

SASTRA UNIVERSITY
(A University under section 3 of the UGC Act, 1956)

B.Tech. Degree Examinations

May 2012

Fifth Semester

Course Code: BCSCCS 504R01

Course: COMPUTER NETWORKS

Question Paper No. : B0151

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$20 \times 2 = 40$ Marks

1. What is broadcasting?
2. Draw the hybrid reference model by–Andrew S Tanenbaum.
3. Expand the following:
 - (a) ATM.
 - (b) NAP
 - (c) RFC
 - (d) ITU.
4. Write the ATM cell header and payload size.
5. Which of the OSI layers handles each of the following:
 - (a) Dividing the transmitted bit stream into frames.
 - (b) Encryption.
6. How long does it take to transmit it over a 56-kbps modem channel for an uncompressed gray and color image of size 256 x 256?

7. A bit string, 0111011110111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing?
8. List the design issues of data link layer.
9. What is forward error correction? Give an example.
10. What is Piggybacking?
11. What is leaky bucket?
12. Why does the internet use a connectionless network service?
13. Name the five current IP address classes which are used for unicast and multicast communication?
14. Elucidate subnetting and its purpose.
15. List the difference between computer network and distributed systems. Give each an example.
16. Define multiplexing and demultiplexing in transport layer.
17. Write the three main divisions of DNS.
18. Define SMTP.
19. Justify for TFTP, UDP connectionless service is sufficient.
20. Can a computer have two DNS names that fall in different top-level domains? If so, give a plausible example. If not, explain why not.

PART - B

4 x 15 = 60 Marks

Answer all the questions

21. Briefly explain open system interconnection reference model.

(OR)

22. Write short notes on the following:

- (a) Guided transmission media. (5)
- (b) The ARPANET. (5)
- (c) Electromagnetic spectrum. (5)

23. (a) Discuss in detail, CSMA/CD. (7)

(b) Briefly explain error correcting codes. (8)

(OR)

24. Briefly explain the operation and merits and demerits of one bit sliding window protocol and Go Back N protocol.

25. (a) Explain distance vector routing. (9)

(b) Explain broadcast routing algorithm. (6)

(OR)

26. Briefly explain congestion prevention policies and congestion control algorithm.

27. Discuss in detail with necessary diagram transmission control protocol.

(OR)

SASTRA UNIVERSITY

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B.Tech. Degree Examinations

November 2013

Fifth Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0118

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$20 \times 2 = 40$ Marks

1. Write the key distinction between a computer network and distributed system.
2. Expand : STDM and NRZI
3. Which of the OSI layer handles the following?
 - (i). Source-to-destination delivery of a packet across multiple network links.
 - (ii). Dividing the transmitted bit stream into frames.
4. List the three commonly used wavelength bands in optical communication. $0.85, 1.30, 1.55$
5. What do you mean by multipath fading?
6. List the three services provided by the data link layer to the network layer.
7. A repeater is not an amplifier- comment.

8. Differentiate between adaptive and non-adaptive routing.
9. Find the binary equivalent of $x^7 + x^6 + x^4 + x^3 + x + 1$ 11011011
10. Define scatternet.
11. Differentiate between broadcasting and multicasting.
12. What is the idea behind admission control?
13. What is explicit congestion notification?
14. Define anycast routing.
15. Change the following IP address from binary notation to dotted decimal notation:
10000000 00001011 00000011 00011111. 128.11.3.?
16. Define marshaling.
17. List the port used for email and www.
²⁵ ⁸⁰
18. Define UDP.
19. Write the use of jumbograms.
20. What is the role of portmapper?

