1011110. Explain with reason what is the action taken at receiver. (04 Marks)

PART – B

- 5 a. In stop-and-wait automatic repeat request (Stop-and-wait ARQ), explain how is error control mechanism added to stop-and-wait protocol of noise free channel for a noisy channel. With frame flow diagram, explain how a frame is delivered when (i) it is delivered first time and acknowledged (ii) When it is lost (iii) when it is delivered but its acknowledgement is lost. (08 Marks)
- b. What is a High-Level Data Link Control (HDLC) protocol? Indicate in diagrammatic form, the frame format of different HDLC frames. Which field in these frames indicates the type of frame? (08 Marks)
- c. Assume that in a stop-and-wait ARQ system the bandwidth of the line is 1 Mbps and 1 bit takes 10 ms for one way trip. What is the bandwidth-delay product? If the system data frames are 1000 bits in length, what is the utilization percentage of the link? (04 Marks)
- 6 a. Describe CSMA/CD access method with space/time model and indicate the requirements needed for this type of access. (08 Marks)
- b. With a neat diagram describe the different fields and their lengths in bytes of standard Ethernet (802.3 MAC) frame. (08 Marks)
- c. A network using CSMA/CD has a bandwidth of 10 Mbps. What should be the minimum size of frame if the maximum propagation time including delays in devices is 25.6×10^{-6} s. (04 Marks)
- 7 a. Describe how the communication takes place in wireless LANs with the help of CSMA/CA flowchart. Also explain how collision is avoided. (08 Marks)
- b. Draw the schematic diagram of a cellular system in cellular telephony and describe how a call is made and a call is received by the mobile station. (08 Marks)
- c. Advanced Mobile Phone System (AMPS) uses 824 MHz to 849 MHz (25 MHz) band for reverse communication and 869 MHz to 894 MHz (25 MHz) band for forward communication. Calculate the number of analog channels if the bandwidth of analog channel is 30.04 kHz. If AMPS has frequency reuse factor of 7, how many channels are available in a cell? (04 Marks)
- 8 a. Why is Network Address Translation (NAT) used in IPv4 protocol? Explain with example how the address of datagram gets changed? (Use private source address 198.168.0.1, NAT router address 200.24.5.8 and Destination address 25.8.2.10). (08 Marks)
- b. Draw the diagram showing the IPv4 datagram format showing different fields with their length in bits. Explain the function of each field. (08 Marks)
- c. In IPv4 datagram has arrived with the following information in the header (in hexadecimal)
OX 4500 0054 0003 5850 2006 0000 7C4E 0302 B40E 0F20
Answer the following questions:
(i) Is the packet fragmented? (Give reason to your answer)
(ii) What is the size of data?
(iii) How many routers the packet can travel to?
(iv) What is the identification of the packet in decimal? (04 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2016
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What is data communication? Explain with neat sketch three types of communications between the devices considering data flow. (06 Marks)
- b. With sketch, explain two types of wide area network in use. (04 Marks)
- c. List out the functionalities of physical layer, data link layer and network layer. Explain in brief. (06 Marks)
- d. Give four levels of addresses used in TCP/IP protocol and give its significances. (04 Marks)

2. a. Define the following :
 - i) Frequency shift keying
 - ii) Band width of composite signal
 - iii) Base band transmission
 - iv) Broad band transmission
 - v) SNR
 - vi) Nyquist bit rate. (06 Marks)
- b. What is latency? List out its components. Find the total delay in a line of length 2000 km, to transfer 5 M bytes of data if band width is 1 Gbps. (04 Marks)
- c. What is line coding? Draw line code of the sequence 01001110 in NRZ_L, Manchester, differential Manchester, RZ and AMI coding scheme. (06 Marks)
- d. Give the block diagram of PCM encoder and state the role of each processes. (04 Marks)

3. a. What is multiplexing? Differentiate synchronous TDM with statistical TDM giving the working of both procedures in brief. (06 Marks)
- b. State and explain the data rate management to handle disparity in input data rates in TDM. (04 Marks)
- c. Explain in brief FHSS technique. (06 Marks)
- d. List out the differences between datagram switching and virtual circuit switching. (04 Marks)

4. a. What is hamming code? With the structure of the encoder and decoder for hamming code C(7, 4), explain how it can find the error and corrects the same. (06 Marks)
- b. Find codeword, using cyclic redundancy code given generator 1011, data word 1001 and show how it is used to check for error detection in the receiver side. (08 Marks)
- c. Write note on error detection method using 16 bit check sum used in internet. Calculate check sum for a text ‘Food’ given ASCII values of F is 46, o is 6F and d is 64. (06 Marks)

PART – B

5. a. With neat sketch, explain two approaches used in variable size framing. (06 Marks)
- b. What should be send window size in Go–Back–N ARQ? Justify your answer. (06 Marks)
- c. What are the 3 types of HDLC frames used in HDLC bit oriented protocol? Explain its significance with its structure. Show how that frames can be used for exchange of data using piggy backing. (08 Marks)

10CS55

- 6 a. With flow diagram, explain the working of CSMA/CD. (08 Marks)
b. Explain working of CDMA with suitable example. (06 Marks)
c. Give the details of minimum and maximum length of Ethernet frame. With an example, explain the format of Ethernet address. (06 Marks)
- 7 a. With neat sketch, explain BSS and ESS. (06 Marks)
b. Explain with necessary sketch IEEE 802.11 addressing mechanism. (08 Marks)
c. Show two types of networks used in Bluetooth. Explain in brief the same. (06 Marks)
- 8 a. Write note on five classes of address used in IPV4 addressing. Give the details of address space. (10 Marks)
b. Give the IPV4 datagram format and brief description of each field. (10 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**Computer Networks – I**

Time: 3 hrs.

Max. Marks:100

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

PART – A

1. a. Define network. With a neat diagram, explain the four basic topologies. (05 Marks)
b. With the help of a diagram, explain the functionalities of each layer of OSI reference model. (10 Marks)
c. List and explain the four levels of addresses used in an internet employing the TCP/IP protocols. (05 Marks)

2. a. Define latency. Briefly explain the components of latency. What are the propagation time and transmission time for a 5 Mbyte message (image), if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and receiver is 12000 km and that light travels at 2.4×10^8 m/s. (08 Marks)
b. Explain the PCM technique used for analog to digital conversion. (Taking suitable example). (08 Marks)
c. What is line coding? Represent the sequence “01001110” using NRZ-L, NRZ-I and Manchester schemes. (04 Marks)

3. a. What is TDM? Explain in detail. (07 Marks)
b. Explain virtual circuit network with an example, and also briefly discuss the phases. (10 Marks)
c. Five channels, each with a 100 kHz bandwidth are to be multiplexed together. What is the minimum bandwidth of the link is there is a need for a guard band of 10 kHz between the channels to prevent interference? (03 Marks)

4. a. How does datawords and codewords is represented in block coding and also explain how can errors be detected and corrected by using block coding. (10 Marks)
b. Find the code word using CRC given data “1101” and generator “1100”. (10 Marks)

PART – B

5. a. With a neat diagram, explain any two protocols of noisy channel. (12 Marks)
b. Explain the frame format of HDLC protocol. (08 Marks)

6. a. Describe pure ALOHA and slotted ALOHA. (10 Marks)
b. What is channelization? List and explain the channelization protocols. (10 Marks)

7. a. Explain the different types of addressing mechanism in IEEE 802.11. (05 Marks)
b. Define Bluetooth and explain the architecture of Bluetooth. (05 Marks)
c. With a neat diagram, explain the categories of connecting devices. (10 Marks)

8. a. Explain classful addressing and classless addressing with respect to IPV4. (08 Marks)
b. Explain in detail IPV6 packet format. (08 Marks)
c. Give a comparison between IPV4 and IPV6. (04 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2015

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What is data communication? What are the five components of data communication system? (06 Marks)
- b. Explain the OSI reference model, listing the functions of each layer in brief. (10 Marks)
- c. What are the four level of addresses used in internet employing TCP/IP. (04 Marks)

