Roll No. ☐☐☐☐☐☐☐

Paper Code: TCS-605/TIT605

End Semester Examination, 2017
### B.Tech. (CS/IT)

### Paper Name: Computer Network -II

Time: Three Hours

MM: 100

Note:

(i) This question paper contains five questions.
(ii) All questions are compulsory.
(iii) Each question contains three parts a, b, c. Attempt any two out of three parts.
(iv) Each part carries *ten* marks. Total marks assigned to each question are **twenty**.

Q1a). (i). What is the difference between a group-shared tree and a source-based tree in the context of multicast routing? [5]

(ii). When a host joins a multicast group, must it change its IP address to that of the multicast group it is joining? [2]

(iii). Compare and contrast the advertisements used by RIP and OSPF. [3]

b). Consider the following network. With the indicated link costs, use link-state/ shortest path algorithm to compute the shortest path from y to all network nodes. [10]
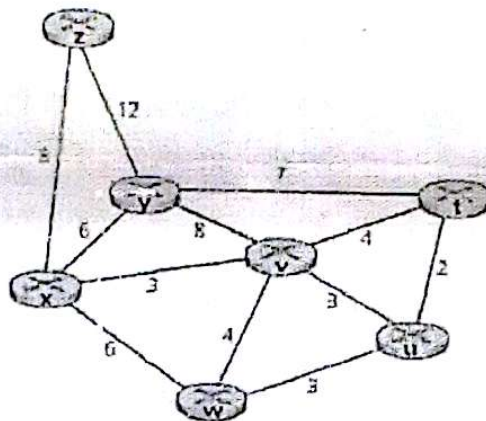
c). Consider the following network with the indicated link cost. Find the routing table of all the nodes after 2nd exchange using Distance-Vector routing algorithm. [10]
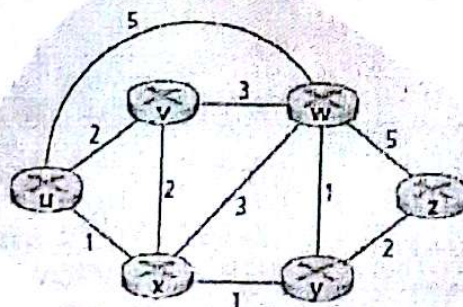
Q2a).i). Suppose nodes A, B, and C each attach to the same broadcast LAN (through their adapters). If A sends thousands of IP datagrams to B with each encapsulating frame addressed to the MAC address of B, will C's adapter process these frames? If so, will C's adapter pass the IP datagrams in these frames to the network layer C? How would your answers change if A sends frames with the MAC broadcast address?

ii). In CSMA/CD, after the fifth collision, what is the probability that a node chooses $K = 5$? The result $K = 5$ corresponds to a delay of how many seconds on a 10 Mbps Ethernet broadcast channel? [2+3]

b). i). Ten thousand airline reservation stations are competing for the use of a single slotted ALOHA channel. The average station makes 18 requests/hour. A slot is 125 μsec. What is the approximate total channel load? [5]

ii). Find the checksum for the following bit sequence. Assume a 8-bit segment size? [5]
01110011 11010101   01011001   11001101

c). i). Explain the Ethernet frame structure. [5]
**ii).** Explain the Point-to-Point (PPP) protocol data frame format. [5]

Q3a). i). What is the difference between end-to-end delay and packet jitter? What are the causes of packet jitter? [2+2]

ii). Why is a packet that is received after its scheduled playout time considered lost? [2]

iii). With HTTP streaming, are the TCP receive buffer and the client's application buffer the same thing? If not, how do they interact? [2+2]

b). Explain the various methods of streaming stored audio and video using proper diagrams of web browser, media player, web server and streaming server. Also explain the various messages exchanged between media player and media server in STSP protocol.

c). Consider the figure below. A sender begins sending packetized audio periodically at $t = 1$. The first packet arrives at the receiver at $t = 8$.
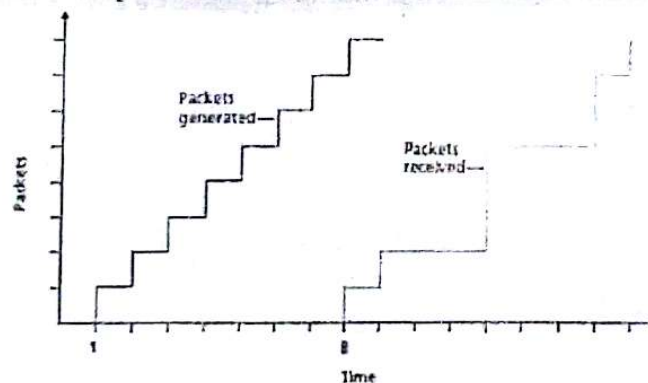
(i). What are the delays (from sender to receiver, ignoring any playout delays) of packets 2 through 8? Note that each vertical and horizontal line segment in the figure has a length of 1, 2, or 3 time units. [5]

(ii). If audio playout begins as soon as the first packet arrives at the receiver at $t = 8$, which of the first eight packets sent will *not* arrive in time for playout? [5]

Q4a).i). What are the differences between message confidentiality and message integrity? Can you have confidentiality without integrity? Can you have integrity without confidentiality? Justify your answer. [2+1+1+2]

ii). Suppose N people want to communicate with each of $N - 1$ other people using symmetric key encryption. All communication between any two people, i and j, is

visible to all other people in this group of N, and no other person in this group should be able to decode their communication. How many keys are required in the system as a whole? Now suppose that public key encryption is used. How many keys are required in this case? [2+2]

b). i). Suppose that Bob receives a PGP message from Alice. How does Bob know for sure that Alice created the message (rather than, say, Trudy)? Does PGP use a MAC for message integrity? [2+3]

ii). Explain the Authentication Header and Encapsulating Security Payload protocols. [5]

c). Consider RSA with $p = 5$ and $q = 11$.
(i) What are n and z or $\phi(n)$?
(ii) Let e be 3. Why is this an acceptable choice for e?
(iii) Find d such that $de = 1 \pmod{\phi(n)}$ and $d < 160$. [2+3+5]

Q5a). i). What does it mean for a wireless network to be operating in "infrastructure mode?" If the network is not in infrastructure mode, what mode of operation is it in, and what is the difference between that mode of operation and infrastructure mode? [4]

ii). What are the differences between a master device in a Bluetooth network and a base station in an 802.11 network? [3]

iii). What is the difference between a permanent address and a care-of address? Who assigns a care-of address? [3]

b). A CDMA receiver gets the following chips: (-1 +1 -3 +1 -1 -3 +1 +1). Assuming the chip sequences of station A, B, C and D as A = (-1 -1 -1 +1 +1 -1 +1 +1), B =

Explain your answer. [1+3]

ii). Explain with a neat diagram all the steps accomplished between base station and new station with a common MSC during handoff process in GSM. [6]

-------------- End of the Question Paper --------------

$B = \{-1 -1 +1 -1 +1 +1 +1 -1\}$, $C = \{-1 +1 -1 +1 +1 +1 -1 -1\}$,
$D = \{-1 +1 -1 -1 -1 -1 +1 -1\}$, which station transmitted, & which bits did each one send? [10]

C (i) :- Consider two mobile nodes in a foreign network having a foreign agent. If it possible for the two mobile nodes to use the same, care-of address in mobile IP? Explain your answer. [1+3]

(ii) See above.