BCSE 4TH YEAR SUPPLEMENTARY EXAMINATION 2017

(1st Semester)

Internet Technology

Time: Three Hours   Full Marks 100

Answer any five questions

1. a) Explain the statement "Traditional model of classful addressing does not allow the address space to be used to its maximum potential."
b) What is *subnetting*. What are the advantages of subnetting?
c) Explain how *extension headers* are used in Ipv6. What is a loopback address in IPv6?
d) "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.
$$4+4+6+6=20$$

2. a) What are different address types in IPv6? What are *Link-local Addresses* in Ipv6? How are they generated? (Discuss the steps).
b) With an example discuss how the mobility header is used in IPv6 by the mobile node and the correspondent node.
c) Differentiate between the two communication modes between a mobile node and a correspondent node in Ipv6 - *Bidirectional tunneling* and *Route optimization*
$$(4+2+4)+4+6=20$$

3. a) Discuss how the DNS hierarchy is managed with clear indication of the roles of different organisations. What are domains and zones?
b) With a state transition diagram, explain how TCP opens and closes a connection.
c) When is a DNS query record needed? What are the formats of DNS query record and DNS response record?
d) Discuss how a domain name is resolved.
$$4+8+6=20$$
$$+2$$

4. a) What are the different layers in the TCP/IP protocol suit? Name at least one protocol at each layer.
b) What is the use of port numbers in TCP and UDP?
c) What are the main advantages of UDP? Explain in what situation you will prefer to use UDP instead of TCP?
d) Why do you think TCP is a reliable transport layer protocol? Explain your answer.
e) Why are the following option fields used in TCP?
    i) Timestamp option, ii) Maximum Segment Size option, and iii) NOP
$$5+2+4+3+6=20$$

5. a) How is UDP checksum computed? What is the role of the UDP pseudo header?
b) How do the two hosts communicate in a *slow start* mode in TCP congestion control?
c) Explain how a host functions in *Fast Retransmit* and *Fast Recovery* modes.

[Turn over

d) What are the different types of HTTP connections? What are the different techniques to improve HTTP connection performance?

$$4+4+(3+3)+6=16$$

6. a) What is ARP? How is an ARP packet transmitted in the network?
   b) Explain how an ARP input module and output module work.
   c) An ARP output module receives an IP datagram with the destination address 116.1.7.22. Discuss how it will use the ARP cache table to resolve the request. Consider all possible situations.
   d) What are the problems with FTP?

$$4+6+6+4=20$$

7. a) Why are the ICMP messages needed?
   b) Explain what are the requirements of the following ICMP messages:
   i) Router Solicitation Message, ii) Echo Request Reply Message, iii) Destination Unreachable Message and iv) Parameter Problem Message.
   c) Explain how an ICMP query message is used to measure the round trip time between the source and destination.
   d) Give a brief overview of FTP. Write at least four commands of FTP and explain their uses.

$$2+8+4+6=20$$