2. a. Using Shannon's theorem, compute the maximum bit rate for a channel having a band width of 3100 Hz and signal to noise ratio of 20 db. (06 Marks)
- b. Sketch the signal waveforms when 01001110 is transmit using following line coding schemes : i) R₂ ii) NRZ – L iii) Manchester coding. (06 Marks)
- c. Explain different types of transmission modes. (08 Marks)

3. a. Four 1 – kbps connections are multiplexed together a unit is 1 bit. Find : i) the duration of 1-bit before multiplexing ii) the duration of a timeslot, iii) the duration a frame. (06 Marks)
- b. Define direct sequence spread spectrum (DSSS) and explain how it achieves band width spread using relevant sketch. (08 Marks)
- c. What is virtual circuit network? List the five characteristics of the same. (06 Marks)

4. a. Given the data word 1001 and divisor 1011 :
 - i) Show the generation code word at the sender site
 - ii) Show the checking of code word at receiver site (assume no error). (10 Marks)
- b. Explain process of error detection and error correction using block coding. (06 Marks)
- c. What is internet check sum? List the steps undertaken by sender to calculate check sum. (04 Marks)

PART – B

5. a. With neat diagram of point – to point protocol (PPP) frame format, explain each of the fields. (08 Marks)
- b. Explain stop and wait automatic repeat request protocol. (06 Marks)
- c. What is framing? With necessary sketches explain bit stuffing and unstuffing. (06 Marks)

6. a. With neat diagram explain TDMA. (06 Marks)
- b. Mention different categories of standard Ethernet and explain implementation of 10 base 5 – thick Ethernet. (08 Marks)
- c. Mention the five goals of fast Ethernet. And give the importance of “AUTONEGOTIATION”. (06 Marks)

7. a. What is blue tooth? Explain its architecture. (06 Marks)
- b. Explain the following connecting devices :
 - i) Hub ii) Bridge iii) Router iv) Gateway. (08 Marks)
- c. Discuss cellular telephone in brief. (06 Marks)

8. a. List the deficiencies of IPV4 and advantages of IPV6 over IPV4. (10 Marks)
- b. Draw format of an IPV6 datagram and explain. (10 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2015
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. Briefly explain the different modes of communication. Give example for each. (06 Marks)
 b. Briefly explain the function of : i) physical layer ii) network layer. (09 Marks)
 c. What is : i) the number of cables ii) the number of ports for each device required if five devices are arranged in : Mesh topology, Star topology. (05 Marks)

2. a. We have a channel with 5 KHz bandwidth. If we want to send data at 150 Kbps. What is the minimum SNR dB? What is the SNR? (06 Marks)
 b. Why is line coding necessary? Encode the bit stream 010011 using NRZ – L, RZ, and differential Manchester line coding schemes. (09 Marks)
 c. Distinguish between asynchronous and synchronous transmission modes. Give examples for each. (05 Marks)

3. a. Briefly describe the digital modulation schemes. (06 Marks)
 b. Explain synchronous TDM scheme. What strategies are used if the data rates of all input lines are not the same? (09 Marks)
 c. Five channels each with 100 KHz are to be multiplexed together. What is the minimum bandwidth of the lines if there is a need for a guard band of 10 KHz between the channels? What is the maximum data rate of each channel if 64 – QAM is used? (05 Marks)

4. a. Describe how data transmission is done using fiber-optic cable. What are the advantages of fiber-optic communications? (10 Marks)
 b. Given the generator polynomial $g(x) = x^3 + x + 1$, find the CRC code word for the information (message) bits 1110. (05 Marks)
 c. Explain the internet checksum method for error detection. (05 Marks)

PART – B

5. a. Why is framing necessary? What is meant by byte stuffing? How is bit stuffing done? (05 Marks)
 b. Compare and contrast Go-Back-N and selective repeat ARQ protocols. What is the size of the sender and receiver windows in selective repeat ARQ? Why? (09 Marks)
 c. Explain the PPP frame format. (06 Marks)

6. a. Explain the CSMA/CD protocol. With a flow diagram, if a network has a band-width of 10 Mbps and the maximum propagation time is 25.6 μ s, what is the minimum size of the frame? (10 Marks)
 b. How does CDMA work? (05 Marks)
 c. What are the advantages of dividing an Ethernet LAN with a bridge? How does a switch improve the situation? (05 Marks)

- 7 a. Explain the Distributed Coordination Function (DCF) protocol with CSMA/CA. (05 Marks)
b. Determinate the hidden and exposed station problems and the solutions. (05 Marks)
c. What is Bluetooth technology? What are piconet and scatternet? (05 Marks)
d. Briefly explain the operation of a repeater, hub, bridge, two layer switch and router. (05 Marks)
- 8 a. Explain cellar telephony with the following concepts : frequency reuse principle, transmitting, Receiving, Hand off and Roaming. (05 Marks)
b. What is SONET? What are the functions of SONET layers? (05 Marks)
c. Calculate the data rates of STS – 1 frame and STS–n frame. What is the duration of a STS frame? (05 Marks)
d. What is ATM? Give the structure of an ATM cell. What are types of connections used by ATM? (05 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What are the components of data communication system? Explain in brief. (05 Marks)
 b. With a neat diagram, explain the interaction between layers in the OSI model. (10 Marks)
 c. What is the difference between a physical and logical address? Explain with example. (05 Marks)

2. a. Distinguish between low pass channel and a band pass channel. (06 Marks)
 b. A network with bandwidth of 10Mbps can pass only an average of 18,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network? (04 Marks)
 c. Compare and contrast between PCM and DM. (06 Marks)
 d. Explain polar biphasic Manchester and differential Manchester encoding schemes with example. (04 Marks)

3. a. Explain following modulation techniques:
 i) Amplitude modulation
 ii) Frequency modulation. (06 Marks)
 b. A multiplexer combines four 100kbps channels using a time slot of 2 bits. Show the output with four arbitrary inputs. What is the frame rate? What is the frame duration? What is the bit rate? What is the bit duration? (04 Marks)
 c. With relevant diagrams, explain the data transfer phase in a virtual circuit network. (10 Marks)

4. a. Explain CRC error detection method with an example. (06 Marks)
 b. Explain the structure of encoder and decoder for a Hamming code. (04 Marks)
 c. What is internet checksum? If a sender needs to send four data items 0×3456 , $0 \times ABCC$, $0 \times 02BC$ and $0 \times EEEE$, answer the following:
 i) Find the checksum at sender site.
 ii) Find the checksum at receiver's site if there is no error. (10 Marks)

PART – B

5. a. Explain GO-BACK-N ARQ and selective-repeat-ARQ. List the differences between them. (10 Marks)
 b. Explain the different frame types in HDLC. (06 Marks)
 c. Write a short note on piggybacking. (04 Marks)

6. a. With a flow diagram, explain the working of CSMA/CD. (10 Marks)
 b. Explain the following channelization techniques: i) TDMA ii) CDMA. (10 Marks)

10CS55

- 7 a. What do you mean by hidden and exposed station problems in IEEE 802.11 protocol. Explain in detail. (06 Marks)
- b. With neat diagram, explain the architecture of Piconet and Scatternet Bluetooth networks. (06 Marks)
- c. Explain the working of global system for mobile (GSM) in detail. (08 Marks)
- 8 a. Explain IPV₆ header format with its extension headers. (10 Marks)
- b. Write short note for following:
- i) Token passing
 - ii) Gigabit Ethernet
 - iii) Polling
 - iv) FHSS.
- (10 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What is data communication? List and explain the five components of data communication system. (06 Marks)
- b. Discuss the ISO–OSI layered model, bringing out the functionalities of each layer. (10 Marks)
- c. Differentiate between :
 - i) ARP and RARP
 - ii) UDP and TCP.(04 Marks)
2. a. Write a descriptive note on three causes of transmission impairment. (08 Marks)
- b. Explain the transmission modes? (06 Marks)
- c. Explain delta modulation? (06 Marks)
3. a. What is FDM? Briefly explain its multiplexing and demultiplexing process. (06 Marks)
- b. Four sources create 250 characters per second. The frame contain 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) Frame rate
 - iv) Duration of output frame
 - v) Frame size in bits
 - vi) Data rate of link.(06 Marks)
- c. What is time division multiplexing? Explain how statistical TDM overcomes the disadvantages of synchronous TDM. (08 Marks)
4. a. Describe different types of errors. (03 Marks)
- b. Explain error detection and error correction with respect to block coding. (08 Marks)
- c. Find the codeword, using CRC given data word “1001” and generator “1011”. (09 Marks)

