BCSE 4TH YEAR EXAMINATION 2018

(1st Semester)

Internet Technology

Time: Three Hours

Full Marks 100

Answer any five questions

1. a) Briefly discuss how the Internet is controlled by different bodies.
   b) Discuss how checksum is computed in UDP.
   c) Compute the checksum for a UDP datagram with following details:
   Source IP address: 153.18.8.100, destination IP address: 172.1.68.10, 8-bit protocol field: 17, UDP length field 15, source port address: 20, destination port address: 21, and the UDP datagram contains "AAAA"
   d) Compare UDP with TCP with examples when each of these protocols is useful.

   4+4+6+6=20

2. a) What are the main features of TCP?
   b) "TCP uses a version of the sliding window flow control" – Explain how the window size is initially set in TCP. With an example show how the window size is changed.
   c) Why are the following option fields used in TCP?
       i) Timestamp option, ii) Maximum Segment Size option, and iii) NOP
   d) How does a TCP client open a connection with TCP host? Which parameters are needed to be passed between the client and the server to open a connection? (state transition diagram is not needed).

   5+6+4+5=20

3. a) What is a loopback address in IPv6?
   "An IPv6 host and a IPv6 router usually can have multiple IPv6 addresses" – what are the different possible addresses for a IPv6 host and IPv6 router?
   What is the use of an anycast address in IPv6?
   b) Differentiate between the two communication modes between a mobile node and a correspondent node in IPv6 - *Bidirectional tunneling* and *Route optimization.*

   (2+6+4)+8=20

4. a) With an example discuss how the mobility header is used in IPv6 by the mobile node and the correspondent node.
   b) How are the extension headers used in IPv6? Give two examples of extension headers.
   c) With a state transition diagram, explain how TCP closes a connection?
   d) What is the use of port numbers in TCP and UDP?

   6+(3+2)+6+3=20

5. a) What are the different types of top-level domains in DNS?
   b) How are the different name servers organised in a hierarchy in DNS?

c) When is a DNS query record needed? What are the formats of DNS query record and DNS response record?

d) How do you use DNS records to find the canonical or primary name for a hostname?

e) How is a DNS query resolved by the local name server, resolver and foreign name servers? (Explain the responsibility of each considering different situations.)

3+3+6+3+5=20

6. a) With a diagram show the ARP components which are used to resolve ARP requests.

b) Explain how an ARP output module works.

c) An ARP input module receives an ARP reply packet with target protocol (IP) address 188.11.8.71. Discuss how the cache table will be affected with the arrival of this packet. (Consider all possible situations in the cache table). Also show a possible structure of the cache table.

d) What is "silly window syndrome" in TCP? What is Clark's solution to this syndrome?

e) How is retransmission timer set in TCP?

5+3+4+4+4=20

7. a) What is a non-persistent connection in HTTP? Discuss the techniques to improve HTTP connection performance in comparison with non-persistent HTTP connection.

b) What are the problems with persistent connection? What are the problems with parallel connection?

c) Explain how an ICMP query message is used to measure the round trip time between the source and destination.

d) At any time instant, local time at host 1 is 820 and at host 2 it is 1060. Discuss how ICMP messages can be used to synchronize the two clocks in two hosts. (Assume any data as required).

(2+6)+4+4+4=20

8. a) With appropriate FTP messages explain how the following actions are performed:
   i)    A connection is opened between client and server
   ii)   Client retrieves the list of files from server
   iii)  Client deletes a particular file
   iv)   Client stores a file onto the server

b) What are the problems with FTP?

c) Write four most used ICMP error messages. Describe the situations when these ICMP error messages are needed.

8+4+8=16