M.Sc. (Informatics) – III Semester - 2011
IT-31- Network Application Development

Time: 3 Hrs.   Max. Marks: 75

Note: Answer five questions in all. Question 6 is compulsory.
      (Write your roll number on the top on receipt of the question paper)

Q1. Answer all parts of this question.   (3+2+5+3+2)

    a. Mention differences and similarities between TCP and SCTP?

    b. TCP is sending data at 2Mbytes/s. If the sequence number starts with 7000, how long it takes before the sequence number goes back to zero?

    c. Draw the TCP state machine for connection establishment and termination? Mention each state during both connection establishment and connection termination?

    d. Mention all the fields of UDP Datagram header with their sizes. What is maximum and minimum size of UDP Datagram?

    e. Name the Transport layer protocol used by DNS, PING, TELNET and HTTP?

Q2. Answer all parts of this question.   (2+3+5+5)

    a. For the IP Address = 130.200.100.100 and Mask= /19, calculate subnet number, first IP address, last IP address and broadcast address?

    b. Calculate all the subnet numbers for the IP network = 130.198.0.0 and Mask= /18?

    c. How IP addresses are arranged in classes in IPv4? What are the drawbacks of classful addressing schemes? Explain the remedies used to overcome such drawbacks?

    d. Define NAT using the NAT translation table? Also explain how PAT or NAT overload works?

Q4. Answer all the parts of this question.   (1+1+2+2+4+5)

    a. Name the OSI layer that defines the standards of data formats and encryption?

    b. Name the protocol, which allows client PC to request the assignment of an IP address, subnet-mask, default gateway and DNS IP address?

    c. PC1 is using TCP and has a window size of 4000. PC1 sends four segments to PC2 with 1000 bytes of data each, with sequence number 2000, 3000, 4000 and 5000. PC2 replies the acknowledgment number of 4000. What should PCI do next?

    d. If mask is 255.255.255.240 used with class C network, how many subnets could exists, with how many hosts per subnet respectively? Choose correct answer from below and give reason to suggest your answer:

        I.   16 subnets and 16 hosts per subnet

        II.   14 subnets and 14 hosts per subnet

        III. 16 subnets and 14 hosts per subnet

        IV.   32 subnets and 8 hosts per subnet

    e. What is VPN? How VPN tunnel works for site to site Intranet VPN?

    f. What is need of sub-netting? How sub-netting is implemented in Campus Area Network of Delhi University South Campus?

Q3. Answer all parts of this question.   (4+2+2+3+4)

    a. Following is the routing table of HATHWAY Router, show the forwarding process if the Destination IP address has values:

        I.   180.70.65.140

        II.   201.4.22.35

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Mask	Network Address	Next Hop	Interface
/26	180.70.65.192	-	M2
/25	180.70.65.128	-	M0
/24	201.4.22.0	-	M3
/22	201.4.16.0	-	M1
Any	Any	180.70.65.200	M2

b. Why different type of addresses required at Network layer (IP address) and Data-link layer (MAC Address)?

c. Explain the significance of **TIME_WAIT** state in TCP protocol?

d. What is ARP? Which layer of TCP/IP protocol suite it resides? Explain its functionality?

e. How TCP uses congestion control to avoid congestion in network?

(8+7)

Q5.

a) What is defined by the Network topology? Why do we have different topologies, give your justification with examples including schematic design.

b) How does the logical topology differ from the physical topology? Why can a single physical topology support multiple logical topologies?

(8+7)

Q6.

a. Compare 12 nodes connected in three ways:

A single 10 Mb/sec coaxial cable, a switch connected via twisted pairs, each running at 10 Mbit/sec., and a switch connected via optical fibers, each running at 100 Mbit/sec. The single coax is 500 meter long and the average length of each segment to a switch is 50 meters. Considering the three topologies viz. Star, Bus and Mesh and the cost of each alternative considering design issues. Design the network using above mentioned criterion and calculate the total cost of the individual network.

The cost for labour, node interface, media, termination are as follows:

$Labour_{coax}$ = 100/- $Node_{coax}$ = 500/- $Media_{coax}$ = 100/- $Termination_{coax}$ = 150/-
$Labour_{twist}$ = 50/- $Node_{twist}$ = 250/- $Media_{twist}$ = 100/- $Termination_{twist}$ = 7500/-
$Labour_{fiber}$ = 200/- $Node_{fiber}$ = 100000/- $Media_{fiber}$ = 700/- $Termination_{fiber}$ = 3000/-

b. Complete the following table and justify each entry.

Characte-ristics	Token ring	10Base5	10BaseFX	10Base 2	10BaseT4	ATM	FDDI	1000BaseT	10BaseT	10Base36
Signalling Method										
Media										
Maximum Throughput										
Segment length										

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