PART – B

5. a. Explain briefly, with neat figure 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. Explain :
 - i) CSMA
 - ii) CSMA/CD.(12 Marks)
- b. Describe 802.3 Mac frame. (08 Marks)
7. a. Explain IEEE 802.11 architecture. (10 Marks)
- b. Bring out the differences between repeaters, bridges, routers and gateways. (10 Marks)
8. a. Explain with respect to IPV4, classful addressing and classless addressing. (10 Marks)
- b. Explain in detail IPV6 packet format. (10 Marks)

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06CS/IS55

Fifth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Computer Networks - I

Time: 3 hrs.

Max. Marks:100

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

PART – A

1. a. What is data communication? List and explain the fundamental characteristics of a data communication system. (06 Marks)
- b. Give the comparison between LAN, WAN and MAN. (06 Marks)
- c. Define the key elements of a protocol. (03 Marks)
- d. Assume that fifty devices are arranged in a mesh topology. How many links are needed? How many ports are needed for each device? (05 Marks)

2. a. Explain the causes of transmission impairment. (06 Marks)
- b. What are the propagation time and transmission time for a 5M byte message if the band width of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. (06 Marks)
- c. Explain the delta modulation. (08 Marks)

3. a. Explain synchronous TDM. (06 Marks)
- b. 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? (06 Marks)
- c. Explain the frequency hopping spread spectrum (FHSS). (08 Marks)

4. a. With neat sketch explain the twisted pair cable and optical fibre cable with their applications. (10 Marks)
- b. Explain the types of errors. (04 Marks)
- c. Find the codeword, using CRC given data word “1001” and generator “1011”. (06 Marks)

PART – B

5. a. Explain stop-and-wait protocol for noise less channels. (08 Marks)
- b. Explain the HDLC protocol along with the header format. (08 Marks)
- c. Define piggy backing and its use fullness. (04 Marks)

6. a. Explain carrier sense multiple access (CSMA) with a diagram. (10 Marks)
- b. What do you mean by channelization? Explain the three protocols used for channelization briefly. (10 Marks)

7. a. Explain IEEE 802.11 architecture in detail with figures. (10 Marks)
- b. Explain Bluetooth architecture. (06 Marks)
- c. How does a VLAN reduce network traffic? (04 Marks)

8. a. Explain frequency reuse, hand off and roaming concepts in cellular telephony. (06 Marks)
- b. Explain SONET/SDH layers in detail. (08 Marks)
- c. Explain the architecture of ATM with a diagram show how VP's and VC's are established. (06 Marks)

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Fifth Semester B.E. Degree Examination, June/July 2013

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. Explain OSI reference model. (10 Marks)
b. Explain categories of network and differentiate between them. (10 Marks)
2. a. Represent the given sequence 01001110 in unipolar, NRZ-L, Manchesters, AMI, Pseudoternary? (06 Marks)
b. The loss in a cable defined in debels/km (dB/km). If the signal at beginning of a cable with -3 dB/km has a power of 3 mW. What is the power of the signal at 5 km? (06 Marks)
c. Explain the PCM encoder. (08 Marks)
3. a. Explain frequency hopping spread spectrum (FHSS). (10 Marks)
b. Four 1 Kbps connections are multiplexed together. A unit is 1 bit. Find
i) The duration of 1 bit before multiplexing.
ii) The transmission rate of the link.
iii) The duration of a time slot.
iv) The duration of a frame. (05 Marks)
c. Differentiate between circuit switched, datagram networks and virtual circuit networks. (05 Marks)
4. a. Explain structure of encoder and decoder for hamming code. (08 Marks)
b. Find the codeword, using CRC given dataword 1001 and generator 1011. (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 stop-and-wait ARQ protocol with neat diagram. (08 Marks)
b. What is framing? Explain bit and character stuffing with an example. (04 Marks)
c. Write short notes on HDLC. (08 Marks)
6. a. Explain CDMA. (06 Marks)
b. A slotted ALOHA network transmits 200 bit frames using a shared channel with 200 Kbits/sec bandwidth. Find throughput if system produces i) 1000 frames/sec
ii) 500 frames/sec iii) Frames/sec. (06 Marks)
c. Explain 802.3 MAC frame format. (08 Marks)
7. a. Explain the architecture of IEEE 802.11. (10 Marks)
b. Explain connecting devices. (10 Marks)
8. a. Draw IPV4 header format and explain. (08 Marks)
b. A ISP is granted a block of address starting with 190.100.0.0/16 (655,536 address). The ISP needs to distribute these addressing to 3 groups of customers.
i) First group has 64 customers each needs 256 address.
ii) Second group has 128 customers each needs 128 address.
iii) The third group has 128 customers each needs 64 address.
Design the subblock and findout. How many addresses are still available after their allocations? (07 Marks)
c. Compare between IPV4 and IPV6. (05 Marks)

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06CS55

Fifth Semester B.E. Degree Examination, June/July 2013

Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What do you mean by the term – data communication? Explain the different forms of data representation. (06 Marks)
- b. Explain the fundamental characteristics for effective data communication. (06 Marks)
- c. Explain with diagram, the OSI reference model for computer network. (08 Marks)

2. a. Explain the causes of transmission impairment. (06 Marks)
- b. Discuss Nyquist bit rate and Shannon's channel capacity. (06 Marks)
- c. Draw the line coding waveforms for the data stream 101101, in the following schemes
i) NRZ – I ii) RZ iii) Manchester iv) AMI write average signal rate for each scheme. (08 Marks)

3. a. With the help of neat waveforms, explain the following :
i) Binary ASK ii) Binary FSK iii) Binary PSK. (06 Marks)
- b. With the help of neat diagram, explain the synchronous and statistical TDM schemes. (06 Marks)
- c. What is spread spectrum? Explain the goals of spread spectrum. Discuss FHSS technique to spread bandwidth. (08 Marks)

4. a. Explain the principle used to guide light in optical fibers. Discuss the advantages and disadvantages of optical fiber. (06 Marks)
- b. Explain the terms – Hamming distance and minimum Hamming distance. What is the error detection and correction capability of a coding scheme which has $d_{min} = 5$? (06 Marks)
- c. Obtain CRC codeword using generator polynomial $g(x) = x^3 + x^1 + 1$, for the data - 1001 show how CRC bits can be used for error detection. (08 Marks)

PART – B

5. a. Explain the concepts of bit stuffing and byte stuffing, with example. (06 Marks)
- b. With the help of flow diagram, explain stop and wait ARQ protocol. What is the drawback of stop and wait ARQ protocol? (06 Marks)
- c. Explain the frame formats and control fields of different types of frames in HDLC. (08 Marks)

6. a. Explain the three persistence methods of CSMA. (06 Marks)
- b. Explain 802.3 MAC sublayer frame format. (06 Marks)
- c. Explain with the help of an example, how encoding and decoding is done in CDMA technique. (08 Marks)

7. a. Explain with flowchart CSMA/CA. (06 Marks)
- b. Explain the categories of connecting derives based on the layer of operation in a network. (06 Marks)
- c. Write a note on : i) Hidden station problem ii) TDD – TDMA. (08 Marks)

