9. Write notes on : 20

   (a) MPLS

   (b) Routing in WSNs.

   (c) Overlays

Note : Question No. 1 is *compulsory*. Attempt *five* questions in total selecting *one* from each Section.

1. (a) On which two layers of OSI reference model error control and flow control is performed. What is the need for performing these functions twice ?

                               $2.5 \times 8 = 20$

   (b) Differentiate between an active hub and a switch.

   (c) Differentiate between IPV4 and IPV6 addressing.

   (d) Differentiate between connection oriented and connectionless services with examples. Name the protocols at Transport layer which implements these services.

(e) What is a socket and what is a socket address ?

(f) Mention some advantages of using VPN.

(g) Briefly explain the mechanism for wavelength allocation in optical networks.

(h) Mention various categories of routing protocols in wireless sensor networks.

SECTION – A

2. (a) Describe CSMA/CD protocol. Which LAN standard uses this protocol ?   10

(b) What is a router ? Discuss its role in computer networks. Also explain the structure of routing table.   10

3. (a) Compare TCP/IP model with OSI reference model.   10

(b) Explain distance vector routing.   10

SECTION – B

4. (a) Explain how TCP manages flow control and congestion control.   10

(b) Which protocols are used for file transfer at application layer ? Also explain working HTTP.

    10

5. (a) An ISP is granted a block of addresses starting with 140.100.0.0/15. The ISP wants to distribute these blocks to 1730 customers as follows :   14

(i) The first group has 160 customers; each needs 16 addresses.

(ii) The second group has 340 customers; each needs 8 addresses.

(iii) The third group has 1200 customers; each needs 4 addresses.

(iv) The fourth group has 30 customers; each needs 32 addresses.

Design the sub blocks and give the slash notation for each sub block. Find out how many addresses are still available after these allocations.

(b) Explain working of domain name system.   6

SECTION – C

6. Write notes on :
   (a) Optical switch
   (b) Wireless mesh networks.
   (c) Mobile IP

7. Explain IEEE.802.11 standard in detail.   20

SECTION – D

8. (a) What is an Ad-Hoc network ? How it is different from other wireless networks ?   10

(b) What is VOIP ? How this service is useful ?   10