MCA 2ND YEAR EXAMINATION 2018

(2nd Semester)

DATA COMMUNICATION AND COMPUTER NETWORKS

Time: Three Hours   Full Marks 100

Answer any five questions

1. a) Discuss how the DNS hierarchy is managed.
    b) What are the different types of top-level domains? Describe the roles of *Root Name Server*, *Primary Name Server* and *Secondary Server* .
    c) Discuss how a domain name is resolved.
    d) You would like to contact jaduniv.edu.in from your home computer. Explain how you could get the IP address for it.
    e) Discuss the use of HTTP methods PUT, GET and POST.

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

2. a) With appropriate FTP messages explain how the following actions are performed one after another:

    A connection is opened between client and server,
    client retrieves the list of files from server,
    client stores a file onto the server, and
    quits the FTP connection.

    b) Compare UDP with TCP with examples when each of these protocols is useful.
    c) "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.

    $8+6+6=20$

3. a) Why are the following option fields used in TCP?
        i) Timestamp option, ii) Maximum Segment Size option, and iii) NOP
    b) How does a TCP client open a connection with TCP host?
    c) How do the two hosts communicate in a *slow start* mode in TCP congestion control?
    d) What is a loopback address in IP?
    e) How are the extension headers used in IPv6?

    $6+3+4+3+4=20$

4. 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) Consider an IP address of a particular host is 144.97.16.132 and the subnet mask of 255.255.255.224. Find the network address, subnet address and host address. How many subnets are possible? How many hosts can be included in each subnet?
    d) What is the difference between routing and forwarding?
    e) How is longest prefix match used in routing table lookup? Explain with an example.

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

[Turn over

5. (a) What is Network Address Translation (NAT)? How can be NAT used to manage the scenario when an organisational network has many hosts but only a small number of public IP addresses?

   (b) A network has a public address 144.132.71.0 and three hosts with private addresses 10.0.1.2, 10.0.1.3, 10.0.1.4. The first host initiates communication with another host in a network with a private address 192.128.0.1 in a network with public address 128.168.112.3. Explain how a NAT is used for making the communication between the two hosts happen (write the source and destination addresses of the IP packet in each step).

   (c) Why is classless interdomain routing needed in IP? What does a CIDR routing table entry contain?

   (d) When a CIDR starting address is represented as 194.24.0.0/21, how many hosts can be accommodated in the network? What are the first address and last address in this address pool? Explain your answer.

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

6. (a) What are the main features of *distance vector routing* algorithm?

   (b) Three nodes, X, Y and Z are connected in a triangle. Cost of the links between (i) X and Y, (ii) Y and Z, and (iii) Z and X are 7, 3 and 5 respectively. Show how the routing table is built up while using *distance vector routing*.

   (c) Explain "count to infinity" problem. How can the problem be solved?

   (d) Briefly explain how a *link state routing* algorithm is implemented.

   $$4+6+5+5=20$$

7. (a) What is hamming distance? With geometric concepts explain why the minimum hamming distance between two codewords should be larger than s for detection of s errors.

   (b) What is burst error? Explain a CRC generator. A dataword 1001 is to be sent to the receiver. Using a divisor 1011 find what should be the codeword (dataword+remainder).

   (c) Explain the difference between Slotted ALOHA and Pure ALOHA.

   (d) What are the requirements for multiple access protocols? What do you mean by *time division multiple access* and *frequency division multiple access*?

   $$(2+3)+(2+4)+4+5=20$$