8. a. What is the bit rate of STS – 1? Explain STS multiplexing. (06 Marks)
- b. Explain the architecture of an ATM network. Discuss virtual connections in ATM. (06 Marks)
- c. Write a note on (any one) : i) GSM ii) SONET frame format. (08 Marks)

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10CS55

Fifth Semester B.E. Degree Examination, December 2012
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

- 1 a. What is protocol? Define the key elements of protocols? (05 Marks)
- b. Define network topology, explain ring topology with advantages and disadvantages. (05 Marks)
- c. Explain the different levels of addressing used in an internet with a suitable example for each level of addressing in TCP /IP? (10 Marks)

- 2 a. Explain the following : (05 Marks)
 - i) Bandwidth
 - ii) Through put
 - iii) Transmission time
 - iv) Latency
 - v) Jitter.
- b. Explain with the block diagram, the causes for transmission impairments. (09 Marks)
- c. Explain with neat waveform any two polar line coding schemes. (06 Marks)

- 3 a. What is multiplexing? Explain with a neat diagram FDM. (08 Marks)
- b. Explain how time – division – multiplexing differs from FDM, with a neat diagram? (04 Marks)
- c. What is switching? Differentiate circuit switch network with packet – switched network. (08 Marks)

- 4 a. What is internet checksum? List the steps undertaken by sender and receiver for error detection. (06 Marks)
- b. Explain with an example of block coding method for error detection and correction? (10 Marks)
- c. What is the Hamming distance? Find the minimum Hamming distance of the coding scheme shown in the table. (04 Marks)

Data word		Code word				
0	0	0	0	0	0	0
0	1	0	1	0	1	1
1	0	1	0	1	0	1
1	1	1	1	1	1	0

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 e.g. $42+8 = 50$, will be treated as malpractice.

PART – B

- 5 a. Calculate the time takes to send 2 million bits of data in a system that uses stop and wait protocols, if the distance between sender and receiver is 2000 kms. Assume packet size is 400 bits and propagation speed is 2×10^8 m. No data or control frame is lost. (10 Marks)
- b. Explain the frame format and transitional phases of Point – to – point protocols. (10 Marks)
- 6 a. Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocols? (04 Marks)
- b. Explain any two popular control access methods, with a neat diagram. (08 Marks)
- c. Explain 802.3 MAC frame format. (08 Marks)
- 7 a. Explain the services of IEEE 802.11 standards. (04 Marks)
- b. Write a short notes on :
i) Blue tooth
ii) Cellular telephone. (10 Marks)
- c. Explain the five standard of IMT – 2000 radio – interface of 3G systems? (06 Marks)
- 8 a. Explain briefly the advantages of IPV6. (06 Marks)
- b. Find out the netid and hostid of the following IP address?
i) 111.64.2.6
ii) 131.57.9.3
iii) 207.64.52.11
iv) 225.34.2.1. (08 Marks)
- c. Write short notes on network address translation (NAT). (06 Marks)

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06CS55

Fifth Semester B.E. Degree Examination, December 2012
Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

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

PART – A

1. a. What are different modes of communication? (04 Marks)
- b. What are four fundamental characteristics on which the effectiveness of a data communication depends on? (06 Marks)
- c. What is protocol? What are its key elements? (02 Marks)
- d. Briefly describe OSI reference model and differentiate with TCP/IP. (08 Marks)

2. a. Write a short note on line coding schemes. (04 Marks)
- b. Explain delta modulation technique used in analog to digital conversion. (06 Marks)
- c. List three causes for transmission impairment. (02 Marks)
- d. Define Nyquist bit rate and Shannon capacity. What are the propagation time and the transmission time for a 2.5 Kbyte message, if the bandwidth of the network is 1 Gbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. (08 Marks)

3. a. The power of a signal is 10 mw and the power of the noise is 1 μ w (microwatts), What are the values of SNR and SNR_{dB}. (04 Marks)
- b. A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minutes with each frame carrying an average of 10,000 bits. What is the throughput of this network? (02 Marks)
- c. What is multiplexing? With neat diagram, explain FDM. (06 Marks)
- d. What is TDM? A four 1 – Kbps connections are multiplexed together. A unit is 1 bit. Find :
 - i) The duration of 1 – bit before multiplexing
 - ii) The transmission rate of the link
 - iii) The duration of a time slot
 - iv) The duration of a frame. (08 Marks)

4. a. Describe the physical and transmission characteristic of the following :
 - i) Coaxial cable
 - ii) Fiber optic cable, with neat diagram. (08 Marks)
- b. Define hamming distance and CRC. (02 Marks)
- c. Distinguish between radio waves and infrared waves. (04 Marks)
- d. What is CRC? Explain with suitable example. (06 Marks)

PART – B

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

- 6 a. What is channelization? Explain CDMA. (06 Marks)
- b. What is random access? Explain following random access protocols.
- i) Slotted ALOHA (08 Marks)
 - ii) CSMA/ CD. (06 Marks)
- c. Describe the MAC layers in IEEE 802.11 standard. (06 Marks)
- 7 a. Explain the hidden and exposed station problem in IEEE 802.11. (08 Marks)
- b. Describe frame format for IEEE 802.3 MAC frame format. (06 Marks)
- c. In brief explain Bluetooth layers. (06 Marks)
- 8 a. With neat diagram, describe cellular telephony network. (06 Marks)
- b. Explain briefly SONET/ SDH protocol. (06 Marks)
- c. What is ATM and its design goals. Explain ATM architecture, with neat diagram. (08 Marks)

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Fifth Semester B.E. Degree Examination, June 2012

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 the four important fundamental characteristics? (06 Marks)
- b. What is a protocol? Briefly explain its key elements. (05 Marks)
- c. Explain the responsibilities of transport layer in OSI reference model. (09 Marks)

- 2 a. Define bandwidth. A periodic signal has bandwidth of 20Hz. 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)
- b. Calculate the Shanon channel capacity in the following cases :
i) Bandwidth = 20 kHz SNR_{dB} = 40 ; ii) Bandwidth = 200 kHz SNR_{dB} = 6. (06 Marks)
- c. Define line coding. Describe unipolar NR2, polar NR2-L, bipolar AMI and Manchester encoding by applying on the information sequence 101011100. (10 Marks)

- 3 a. An analog signal has a bit rate of 8000 bps and a band rate of 1000 band. How many data elements are carried by each signal element? How many signal elements do we need? (05 Marks)
- b. Explain phase modulation with a neat diagram. (05 Marks)
- c. What is time division multiplexing? Explain how statistical TDM overcomes the disadvantages of synchronous TDM. (10 Marks)

- 4 a. Briefly explain the coaxial cable and optical fiber with their applications. (08 Marks)
- b. Find the codeword, using CRC given data word “1001” and generator “1011”. (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 selection repeat ARQ with neat diagrams. (08 Marks)
- b. What is piggybacking? List its usefulness. (04 Marks)
- c. Explain the frame format and transitional phases of point-to-point protocol. (08 Marks)

- 6 a. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughout if the system produces 1000 frames per second. (06 Marks)
- b. With a neat diagram explain CSMA/CD protocol. (08 Marks)
- c. Explain the MAC sublayer of gigabit Ethernet (06 Marks)

- 7 a. Explain the architecture of IEEE 802.11. (08 Marks)
- b. Differentiate between repeater and amplifier. (02 Marks)
- c. How does a VLAN reducer network traffic? (04 Marks)
- d. Differentiate between bus backbone and star backbone. (06 Marks)

- 8 a. Explain in detail, the architecture of a SONET system. (10 Marks)
- b. Give the architecture of ATM. Show how VPs and VCs are established. (06 Marks)
- c. Write a short note on AMPS. (04 Marks)

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

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Fifth Semester B.E. Degree Examination, December 2011
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? Explain the fundamental characteristics on which effectiveness of data communication depends. (06 Marks)
 b. Differentiate between LAN, WAN and MAN. (04 Marks)
 c. Explain the OSI reference model for computer networks. (10 Marks)

