COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CT -17003) Computer Networks

Course: B.Tech Branch: Computer Engineering

Semester: Sem V

Max.Marks:60

Year: 2017-2018

Date:

Duration: 3 Hours Time:-

Instructions: MIS No. | | | | | | | | | |

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper.

			Marks
Q. 1	A	Consider a router that interconnects three subnets: Subnet 1, Subnet 2 and Subnet 3. Suppose all of the interfaces in each of these three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12 interfaces. Provide three network addresses (of the form A.B.C.D/X) that satisfy these constraints.	03
	B	Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation?	03
	C	In an IPv4 datagram, the M bit is 0, the value of HLEN is 5, the value of total length is 200, and the offset value is 200. What is the number of the first byte and number of the last byte in this datagram? Is this the last fragment, the first fragment, or a middle fragment?	02
	D	What are the differences between classful addressing and classless addressing in IPv4?	02

Q. 2 **A** What is the difference between Forwarding and Routing? **03**

B What is the meaning of time to live (TTL)? **01**

C A router running RIP has a routing table with 25 entries. Answer the following questions: **03**

a) How many periodic timers are running?
b) How many expiration timers are running?
c) How many garbage collection timers are running if 5 routes are invalid?

OR

C What is count to infinity problem? **03**

D What is the difference between OSPF and RIP? **03**

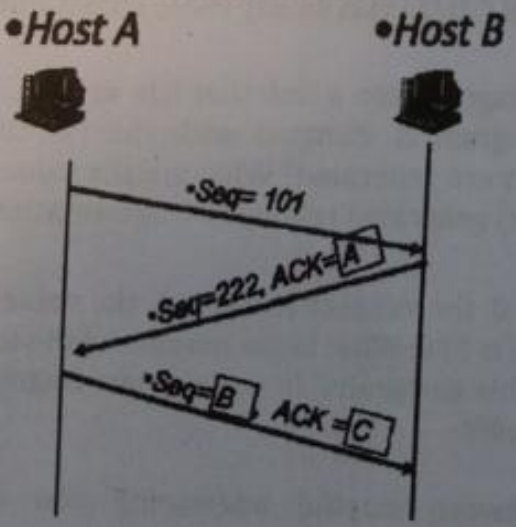
Q.3 **A** Suppose host A sends two TCP segments back to back to host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. **02**

a) How much data is in the first segment?
b) Suppose 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?

B When establishing a connection in TCP, a "three-way handshake" is done before exchanging data. Why does it take three steps instead of just two? Explain using a self-chosen scenario what could go wrong and under which conditions. **03**

C Suppose that the UDP receiver computes the Internet checksum for the received UDP segment and finds that it matches the value carried in the checksum field. Can the receiver be absolutely sure that there were no bit errors during transmission? Explain. Would things be different with TCP? **02**

D The following figure shows the three way handshake for TCP connection between two hosts; Host A and Host B. **03**



a) What is the value of ACK number **A** depicted in the box at step 2?
b) What is the value of Sequence number **B** depicted in the box at step 3?
c) What is the value of ACK number **C** depicted in the box at step 3?

Q.4 A Hosts A and B are communicating over a TCP connection, and Host B has already received all bytes up through byte 248 from A. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 40 and 60 bytes of data, respectively. In the first segment, the sequence number is 249, the source port number is 503, and the destination port number is 80. Host B sends an acknowledgement whenever it receives a segment from Host A. **04**

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

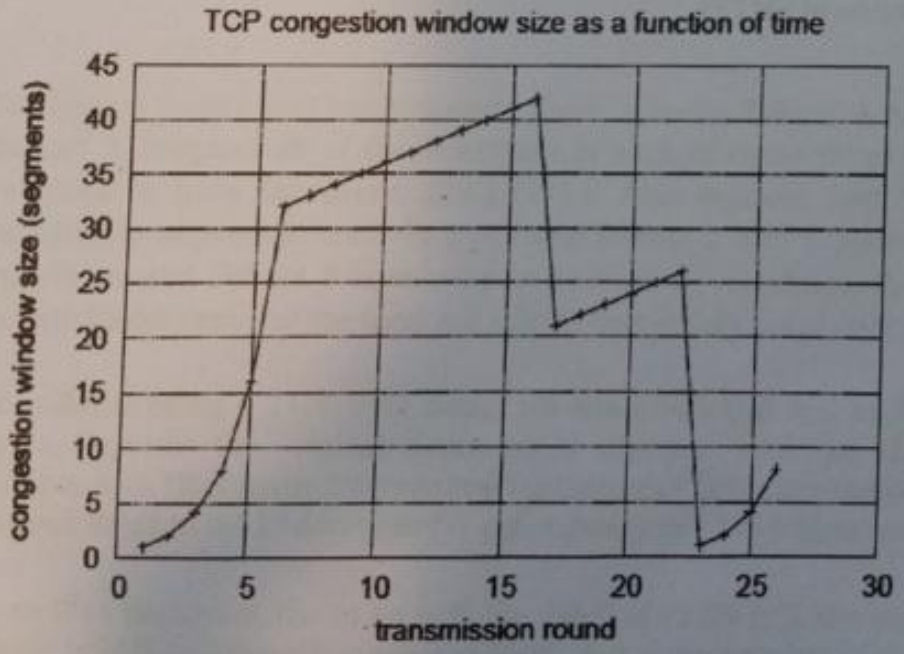
b) If the second segment arrives before the first segment, in the acknowledgement of the first arriving segment, what is the acknowledgement number?

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

d) Suppose the two segments sent by A arrive in order at B. The first acknowledgement is lost and the second acknowledgement arrives after the first timeout interval. Draw a timing diagram showing these segments and all other segments and acknowledgements 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 acknowledgement that you add, provide the acknowledgement number.

OR

A The following plot shows the TCP congestion window size as a function of time. **04**



Assume that the TCP implementation supports fast retransmit / fast recovery. Answer the following questions:

a) Identify the intervals of time when TCP slow start is operating.

b) Identify the intervals of time when TCP congestion avoidance is operating.

c) After the round 16, is segment loss detected by duplicate ACKs or by a timeout?

d) After the round 22, is segment loss detected by duplicate ACKs or by a timeout?

	B	IP Packets on a certain network can carry a maximum of only 500 bytes in the data portion. An application using TCP/IP on a node on this network generates a TCP segment with 1,000 bytes in the data portion. How many IP packets are transmitted to carry this TCP segment and what are their sizes (including the header)?	03
	C	Look at the 40 byte dump of an IP packet containing a TCP segment below. 45 20 03 c5 78 06 00 00 34 06 ca 1f d1 55 ad 71 c0 a8 01 7e 00 50 9a 03 3e 64 e5 58 df d0 08 b3 80 18 00 de 00 02 00 00 Identify all the fields of the IP and TCP header.	03
Q.5	A	Describe the meaning of unicast, multicast and broadcast.	03
	B	What are the different types of messages in label distribution protocol (LDP)?	02
	C	What is VoIP? What are the advantages of VoIP?	03
	D	What is SIP? Why is SIP needed?	02
Q.6	A	What is DHCP? Explain its operation.	04
	B	What is the difference between Telnet and SSH?	02
	C	Describe FTP in short.	02
	D	What is the function of SMTP?	02