

[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 masks 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 least 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.

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

(b) Explain how the Hypertext Transfer Protocol (HTTP) facilitates communication between web 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 protocol, Go-back N protocol and selective repeat/reject protocol. Give diagrammatic representation of each. Compute the channel efficiency and channel throughput in each case. 10