Answer all the questions

4 x 15 = 60 Marks

21. (a) Discuss the use of computer networks with respect to business application. (8)
(b) Write notes on WAN. (7)

(OR)

22. Explain the following:

- (i) Twisted-pair cable for communication (9)
(ii) Code division multiplexing (6)

23. Explain various error correcting codes in detail.

(OR)

24. With a neat sketch explain Bluetooth protocol stack and its frame structure.

25. With a suitable diagram explain link state routing.

(OR)

26. (a) Explain how to regulate the traffic in a network (10)
(b) List the issues to be addressed for ensuring quality of service (5)

27. (a) With a neat diagram explain the various fields in TCP segment header. (10)
(b) List the states used in TCP connection management. (5)

(OR)

28. Discuss domain name system in detail.

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Fifth Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0116

Duration: 3 hours

Max. Marks: 100

PART - A

$20 \times 2 = 40$ Marks

Answer all the questions

1. How will you prevent computers from impersonating people on the internet?
2. Define gateway.
3. Expand: FHSS and DSSS.
4. What is meant by chromatic dispersion?
5. Draw the Manchester encoding for the bit stream 100001.
6. List the functions of Data Link Layer.
7. In routing, what does the term shortest mean?
8. What is the router's role in controlling the packet life time?

9. Bit stuff the following data:

011011111111111111110010

10. Find the polynomial equivalent of
11011011

11. Define flooding.

12. What is congestion?

13. What is the use of choke packet?

14. List the issues to be addressed to ensure quality of service.

15. What is the limitation of Round robin fair queuing algorithm?

16. List the primitives for a simple transport service.

17. What is name resolution?

18. List four generic top-level domains.

19. Define TCP.

20. Give an example for inverse multiplexing.

PART - B

Answer all the questions

4 x 15 = 60 Marks

21. (a) Discuss the various design issues for the layers. (8)
(b) Differentiate: Connection oriented Vs Connectionless service. (7)

(OR)

22. Explain the following:

- (a) Primitives for connection oriented service. (6)
(b) Frequency Division Multiplexing. (9)

23. Discuss Error-Detecting Codes in detail.

(OR)

24. (a) With a suitable diagram explain the fields in IEEE 802.3 frame format. (9)

(b) Write notes on 802.11 Standard Services. (6)

25. Explain the following:

- (a) Broadcast Routing (7½)
(b) Multicast Routing (7½)

(OR)

26. Discuss various approaches to congestion control.

27. Explain delay-tolerant networking in detail.

(OR)

28. Discuss real-time transport protocol in detail.

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Fifth Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0113

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$20 \times 2 = 40$ Marks

1. List out the uses of computer networks.
2. Mention the functions of sessions layer.
3. Define Protocol stack.
4. List out the differences between TCP/IP and OSI reference model.
5. List out the layers of ATM.
6. List out the framing methods.
7. What is stop and wait protocol?
8. Name the cabling system in ethernet.
10 Base 5, 10Base 2, 10 base T, to
9. What is piconet?

10. What is gateway?
every incoming pkt sent out an
every outgoing pkt line
11. What is flooding?
^{subset of subnet}. All routers contain no loop
12. Define spanning tree.
13. List out the difference between leaky bucket algorithm and token bucket algorithm.
14. Define admission control. ^{congestion has been signaled, no more virtual circuit are set up until the problem gone away}
15. List out the categories of IP addresses. ^{Class A, B, C, D, E}
16. Write the service primitives of TCP. ^{SOCKET, BIND, LISTEN, ACCEPT, CONNECT, SEND, RECEIVE, CLOSE}
17. Write any four fields in the IP header.
18. What is SNMP? ^{monitor, maintain, mgmt}
19. List out the advantages of IPV6. ^{large addr space, better header, new option - allowance for extension, support for resource allocation}
20. What is tunneling?