2. a. What are the factors on which data rate depends in data communications? (04 Marks)
 b. Explain the different causes for transmission impairments during signal transmission through media. (06 Marks)
 c. Explain with a neat diagram, the components of a PCM encoder. (10 Marks)

3. a. With the help of a neat diagram, explain the ASK, FSK and PSK. Discuss the bandwidth requirement in each case. (10 Marks)
 b. What is spread spectrum? Explain the following techniques for spread spectrum: FHSS and DSSS. (10 Marks)

4. a. Explain the principles of optical fiber communication. Discuss the advantages and disadvantages of optical fibers. (06 Marks)
 b. Obtain the CRC code word using generator polynomial $g(x) = x^3 + x + 1$, for the data [1001]. Give the hardware realization of CRC divisor. (08 Marks)
 c. With the help of an example, explain the computation of internet checksum. Explain how the error detection is done, using internet checksum. (06 Marks)

PART – B

5. a. Explain with the help of examples, the concepts of bit stuffing and byte stuffing. (04 Marks)
 b. Explain step and wait ARQ protocol, with the help of a neat diagram. (06 Marks)
 c. Explain the frame formats and control fields for different types of HDLC frames. (10 Marks)

6. a. An ALOHA network transmits 200 bit frame on a shared channel of 200 kbps. If the system produces 1000 frames per second, obtain the throughput. (06 Marks)
 b. What is CSMA? Explain the different persistence methods of CSMA. (06 Marks)
 c. Explain the 802.3 MAC frame format. (08 Marks)

7. a. Explain the different types of addressing mechanisms in IEEE 802.11. (10 Marks)
 b. Write short notes on: i) TDD TDMA ii) Virtual LAN. (10 Marks)

8. a. Explain w.r.t SONET, the following:
 i) SONET layers ii) SONET frame format iii) STS multiplexing. (12 Marks)
 b. Explain w.r.t ATM, the following:
 i) ATM network architecture ii) ATM frame formats. (08 Marks)

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CS64

Sixth Semester B.E. Degree Examination, December 2011

Computer Networks - I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

1. a. Explain 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. What are service primitives? Distinguish between services and protocols. (06 Marks)
2. a. Explain the frame structure of IEEE 802.3 MAC frame along with its fields. (08 Marks)
b. Explain the significant challenges faced by wireless technology. (06 Marks)
c. Define basic service set. Explain the terms :
i) Adhoc network ii) Infrastructure network (06 Marks)
3. a. Distinguish between virtual circuit subnet and datagram subnet. (06 Marks)
b. Explain the count-to-infinity problem. (04 Marks)
c. What is flooding? What are the drawbacks of flooding? Explain the different methods for preventing the generation of duplicate packets in flooding. Mention some applications of flooding. (10 Marks)
4. a. What is load shedding? Explain milk and wine policy with respect to congestion control. (06 Marks)
b. Explain the RED (Random Early Detection) algorithm. (04 Marks)
c. Explain with a neat diagram, how class based quality of service can be achieved using :
i) Expedited forwarding ii) Assured forwarding. (10 Marks)
5. a. What is fragmentation? Explain with a diagram transparent and nontransparent fragmentation. (06 Marks)
b. Explain the IPV4 header format along with various fields. (10 Marks)
c. Explain the concept of network address translation. (04 Marks)
6. a. List and explain the socket primitives of TCP. (10 Marks)
b. Explain TCP connection establishment. (06 Marks)
c. Explain multiplexing of connections in transport layer. (04 Marks)
7. a. What is RPC? Explain the terms : i) Client stub, ii) Server stub. (04 Marks)
b. Explain with a neat diagram, the RTP header format. (06 Marks)
c. Explain TCP-header format along with various fields. (10 Marks)
8. Write short notes on the following :
a. ATM cell header
b. AAL1 PDUs
c. FDDI
d. Virtual LANs (20 Marks)

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CS64

Sixth Semester B.E. Degree Examination, June/July 2011
Computer Networks – I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

1. a. What are the different applications of computer networks? (04 Marks)
- b. With a neat diagram, explain the layered architecture of computer network. What is the purpose of adding headers at the layers? (06 Marks)
- c. Distinguish between LAN and WAN. Give examples. (04 Marks)
- d. Explain the important functions of NIC. (06 Marks)

2. a. Discuss the functions of, i) MAC sublayer ii) LLC sublayer. (08 Marks)
- b. What is meant by 10 Base T? What are the three approaches to operate a LAN on star topology? (07 Marks)
- c. Briefly explain the functions of source routing bridge. (05 Marks)

3. a. Distinguish between virtual and datagram subnets. (04 Marks)
- b. What are the desirable characteristics of routing algorithms? Explain distance vector routing with an example. (08 Marks)
- c. Explain the following under congestion: i) Load shedding ii) Hop by Hop choke packets. (08 Marks)

4. a. What is traffic shaping? The capacity of token bucket is 250 K 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. (06 Marks)
- b. Explain with diagram expedited forwarding and assured forwarding. (06 Marks)
- c. Discuss the different types of fragmentation in internetworking. (08 Marks)

5. a. What are the basic differences between IPV₄ and IPV₆? (04 Marks)
- b. Illustrate with a neat diagram the principles of address resolution protocol. (10 Marks)
- c. i) Convert the IP address (C0290614)_H to dotted decimal notation. To which class does it belongs?
ii) If a subnet mask is 255.255.252.0 find the number of hosts it can handle. (06 Marks)

6. a. Explain different scenarios of establishing TCP connection and to release connection. (08 Marks)
- b. What is remote procedure call? Explain the steps in making RPC. (06 Marks)
- c. Explain the TCP segment header format. (06 Marks)

7. a. Explain flow control and buffering in transport layer. (06 Marks)
- b. Briefly explain TCP congestion control. (06 Marks)
- c. With neat diagram, explain ATM reference model. (08 Marks)

8. With short notes on,
 - a. Flooding.
 - b. RTP header format.
 - c. CSMA/CA
 - d. ATM QoS parameters.

Fifth Semester B.E. Degree Examination, June/July 2011

Computer Networks – I

Time: 3 hrs.

Max. Marks:100

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

PART – A

1. a. Explain the fundamental characteristics of a data communication system. (06 Marks)
- b. What is a physical topology? Describe the four basic topologies. (08 Marks)
- c. Assume that fifty devices are arranged in a mesh topology. How many links are needed? How many ports are needed for each device? (06 Marks)

2. a. What are the propagation time and the transmission time for a 5-Mbyte message if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. (06 Marks)
- b. Represent the bit sequence “01001011” using Bipolar schemes AMI and pseudoternary. Explain their characteristics with regard to synchronization and DC component. (08 Marks)
- c. Explain a PCM encoder. (06 Marks)

3. a. Describe the different transmission modes. (08 Marks)
- b. 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? (06 Marks)
- c. List the multiplexing techniques. Explain the concept of multiplexing using frequency. (06 Marks)

4. a. Define FHSS and explain how it achieves bandwidth spreading. (06 Marks)
- b. Find the codeword, using CRC given data word “1001” and generator “1011”. (08 Marks)
- c. Describe the propagation modes in an optical fiber. (06 Marks)

PART – B

5. a. Describe a stop–wait protocol with ARQ. (10 Marks)
- b. Why bit stuffing and byte stuffing are needed? Explain them with examples. (10 Marks)

6. a. Describe the frame format of PPP. (06 Marks)
- b. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system produces 1000 frames per second? (06 Marks)
- c. Describe CSMA /CA protocol with a neat flow diagram. (08 Marks)

7. a. Describe 802.3 MAC frame. (10 Marks)
- b. Describe Bluetooth architectures. (06 Marks)
- c. How does a VLAN reduce network traffic? (04 Marks)

