Register Number:

ANNA UNIVERSITY, CHENNAI
UNIVERSITY DEPARTMENTS
B.TECH. DEGREE END-SEMESTER EXAMINATIONS, NOV/DEC 2011
INFORMATION TECHNOLOGY
V SEMESTER (REGULATIONS 2008)

IT 9303: COMPUTER NETWORKS

Time: Three Hours **Max. Marks: 100**

Answer All Questions

PART-A (10 X 2 = 20 Marks)

1. Assume a network with a n-layer protocol with h bytes of header added at each layer, to transmit small messages (maximum 10 bytes). What is the overhead of this protocol ? For n=4 and n=7, what values of "h" will give an efficiency of at least 50% ?
2. Consider the use of Stop and wait algorithm on a 20 km point-to-point fibre link, sending frames of 1KByte with a data transfer rate of 10 Mbps. Calculate a suitable time-out value for this algorithm.
3. How is the monitor elected in a token ring network ?
4. Suppose a bridge has two of its ports connected to the same network. How could the bridge detect and correct this ?
5. Why is the virtual circuit identifier switched at each switch, in virtual circuit switching ?
6. If a network with an IP address of 182.57.128/18 is to be divided into 4 subnetworks, what would be the addresses of the subnetworks ?
7. Why does the UDP protocol include the pseudo header (fields from the IP header) in the calculation of checksum ?
8. Why is the MaxThreshold actually less than the actual buffer size in the RED gateways?
9. When is conditional get used in HTTP ?
10. State true or false : Telnet is a high-overhead protocol. Justify your answer.

PART-B (5 X 16 = 80 Marks)

11. i. Explain sliding window protocol for flow control with an example. (6)

    ii. Explain the principle behind CRC. (6)

    iii. We normally assume that in a multi-layer stack, a protocol data unit (PDU) of layer N is encapsulated in a PDU at layer (N-1). But it is possible to break one N-level PDU into multiple (N-1) level PDUs (segmentation), or to group multiple N level PDUs into one (N-1)-level PDU(blocking).

    A. In the case of segmentation is it necessary that each N-1 level segment contain a copy of the N-level header ? Explain.

    B. In the case of blocking, is it necessary that each N-level PDU's header should be retained in the N-1 level segment ? Explain. (4)

12. (a) i. Explain the need for collision avoidance in a wireless network, and discuss how this is achieved in the IEEE 802.11 protocol. Also, discuss the handling of node mobility in this protocol. (10)

ii. Let A and B be two stations attempting to transmit frames on an Ethernet network. A collision occurs.

A. What is the probability that A gets to transmit its first frame A1 immediately after the first collision ?

B. After that transmission, A tries to send its second frame A2 and B its first frame B1. Will a collision occur ? What is the probability of the collision ?

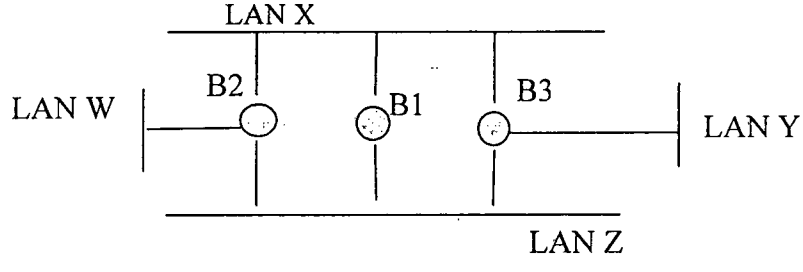
C. If a collision occurs, and a back-off takes place, what is the probability that A wins the race again ?

D. Is it possible for A to win all the time ? What happens to B's transmission ? (6)

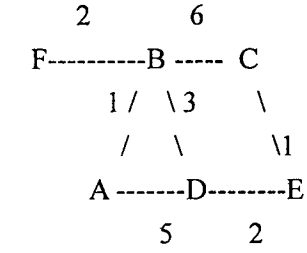
(OR)

12. (b) i. Explain the features of the IEEE 802.5 token ring network. (10)

ii. Show the construction of the spanning tree for the extended LAN shown below. (6)



13. (a) i. Explain the link-state algorithm used for routing. Construct the routing table at node B for the following network. (10)



(ii) Explain the procedure used in Protocol Independent Multi-cast (PIM) in the sparse mode of operation. (6)

(OR)

13.(b) i. Explain the DHCP protocol used to assign IP addresses. (6)

ii. Discuss the issues handled in the design of the BGP protocol. (4)

iii. Consider sending a 3500-byte datagram that has arrived at a router R1 that needs to be sent over a link that has an MTU size of 1000 bytes to R2. Then it has to traverse a link with an MTU of 600 bytes. Let the identification number of the original datagram be 465. How many fragments are delivered at the destination ? Show the parameters associated with each of these fragments. (6)

14.(a) i. Explain the various techniques used for congestion control in TCP. (10)

Two users, one using Telnet, and one sending files with FTP, both send their traffic via router R which has a very slow out-going link. Discuss the relative performance seen by the Telnet user, if R's queuing policy is (A) Round-robin service (B) Fair-queuing. (6)

(OR)

14.(b) i. Explain the adaptive flow control and retransmission techniques used in TCP. (10)

ii. With TCPs slow start and AIMD for congestion control, show how the window size will vary for a transmission where every 5^{th} packet is lost. Assume an advertised window size of 50 MSS. (6)

15. (a) i. Explain the features of the DNS protocol, and their implementation. (10)

ii. If the processing at each layer of the protocol takes "t" seconds, what will be the time taken to send mail to a server that is two-hops away ? Assume that the IP address is known. (6)

(OR)

(b) i. Explain the features of the HTTP protocol. (10)

ii. IPv6 allows hardware addresses to be part of the IPv6 address. This eliminates ARP. But, how does this complicate the job of DNS ? How does this affect the problem of finding the local DNS server ? (6)

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