PART - B

Answer all the questions

$4 \times 15 = 60$ Marks

21. Explain the network hardware in detail.

(OR)

22. Discuss the different multiplexing techniques.

23. Describe the error-detection and correction techniques.

(OR)

24. Explain the following multiple access protocols.

- (a) ALOHA
- (b) CSMA

(10)
(5)

25. Explain the following routing algorithms.

- (a) Distance vector
- (b) Multicast

(7½)
(7½)

(OR)

26. Describe the IP protocol.

27. Discuss the domain name systems.

(OR)

28. Compare IPV4 and IPV6.

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B.Tech. Degree Examinations

May 2015

Fifth Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0113

Duration: 3 hours

Max. Marks: 100

PART - A

Answer all the questions

$20 \times 2 = 40$ Marks

1. Define computer networks
2. What is protocol?
3. List out the difference between OSI and TCP/IP reference model.
4. What is frame relay?
5. Define baud.
6. What is MAC sublayer?
7. Define ARQ.
8. List out the types of ethernet cabling.
9. What is scatternet?
10. What is gateway?

11. What is datagram subnet?
12. What is multicasting?
13. What is congestion?
14. Define jitter.
15. List out any four fields of IP header.
16. List out the transport service primitives.
17. Write the fields of UDP header.
18. State the role of DNS.
19. Expand SNMP.
20. Write the packet format of IPV6.

PART – B

Answer all the questions

4 x 15 = 60 Marks

21. Describe the OSI reference model.

(OR)

22. Explain the various transmission medias in detail.

23. Describe the sliding window protocol.

(OR)

24. Explain the system architecture and protocol stack of Bluetooth.

25. Discuss the link-state routing algorithm.

(OR)

26. Explain any five techniques for achieving good quality of service.

27. Discuss the TCP protocol and its header with neat diagram.

(OR)

28. Discuss the domain name system.

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B.Tech. Degree Examinations

November 2015

Fifth Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0109

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$20 \times 2 = 40$ Marks

1. Differentiate between half-duplex and full-duplex modes of communication.
2. Match the following to one or more layers of the OSI model:
 - (a) Communicates directly with user's application program.
 - (b) Error correction and retransmission.
 - (c) Mechanical, electrical, and functional interface.
 - (d) Dialog control.
3. With a sketch, show the parts of electromagnetic spectrum used for communication.
4. List out the propagation modes of optical fibre.
5. Define processing delay.
6. Define Hamming distance.
7. Differentiate between pure and slotted ALOHA.

8. Compare bridge and router.
9. Define hidden station problem.
10. Bluetooth supports two types of links between a master and a slave. What are they and what is each one used for?
11. Compare virtual circuit and datagram in terms of addressing and circuit setup.
12. Define flooding.
13. Identify the class of IP address.
 - (a) 213.1.2.1
 - (b) 240.3.4.3.
14. What is the function of foreign agents and home agents?
15. Define Load shedding.
16. Draw the structure of UDP header.
17. Define Multimedia.
18. What is the use of accounting?
19. What do you understand by the term "Response time"?
20. Give the basic idea in SNMP.

PART - B

Answer all the questions

$4 \times 15 = 60$ Marks

21. (a) List out the advantages and disadvantages of optical fibre. (8)
(b) Compare the different categories of networks. (7)

(OR)

22. With a neat sketch, discuss the functionalities of each layer of TCP/IP reference model.

23. (a) Suppose the following block of 16 bits is to be sent using a checksum of 8 bits. (5)

10101001 00111001

(i) Calculate the checksum.

(ii) Assume the received data contains error. How will it be identified at the receiver?

(b) With a neat sketch of sender and receiver window, explain the working of sliding window protocol with Go-back N ARQ. (10)

(OR)

24. Discuss in detail about the Bluetooth protocol architecture.

25. Explain in detail about routing in Ad-hoc networks.

(OR)

26. With a neat sketch, discuss in detail about Link state routing.

27. (a) Explain in detail how connection establishment and connection release are carried out in transport layer. (8)

(b) Draw and explain the different components of TCP header.(7)

(OR)

28. Discuss in detail about Domain Name System.

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B.Tech. Degree Examinations

November 2016

End Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0118

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$10 \times 2 = 20$ Marks

1. What are the criteria used to evaluate transmission medium?
2. Define Half and Full duplex.
3. What are the responsibilities of data link layer?
4. Define Repeater.
5. What are the features of OSPF?
6. Define packet switching.
7. Define Routing.
8. Why does congestion occur in network?
9. Define TCP.
10. Name four factors needed for a secure network.