8. a. Describe frequency reuse, handoff and roaming concepts in cellular telephony. (06 Marks)
- b. Describe STS–1 frame. (08 Marks)
- c. Describe the concept of asynchronous TDM. (06 Marks)

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06CS55

Fifth Semester B.E. Degree Examination, December 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? List and explain the five components of a data communication system, with examples. (07 Marks)
 b. Discuss the ISO – OSI layered model, bringing out the functionalities of each layer. (10 Marks)
 c. Define the key elements of a protocol. (03 Marks)

2 a. An analog signal has a bandwidth of 40 kHz. If we use four levels in the signal, what is the minimum bandwidth of the digital signal? (04 Marks)
 b. What is the Nyquist sampling rate for each of the following signals?
 i) A low pass signal with bandwidth of 200 kHz.
 ii) A band pass signal with bandwidth of 300 kHz, having lowest frequency of 200 kHz. (04 Marks)
 c. Write a descriptive note on the three causes of transmission impairments. (12 Marks)

3 a. What is time division multiplexing? Explain how statistical TDM overcomes the disadvantages of synchronous TDM. (08 Marks)
 b. An analog signal has a bit rate of 10000 bps and bandwidth of 2000 Hz. How many data elements are carried by each signal element? How many signal elements do we need? (04 Marks)
 c. Explain phase shift keying, in detail. (08 Marks)

4 a. What is reflection? Briefly explain the fibre optic cable media, with a neat sketch. (08 Marks)
 b. Draw a CRC encoder and decoder for CRC code with C (7, 4). Also explain how this CRC design works, with an example. (10 Marks)
 c. Define line of sight propagation. (02 Marks)

PART – B

- 5 a. List the protocols for noisy channels. Explain stop and wait protocol for noiseless channels. (08 Marks)

b. Define piggybacking and its usefulness. (04 Marks)

c. Write explanatory notes on the different phases of PPP. (08 Marks)

6 a. Describe the different controlled access methods. (10 Marks)

b. Explain 802.3 MAC frame format and frame length. (10 Marks)

7 a. Discuss the 802.11 MAC layer frame format. (08 Marks)

b. Differentiate bus back – bone from star back – bone. Explain each in detail. (10 Marks)

c. Differentiate between amplifier and repeater. (02 Marks)

8 a. Explain in detail, the architecture of a SONET system. (10 Marks)

b. Write a note on byte interleaving. (04 Marks)

c. Give the architecture of ATM. Show how VPs and VCs are established. (06 Marks)

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CS64

Sixth Semester B.E. Degree Examination, December 2010 Computer Networks – I

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 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.
1. a. An alternative to LAN is simply a big time sharing system with terminals for all users. Give two advantages of a client server system using LAN. Draw a block diagram of client – server model. (05 Marks)
 - b. Imagine that you have trained a dog to carry a box of three 8 mm tapes, each containing 7 gigabytes. The dog can travel to your side, wherever you may be, at 18 km/hour. For what range of distances does the dog has a higher clock rate than transmission line whose data rate is 150 Mbps? (05 Marks)
 - c. How is the internet useful for home users? (05 Marks)
 - d. Explain the terms : repeater, bridge, router and gateway. (05 Marks)
 2. a. Explain spanning tree algorithm for bridged LAN. (05 Marks)
 - b. Draw IEEE 802.3 MAC frame structure and explain. (05 Marks)
 - c. Use 802.3 and IEEE 802.11 to discuss the differences between wired and wireless LAN. (05 Marks)
 - d. Suppose that 80% of the traffic generated in a LAN is for the stations in the LAN and 20% is for the stations outside the LAN. Is an Ethernet hub preferable to an Ethernet switch? Does the answer change if the percentages are reversed? (05 Marks)
 3. a. Why we can't have a CSMA/CD in wireless LAN? Explain CSMA/CA operation in wireless LAN. (05 Marks)
 - b. Convert the IP address whose hexadecimal representation is C22F1582 to doted decimal notation. (05 Marks)
 - c. For a hierarchical routing with 4800 routers, what region and cluster size should be chosen to minimize the routing table for a 3 tier hierarchy? How many entries would be required for normal case? (05 Marks)
 - d. Explain network address translation (NAT). (05 Marks)
 4. a. Explain count to infinity problem in case of distance vector routing. (05 Marks)
 - b. Compare virtual circuits and datagram subnet. (05 Marks)
 - c. How do computer networks differ? (05 Marks)
 - d. A large number of consecutive IP addresses are available starting at 198.16.0.0. Suppose that four organizations A, B, C and D request 4000, 2000, 4000 and 8000 addresses respectively in that order. For each of these, give the first IP address assigned and mask in the w.x.y.z/s notation. (05 Marks)

- 5 a. Imagine a flow specification that has maximum packet size of 1000 bytes, a token bucket rate of 10 million bytes/sec, a token bucket size of 1 million bytes, and a maximum transmission rate of 50 million bytes/sec. How long can a burst at maximum speed last? (05 Marks)
- b. Give two examples of computer applications each for connection oriented and connectionless service. (05 Marks)
- c. Briefly explain the Quality of Service (QoS) parameters in ATM. (05 Marks)
- d. Identify the components that contribute to the end – to – end delay experienced in setting up an ATM connection using PNNI. (05 Marks)
- 6 a. What is the bandwidth – delay product for a 50 Mbps channel on a geostationary satellite? If the packets are 1500 bytes (including overhead), how big should the window be in packets? (05 Marks)
- b. R.T.P. is used to transmit CD quality audio, which makes a pair of 16 bit samples 44100 times/sec, one sample for each of the stereo channels. How many packets per second RTP must transmit? (05 Marks)
- c. Draw TCP segment header and explain. (05 Marks)
- d. Explain dynamic buffer allocation. (05 Marks)
- 7 a. Explain how three way handshake for releasing connection perform i) when response is lost ; ii) when response lost and subsequent DRs lost. (05 Marks)
- b. List out some of the potential pitfalls while measuring network performance and parameters. (05 Marks)
- c. List out Berkley Socket primitives. Which primitives are used only by server? Why? (05 Marks)
- d. A client sends a 128 byte request to a server located 100 km away, over a one gigabit network. What is the efficiency of the line during the remote procedure call? (05 Marks)
- 8 Write short notes on :
- a. Layered network architecture. (05 Marks)
- b. Token ring network. (05 Marks)
- c. Tunneling. (05 Marks)
- d. Protocols for gigabit networks. (05 Marks)

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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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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)

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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? (08 Marks)
ii) throughput if the system produces 1000 frames/sec? (10 Marks)
- b. Define channelization and list its three protocols. (02 Marks)
- c. How does p-persistent method improve efficiency? (08 Marks)
- 7 a. Explain with a neat figure, 802.3 MAC frame format. (12 Marks)
- b. Explain the hidden and exposed station problems in IEEE 802.11. (10 Marks)
- 8 a. Explain briefly the three categories of satellites. (10 Marks)
- b. Explain briefly STS-1 frame format. (10 Marks)



Sixth Semester B.E. Degree Examination, Dec.09/Jan.10
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. (08 Marks)
 b. A system has n-layer protocol hierarchy. Application generates messages of length M bytes. At each of the layer, an h-byte header is added. What fraction of network bandwidth is filled with headers? (04 Marks)
 c. Explain Ethernet protocol. Show that the fraction of the time the channel is busy transmitting the frame is given by $\frac{1}{1 + 6.44a}$, where $a = t_{prop} \frac{R}{L}$ (08 Marks)

2. a. What is token ring protocol? Explain which are the different token reinsertion strategies used in IEEE 802.5 with suitable example. (10 Marks)
 b. Explain how FDDI MAC Protocol handles traffic of type synchronous and asynchronous. (06 Marks)
 c. In a given Ethernet LAN if the operating speed is increased from 10 Mbps to 100 Mbps. Find the minimum data length. (04 Marks)

3. a. Explain with a neat diagram the frame structure of IEEE 802.11. (10 Marks)
 b. With the help of a timing diagram, explain the successful transmission of MPDU with and without RTS/CTS in IEEE 802.11. (06 Marks)
 c. 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. (04 Marks)

4. a. Suppose we interconnect LAN's by using bridges and there is redundancy of bridges accidentally, which forms loop within a network. Explain the algorithm to remove the loops with a suitable example. (08 Marks)
 b. Distinguish between virtual circuit subnet and datagram subnet. (06 Marks)
 c. List the desirable properties of routing algorithms. Explain the principle of optimality. (06 Marks)

5. a. Consider the subnet shown in Fig.5(a) below.

