

## NEPAL ENGINEERING COLLEGE

Level: Bachelor

Semester: Spring

Year: 2025

Program: BE

Full Marks: 100

Course: Computer Network\_ New

Pass Marks: 45

Time: 3 hrs.

*Candidates are required to answer in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

***Attempt all the questions.***

- |   |  |     |
|---|--|-----|
| 1 | a) Define computer networks and discuss their merits and demerits. Compare PAN, LAN, MAN, and WAN.   | 7   |
|   | b) Explain the OSI model with a focus on the functions of the Transport and Data Link layers.  | 8   |
|   | OR   |     |
|   | Describe the TCP/IP model and compare it with the OSI model.   |     |
| 2 | a) Discuss guided and unguided transmission media with examples. Explain the concept of circuit switching and packet switching.                      | 7   |
|   | b) Explain ISDN signaling and its architecture.  | 8   |
| 3 | a) Describe the LLC and MAC sublayers of the Data Link layer. Explain framing and flow control mechanisms.   | 7   |
|   | b) Discuss CSMA/CD and its role in Ethernet networks.  | 8   |
| 4 | a) Explain IPv4 addressing, subnetting, and CIDR. Compare IPv4 and IPv6 headers.   | 7   |
|   | OR   |     |
|   | Create 32 Subnet of given IP address 172.30.0.0/16 with new subnet mask and find out the network ID, Wildcard Mask, Usable Host IP & Broadcast Mask. |     |
|   | b) Describe distance vector and link-state routing algorithms. Provide examples of RIP and OSPF.   | 8   |
| 5 | a) Explain the services and features of TCP and UDP. Discuss the concept of socket programming.  | 7   |
|   | b) Discuss congestion control mechanisms (open loop and closed loop) and traffic shaping algorithms (Leaky Bucket, Token Bucket).                    | 8   |
|   | OR   |     |
|   | Compare TCP and UDP segment headers. (Unit VI)   |     |
| 6 | a) Discuss symmetric key (DES) and asymmetric key (RSA) cryptography.  | 7   |
|   | b) Describe the role of firewalls & its types and digital certificates in network security.  | 8   |
| 7 | Write Short notes (Any Two)  | 2*5 |
|   | a) NGN   |     |
|   | b) E-Mail Services   |     |
|   | c) ATM   |     |