PART – B

Answer all the questions

$4 \times 15 = 60$ Marks

11. Explain the fibre optics transmission media.

(OR)

12. Describe the various multiplexing methods with suitable example.

13. Discuss error detection and correction.

(OR)

14. Explain the following (a) Bluetooth (b) Remote bridges.

15. Describe about Routing in Ad hoc networks.

(OR)

16. Explain Quality of Service.

17. What are the elements of transport protocols? List out and explain.

(OR)

18. Describe about IPV6 packet format.

PART – C

Answer the following

$1 \times 20 = 20$ Marks

19. Explain one-bit sliding window protocol with an example.

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B.Tech. Degree Examinations

May 2017

End Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0121

Duration: 3 hours

Max. Marks: 100

PART – A

Answer all the questions

$10 \times 2 = 20$ Marks

1. What are the features provided by layering?
2. Define modulation.
3. What do you mean by collision detection?
4. What is the function of Bridge?
5. What is meant by congestion?
6. Define Reliable flooding?
7. What is meant by LSP?
8. What are the two categories of Qos attributes?
9. Explain the main idea of UDP.
10. What is the purpose of Domain name system?

PART – B

Answer all the questions

$4 \times 15 = 60$ Marks

11. Describe about wireless LAN with suitable examples.

(OR)

12. Discuss Baseband Transmissions.

13. Describe the ALOHA and SLOTTED ALOHA with suitable example.

(OR)

14. Describe the channel allocation problem.

15. Explain the following Routing algorithms

(a) Link state routing.

(8)

(b) Multicast Routing.

(7)

(OR)

16. Explain with a neat diagram Leaky and token buckets algorithm.

17. Explain the TCP segment header with a neat diagram.

(OR)

18. Describe about the domain name system.

PART - C

1 x 20 = 20 Marks

Answer the following

19. Describe the TCP/IP reference models with a neat diagram.

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End Semester

Course Code: BCSCCS 504R02 / BITCIT 504R02 / BICCIC 504R02

Course: COMPUTER NETWORKS

Question Paper No. : B0116

Duration: 3 hours

Max. Marks: 100

PART - A

Answer all the questions

$10 \times 2 = 20$ Marks

1. What are the possible ways of data exchange?
2. What are the three main sectors of ITU?
3. What are the design goals of SONET?
4. What are the specific functions of data link layer?
5. What are 10Base5 Ethernet LANs?
6. Draw the control frame of Supervisory frame.
7. Define Sink Tree.
8. List out some ways used to identify the different networks.
9. What are the elements of transport protocol?
10. Illustrate the IPV 6 packet format.

Answer all the questions

$4 \times 15 = 60$ Marks

11. Describe the functional role of OSI layers with neat OSI reference model.

(OR)

12. Explain the following:

(a) Wireless transmission

(8)

(b) Timing Events of Circuit and Packet Switching

(7)

13. (a) With suitable example, explain Error Detection and Error Correction Codes. (8)

(b) Explain Data Link Layer Switching. (7)

(OR)

14. Define WLAN. With a neat diagram, explain CSMA/CD and 802.11 frame structure.

15. (a) With a neat diagram, explain Hierarchical Routing. (8)

(b) What is meant by reverse path forwarding? Explain in broadcast routing. (7)

(OR)

16. (a) What is meant by congestion control? Explain congestion control approaches. (8)

(b) Briefly explain IPV6. (7)

17. With a neat diagram, explain remote procedure call and real time transport protocol using UDP.

(OR)

18. What is meant by TCP protocol? How is connection establishment done using TCP? Explain TCP connection management process.