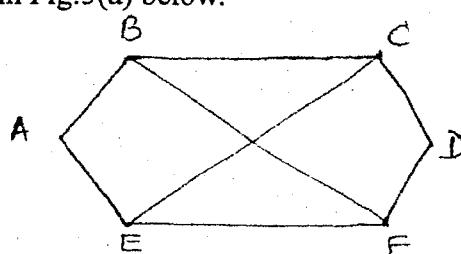


Fig.5(a)

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)

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- b. What is broadcast routing? List and explain the four methods if broadcast routing. (08 Marks)
- c. Explain with a suitable example, how hierarchical routing helps to reduce the routing table entries. (06 Marks)
- 6 a. Open loop systems are designed to minimize congestion in the first place, list the policies defined at data link, network and transport layers to minimize the congestion and explain. (06 Marks)
- b. Explain token bucket algorithm and its implementation. Derive expression to calculate burst length S given by $S = C/(M - P)$. (06 Marks)
- c. Explain IPV4 header format. (08 Marks)
- 7 a. Discuss how crash recovery is done in transport layer. (08 Marks)
- b. A TCP machine is sending full windows of 65,535 bytes over a 1 Gbps line (Channel), that has 10 msec one way delay. What is the maximum throughput achievable? What is the line efficiency? (04 Marks)
- c. Explain with a neat diagram TCP segment header. (08 Marks)
- 8 a. What is delayed duplicate problem? How does three way handshake solves this problem? Explain. (06 Marks)
- b. What is remote procedure call? Explain the steps in making RPC. (08 Marks)
- c. Explain with a block diagram ATM reference model. (06 Marks)

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2002 SCHEME

CS64

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

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

1. Differentiate between the following:
 - a. Connection-less and connection-oriented service. (10 Marks)
 - b. Local area and wide area networks. (05 Marks)
 - c. Thick-ethernet and thin-ethernet. (05 Marks)

2. a. Explain the need for breaking (Separating) the Data-link layer into two layers, namely, LLC sublayer and MAC sublayer. Also mention the functions performed by these 2 sub layers. (08 Marks)
b. Explain the data frame format of Ethernet, clearly bring out the functions of each field. (12 Marks)

3. a. Explain the working of a LAN bridge. Clearly explain how a transparent bridge sets – up ‘its’ table entries. (10 Marks)
b. Explain the “Store – and – forward” packet switching used to send a packet from the source to the destination. (10 Marks)

4. a. Explain the implementation of connection-oriented service through an example (on a sub-net). (12 Marks)
b. Compare connection-less and connection oriented service with respect to the following metrics:
 - i) Circuit setup
 - ii) Addressing
 - iii) Maintaining state information and
 - iv) Routing and router failures. (08 Marks)

5. a. Explain any four properties desirable in a routing algorithm. (10 Marks)
b. Explain how folding can be used as a routing algorithm. What are the problems associated with it? How can they be prevented? (10 Marks)

6. a. Explain the encapsulation of the TPDU (Transport Protocol Data Unit) in the packets (Network Layer) and the encapsulation of the packets in the frames (data link layer). Also, explain how this frame is processed by the receiver. (10 Marks)
b. Explain the connection-less protocol UDP supported by the internet, with a schematic of its (UDP'S) header. Explain the header details. (10 Marks)

7. a. What is RPC? (Remote Procedure Call). Explain. (10 Marks)
b. Explain the salient features of the TCP header fields. (10 Marks)

8. Write short notes on any four:
 - a. Need for ATM.
 - b. IP over ATM.
 - c. The leaky bucket algorithm.
 - d. IP addressing.
 - e. Subnetting. (20 Marks)

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06CS55

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

5. 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.08/Jan.09
Computer Networks - I**

Time: 3 hrs.

Max:

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.
b. Define following terms: (i) Protocol (ii) Internet
c. Describe with neat diagram the functionalities of each layer in the OSI model.

2. a. Calculate the Shannon channel capacity in following cases:
(i) Bandwidth = 20 kHz SNR_{dB} = 40 (ii) Bandwidth = 200 kHz SNR_{dB} = 30
b. A file contains 3 million bytes. How long does it take to download this file using a 1 Mbps channel?
c. Define line coding. Describe Unipolar NRZ, Polar NRZ-L, Bipolar AMI encoding by applying on the information sequence 101011100.

3. a. We have four sources, each creating 250 characters/sec. If the interleave 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.
b. Define synchronous TDM.
c. Describe ASL, FSK and PSK mechanisms and apply them over the digital data link.

4. a. Briefly explain the coaxial cable and optical fiber with their applications.
b. Explain how CRC is used in detecting errors for the following polynomial, g(x). 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 with error checking?

PART – B

5. a. Explain selective repeat ARQ. Justify how selective repeat ARQ outperforms Stop-and-wait ARQ.
b. Explain point-to-point protocol frame format. Also briefly describe different transmission phases of PPP in establishing a connection from home PC to ISP.

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

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

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CS64

Sixth Semester B.E. Degree Examination, June / July 08
Computer Networks - I

Time: 3 hrs.

Max. Marks: 100

Note : Answer any FIVE full questions. :-

1. a. Define the following : i) Protocol and Protocol stack ii) SAP and PDU iii) Multiplexing and Demultiplexing. (06 Marks)
- b. What are headers and trailers? How do they get added and removed in different layers of Internet architecture? (06 Marks)
- c. Give the comparison between LAN, MAN and WAN with an example. (06 Marks)
- d. Write a note on X.25 network. (02 Marks)
2. a. Explain IEEE 802.3 MAC frame format. (06 Marks)
- b. What is the minimum and maximum size of IEEE 802.3 frame? How it is fixed? (04 Marks)
- c. What are the functions of monitor in a Token-ring network? Explain, how a station can become a monitor. (04 Marks)
- d. What are the functions of transparent bridges? Explain, how a transparent bridge learns the presence of another LAN in the network. (06 Marks)
3. a. Compare the operations of the network layer entities in the end systems and in the routers inside the network. (06 Marks)
- b. What is sink tree? Explain its importance with a subnet. (06 Marks)
- c. Explain the dynamic routing algorithm used in OSPF protocol. (08 Marks)
4. a. What is congestion? Explain the network layer policies that affect congestion. (04 Marks)
- b. Explain the following : i) Expedited forwarding ii) Assured forwarding. (06 Marks)
- c. What is subnetting and subnet addressing? Explain subnetting for a class - B network. (06 Marks)
- d. What is ICMP? Explain the functions of ICMP. (04 Marks)
5. a. Explain the IPv6 header format along with various fields. What are the changes and improvements of IPv6 over IPv4? (08 Marks)
- b. What are the various types of OSPF routers? Explain their functions. (06 Marks)
- c. For the IP – address – C22F1582 :
 - i) Obtain the IP – address in dotted decimal notation.
 - ii) To which class does it belong?
 - iii) Obtain the network address and host address.
 - iv) Mention the protocol, which gets physical address from the IP-address. (06 Marks)
6. a. What are the protocols of transport layer of Internet architecture? Explain their functions. Why shouldn't applications use IP directly? (06 Marks)
- b. What is multiplexing? How it is useful at transport layer? Explain different types of multiplexing. (06 Marks)
- c. What is delayed duplicate problem? How does Tomlinson's algorithm solve this problem? (08 Marks)
7. a. Explain the TCP timer management. (08 Marks)
- b. A TCP machine is sending full windows of 65,535 bytes over a 2 Gbps channel has a 10ms one way latency. What is the maximum throughput achievable? What is the line efficiency? What is the delay * bandwidth product? (06 Marks)
8. a. Explain the functions of ATM network layers. (08 Marks)

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CS

~~SIXTH~~ Semester B.E. Degree Examination, Dec. 07 / Jan. 08~~IV~~ Computer Networks - I

Time: 3 hrs.

