5. (a) Compare TCP and UDP protocols in detail. 5

(b) Explain how the Hypertext Transfer Protocol (HTTP) facilitates communication between wed browsers and servers. Also, describe the role of HTTP request methods and status codes in this process. 10

6. (a) What is a Virtual LAN (VLAN)? Why are VLANs used in enterprise networks? 5

(b) Explain the following networking devices (any **five**) 10

(i) Bridge (ii) Router

(iii) Switch (iv) Repeater

(v) Gateway (vi) Modem

7. (a) Explain the role of the Internet Control Message Protocol (ICMP) in network communication. 5

(b) Differentiate between sliding window protocal, Go- back N protocoal and selective repeat/reject protocal .Give diagrammatic representation of each. Compute the channcl efficiency and channel throughput in each case. 10

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[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **3528**

Unique Paper Code : 6202452403

Name of the Paper : Data Communication and Networks

Name of the Course : **B. Voc. (Software Development)**

Semester : IV

Time : 3 Hours ***Maximum Marks : 90***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) **Section-A** is Compulsory.

(c) Parts of a question must be answered together.

(d) Attempt any **four** questions from **Section-B**.

Section-A

1. (a) What is the purpose of network topologies in network design ? Explain any two topologies with diagrams. 5

P.T.O.

(b) Briefly explain any three protocols used at different OSI layers. 5

(c) Differentiate between Simplex, Half -Duplex and Full-Duplex Ethernet with suitable examples. 5

(d) What is the role of switches in a network? Describe MAC address learning and frame forwarding with suitable examples. 5

(e) Explain the five IPv4 address classes. 5

(f) Briefly explain the key components of a URL. 5

Section - B

2. (a) Given that direct broadcast address of a subnet is 201.15.16.31, determine the subnet maks for this network. 5

(b) Explain how the Domain Name System (DNS) translates a human-readable domain name into an IP address. Also describe the significance of DNS caching improving efficiency. 10

3. (a) Differentiate between Unicast, Multicast, and Broadcast addressing in computer networks. Explain which mode is best suited for video conferencing. 5

(b) Illustrate the IPv4 packet header structure with diagram. Explain the purpose and function of each header field. 10

4. (a) What is subnet mask? Write the default subnet masks for Class A,B, and C IPv4 addresses. 5

(b) Your company has received a 192.168.1.0/24 network. They need to divide this into 5 departments with at lest 25 hosts each.

(i) Calculate the number of bits borrowed

(ii) Determine the subnet mask

(iii) Calculate total number of valid subnets and hosts per subnet

(iv) Determine the network ID, first usable IP, and broadcast address for the first three subnets.