PART - C

Answer the following

1 x 20 = 20 Marks

19. (a) The following character encoding is used in a data link protocol: A: 01000111; B: 11100011; FLAG: 01111110; ESC: 11100000. Show the bit sequence transmitted (in binary) for the four-character frame: A B ESC FLAG when each of the following framing methods are used.

- (i) Character count
- (ii) Flag bytes with byte stuffing
- (iii) Starting and ending flag bytes, with bit stuffing (10)

(b) An 8-bit byte with binary value 10101111 is to be encoded using an even-parity Hamming code. What is the binary value after encoding? (5)

(c) What is the broadcast address of the subnet address 10.254.255.19 255.255.255.248? (5)

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B.Tech. Degree Examinations

November 2017

End Semester

Course Code: BCSCCS 504R03 / BITCIT 504R03 / BICCIC 504R03

Course: COMPUTER NETWORKS

Question Paper No. : B0117

Duration: 3 hours

Max. Marks: 100

PART - A

Answer all the questions

10 x 2 = 20 Marks

1. Why do HTTP, FTP, SMTP, and POP3 run on top of TCP rather than on UDP?
2. What is overlay network? Does it include routers? What are the edges in the overlay network?
3. Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. How much data is in the first segment? Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgment that Host B sends to Host A, what will be the acknowledgment number?
4. How does BGP use the NEXT-HOP attribute? How does it use the AS-PATH attribute?
5. Suppose that N switches supporting K VLAN groups are to be connected via a trunking protocol. How many ports are needed to connect the switches? Justify your answer.

6. What are three approaches that can be taken to avoid having a single wireless link degrade the performance of an end-to-end transport-layer TCP connection?
7. What is the role of a SIP registrar? How is the role of an SIP registrar different from that of a home agent in Mobile IP?
8. What is the role of ASN.1 in the ISO/OSI reference model's presentation layer?
9. What is the difference between MAIL FROM: in SMTP and From: in the mail message itself?
10. Suppose you purchase a wireless router and connect it to your cable modem. Also suppose that your ISP dynamically assigns your connected device (that is, your wireless router) one IP address. Also suppose that you have five PCs at home that use 802.11 to wirelessly connect to your wireless router. How are IP addresses assigned to the five PCs? Does the wireless router use NAT? Why or why not?

PART - B

Answer all the questions

4 x 15 = 60 Marks

11. (a) Write detailed notes on internet protocol stack with clear sketch. (5)
(b) List out and explain the various classes of DNS servers, its interaction and recursive queries with neat sketch. (10)

(OR)

12. (a) Consider sending a large file of F bits from Host A to Host B. There are three links (and two switches) between A and B, and the links are uncongested (that is, no queuing delays). Host A segments the file into segments of S bits each and adds 80 bits of header to each segment, forming packets of

$L = 80 + S$ bits. Each link has a transmission rate of R bps. Find the value of S that minimizes the delay of moving the file from Host A to Host B. Disregard propagation delay. (8)

(b) Review the car-caravan analogy. Assume a propagation speed of 100 km/hour.

(i) Suppose the caravan travels 150 km, beginning in front of one tollbooth, passing through a second tollbooth, and finishing just after a third tollbooth. What is the end-to-end delay?

(ii) Repeat (i), now assuming that there are eight cars in the caravan instead of ten. (7)

13. (a) Tabulate any 10 differences between IPv4 and IPv6. (10)

(b) Write short notes on IP fragmentation with suitable example. (5)