Max. Marks: 10

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 :

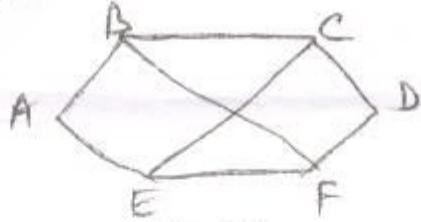


Fig.4(c)

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). Measure 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 any 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 downward multiplexing with examples. (06 Marks)
 c. Illustrate the phenomenon of silly window syndrome in TCP. (06 Marks)

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NEW SCHEME

~~Sixth Semester B.E. Degree Examination~~
~~X~~ Computer Science and Engineering
Computer Networks - I

Time: 3 hrs.]

Note : Answer any FIVE full questions.

- 1 a. An image is 1024×768 pixels with 3 bytes/pixel. Assuming each byte is transmitted over a 1 Mbps link. How long does it take to transmit it over 1 Mbps cable medium?
b. A system has n – layer protocol hierarchy. Applications generate M bytes. At each of the layers, an N-byte header is added. If the total bandwidth is filled with headers?
c. Why is error control included in the MAC layer in IEEE 802.3?
d. Explain the bridge learning process with an example.
- 2 a. Why CSMA – CD cannot be used in wireless networks?
b. How FDDI MAC protocol handles different types of traffic?
c. Which are the different token re-insertion strategies used in IEEE 802.5?
d. Explain the responsibilities of LAN adapter card.
- 3 a. Explain the frame structure of IEEE 802.3 MAC frame.
b. Compute a multicast spanning tree for router C in the following network diagram with members at routers A, B, C, D, E, F, I and K.

- 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)

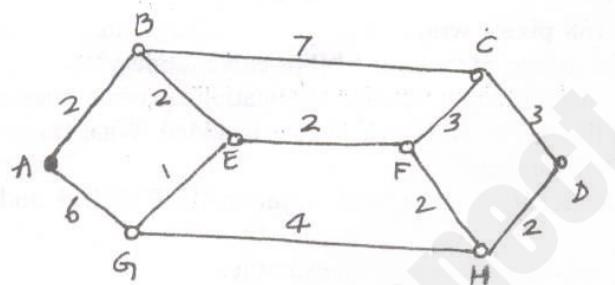


Fig.5(c)

- 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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CS64

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NEW SCHEME

~~Sixth Semester B.E. Degree Examination, Dec. 06 / Jan. 07~~
C S E / I S E

Computer Networks - I

Time: 3 hrs.]

[Max. Marks:100

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 :
i) Repeater ii)Bridge iii) Router iv) Gateways. (04 Marks)
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)



- 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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NEW SCHEME

Sixth Semester B.E. Degree Examination, July 2006

CS / IS

Computer Networks - I

Time: 3 hrs.]

[Max. Mark]

Note: Answer any FIVE full questions.

- 1 a. Clearly bring out the differences between LAN, WAN and MAN. Give examples.
b. Distinguish between Connection Oriented and Connectionless Services.
c. What is multi path fading? Explain the 802.11 standard for WLAN.
- 2 a. Explain the following with examples :
i) UniCasting ii) MultiCasting iii) BroadCasting.
b. List and explain different design issues for the layer – 2.
c. Write a note on X.25.
- 3 a. Explain the functional units of a Network interface card.
b. Discuss the functions of i) MAC Sublayer ii) LLC Sublayer.
c. What is the minimum and maximum packets that can be encapsulated in a frame?
- 4 a. Explain ethernet protocol. Show that the fraction of the time the channel transmitting the frame is given by $\frac{1}{1+6.44a}$, where $a = \frac{R}{L} t_{prop}$. How does it affect the average transfer delay and through put?
b. Discuss the structure of IEEE 802.3 MAC frame?
c. Discuss the differences between a HUB and a switch.
- 5 a. Explain different issues related to Network layer design.
b. Discuss the principle of optimality and hence explain shortest path routing algorithm.
c. What are the drawbacks of Flooding?
- 6 a. Explain Bellman-Ford routing algorithm with necessary illustration. What are the draw backs of this algorithm ?
b. What is congestion? Discuss the general principles of congestion control. Name at least 3 policies in data link, network layer that can prevent congestion.
- 7 a. Explain briefly the following with respect to Transport layer, i) Addressing ii) Connection establishment iii) Connection release iv) Flow and Buffering
b. Discuss the functions of UDP. How is it different from IP ? Give examples.
c. Briefly explain TCP congestion control.
- 8 Write short notes on :
a) IP Protocol b) OOS c) OSPF d) ATM Networks.

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NEW SCHEME

CS6

Reg. No.

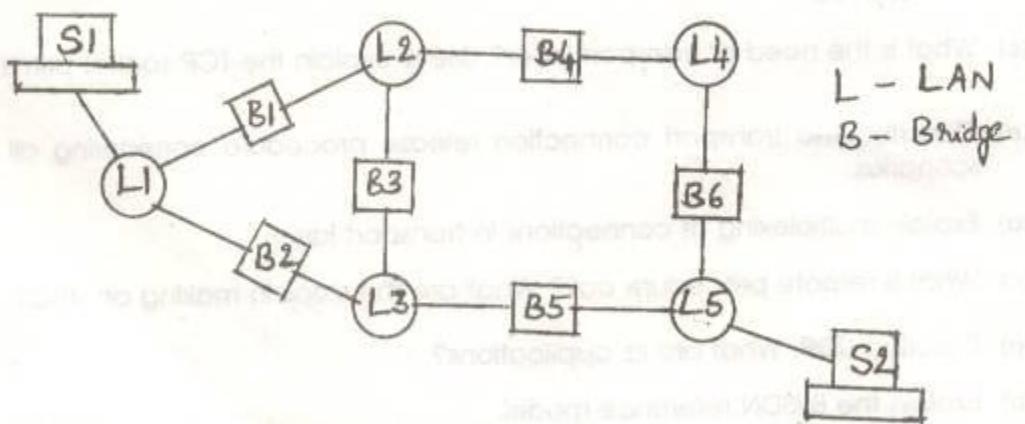
~~Sixth~~ Semester B.E. Degree Examination, January/February 2006
Computer Science and Information Science & Engineering
Computer Networks I

Time: 3 hrs.)

(Max.Marks : 100)

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 achieve 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)

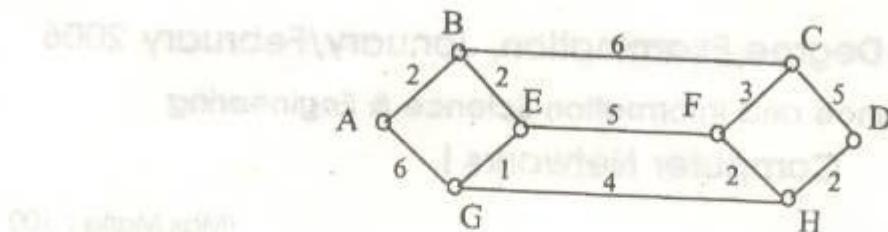


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(6 Marks)

4. (a) Using Dijkstra's algorithm find the shortest path between A and D.



- (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)
- Time to live
 - Fragment offset
 - Header checksum
- (b) Perform the following : (6 Marks)
- Convert 194.47.21.130 in to hexadecimal format
 - If a subnet mask is 255.255.252.0 find the maximum number of hosts it can handle.
- (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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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 (QoS) 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)

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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)
