

The LNM Institute of Information Technology

III Year, II Semester, 2016

Exam: End Term

COMPUTER NETWORKS

(Duration: 2.5 hours)

NOTE: Answer ALL questions. Answer all the bits of a question at one place.

1. [Marks 8] Write the full form of following terms and explain each one in one or two sentences.

- | | |
|----------|----------|
| (A) CSMA | (E) PAP |
| (B) CRC | (F) ISP |
| (C) NRM | (G) IFS |
| (D) ARQ | (H) CIDR |

FTP

2. [Marks 12] Draw an internet with following specification. Show all of the hosts, their IP addresses with subnet mask (show all calculation also), and their connections.

- (A) a network with bus topology with three hosts (class A address)
- (B) a network with star topology with three hosts (class B address)
- (C) a network with ring topology with four hosts (class A address)
- (D) a network with two subnets (specify broadcast address also) both connected with switched network (class C address)

* 3. [Marks 3] A laptop has the following IP configuration: IP address: 192.168.1.118, mask: 255.255.255.0, default gateway: 192.168.1.1, DNS Server 1: 192.168.1.200, DNS server 2: 172.22.2.15. Suppose one wants to telnet to library OPAC server (IP address: 172.22.2.26) using this laptop. Which of the following scenario(s) is/are possible with respect to ARP?

- | | |
|---------------------------------|-------------------------------|
| (A) ARP query for 192.168.1.118 | (D) ARP query for 172.22.2.15 |
| (B) ARP query for 192.168.1.1 | (E) ARP query for 172.22.2.26 |
| (C) ARP query for 192.168.1.200 | (F) No ARP query |

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4. [Marks 4] Consider sending a 2400 bytes IP 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?

- * 5. [Marks 2+3+3+2+3 = 13] Look at the 40byte dump (in hexadecimal) of an IP packet given 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

Handwritten labels above the dump:
S (above 45), D (above 20), Seq (above 78), Ack (above 34), HLen (above d1), Window (above c0), S (above 01)

- (a) Give the source IP address of the datagram.
- (b) What is the value of the length field of this IP datagram? Is the length of the actual datagram consistent with the value given in the length field? Explain.
- (c) How can you tell that this datagram encapsulates an TCP? Is this segment traveling from the client to the server, or vice versa? How can you tell?
- (d) What kind of IP service is requested by TCP segment? How can you tell?
- (e) What is the value of the "Window size" field of this TCP segment? How is the content of this field interpreted by the recipient of the segment?
6. [Marks 5] A sender transport layer wants to send 3 bytes of data to a receiver using UDP. Assume the sender IP address is 139.133.217.110 and port number is 39376 and the destination IP address and port number are 139.133.233.2 and 80 respectively. If the 3 bytes of data to be send is "0A6568" in hexadecimal, show the computation of checksum and the UDP header for this segment.
7. [Marks 5] The *ssthresh* value for a Tahoe TCP station is set to 10 MSS. The station is now in the slow-start state with *cwnd* = 8 MSS. Show the values of *cwnd*, *ssthresh*, and the current and the next state of the station after following events (in order): (i) ACK received (ii) ACK received (iii) ACK received (iv) Time-out (v) ACK received.
8. [Marks 5] Consider a scenario where Alice (*Alice@abc.com*) wants to send an email to Bob (*Bob@xyz.com*) where the two email servers are in two separate networks. Alice is using a web browser to compose and send an email to Bob who is using a GUI based application like *Microsoft Outlook* to access emails. Assume both Alice and Bob are part of the same network which is different from the two networks that the two mail servers belong to. Show the steps involved including the protocols for the email communication in the above scenario.