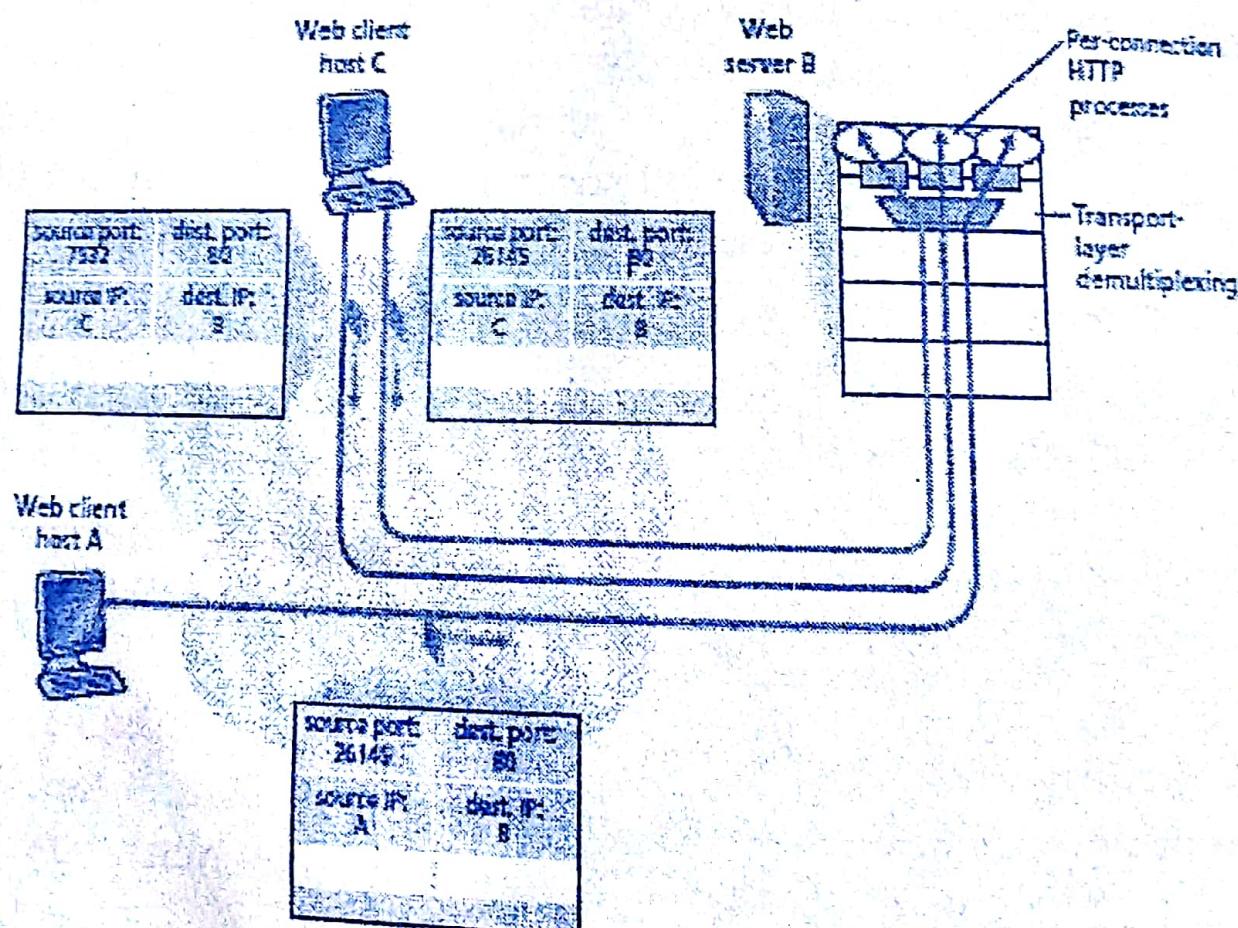
(OR)

14. (a) Host A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 126. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 80 and 40 bytes of data, respectively. In the first segment, the sequence number is 127, the source port number is 302, and the destination port number is 80. Host B sends an acknowledgment whenever it receives a segment from Host A. (10)

(i) In the second segment sent from Host A to B, what are the sequence number, source port number, and destination port number?

(ii) If the first segment arrives before the second segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number, the source port number, and the destination port number?

- (iii) If the second segment arrives before the first segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number?
- (iv) Suppose the two segments sent by A arrive in order at B. The first acknowledgment is lost and the second acknowledgment arrives after the first timeout interval. Draw a timing diagram, showing these segments and all other segments and acknowledgments sent. (Assume there is no additional packet loss.) For each segment in your figure, provide the sequence number and the number of bytes of data; for each acknowledgment that you add, provide the acknowledgment number.
- (b) Consider the following Figure, What are the source and destination port values in the segments flowing from the server back to the clients' processes? What are the IP addresses in the network-layer datagrams carrying the transport-layer segments? (5)



15. Explain in detail the concepts of MPLS with its header and suitable example.

(OR)

16. (a) A host wants to transmit the message 1011001001001011 and protect it from errors using the CRC-8 polynomial x^8+x^2+x+1 . (10)

- (i) Use polynomial long division to determine the message that should be transmitted.
 - (ii) Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred?
- (b) If a node has a wireless connection to the Internet, does that node have to be mobile? Explain. Suppose that a user with a laptop walks around her house with her laptop, and always accesses the Internet through the same access point. Is this user mobile from a network standpoint? Explain. (5)

17. Write detailed notes on SNMPv3 engine and applications with neat sketch.

(OR)

18. (a) (i) Consider an audio conference call in Skype with $N > 2$ participants. Suppose each participant generates a constant stream of rate r bps. How many bits per second will the call initiator need to send? How many bits per second will each of the other $N-1$ participants need to send? What is the total send rate, aggregated over all participants?

(ii) Repeat part (i) for a Skype video conference call using a central server.

(iii) Repeat part (ii), but now for when each peer sends a copy of its video stream to each of the $N - 1$ other peers. (9)

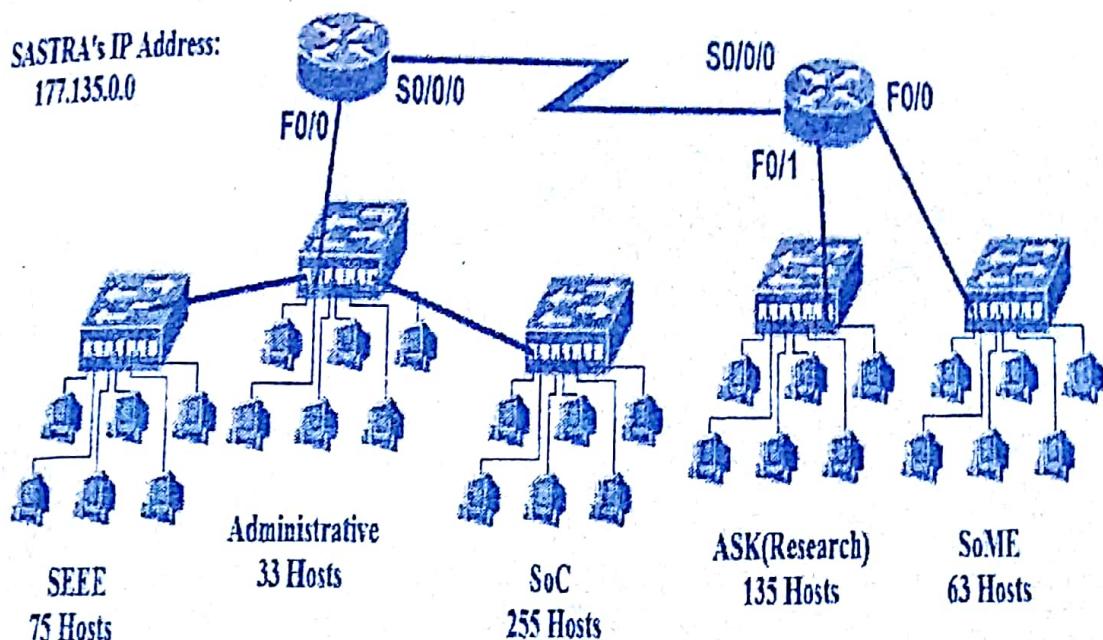
- (b) Consider the leaky-bucket policer that polices the average rate and burst size of a packet flow. We now want to police the peak rate, p , as well. Show how the output of this leaky-bucket policer can be fed into a second leaky bucket policer so that the two leaky buckets in series police the average rate, peak rate, and burst size. Be sure to give the bucket size and token generation rate for the second policer. (6)

PART - C

Answer the following

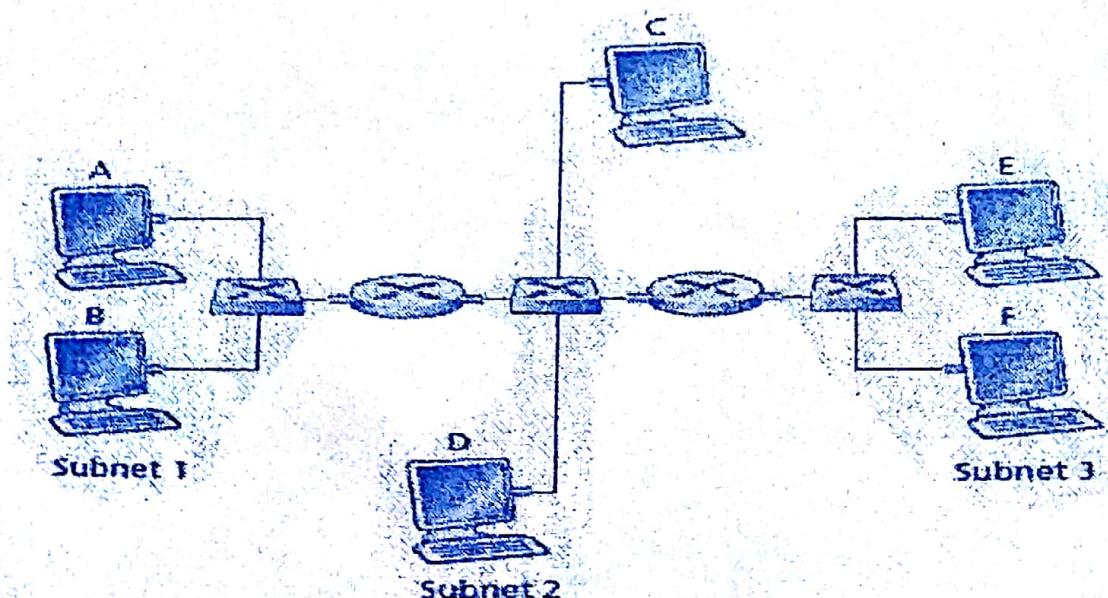
1 x 20 = 20 Marks

19. (a) Based on the information in the following figure shown, design a network addressing scheme that will supply the minimum number of hosts per subnet, and allow enough extra subnets and hosts for 160% growth in all areas. To find the Address class, Custom subnet mask, Minimum number of subnets needed, Extra subnets required for 160% growth, Total number of subnets needed, Number of host addresses in the largest subnet group, Number of addresses needed for 160% growth in the largest subnet, Total number of address needed for the largest subnet, IP address range for SoC, IP address range for ASK (Research), IP address range for SEEE, IP address range for SoME, IP address range for Administrative & IP address range for Router A to Router B serial connection (10)



- (b) Consider the following figure, Provide MAC addresses and IP addresses for the interfaces at Host A, both routers, and Host F. Suppose Host A sends a datagram to Host F. Give the source and destination MAC addresses in the frame encapsulating this IP datagram as the frame is transmitted (i) from A to the left router, (ii) from the left router to the right router, (iii) from the right router to F. Also give the source and destination IP addresses in the IP datagram encapsulated within the frame at each of these points in time.

(10)



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