

IT307

Enrol. No. *A2305221690*

[ET]

END SEMESTER EXAMINATION : NOVEMBER-
DECEMBER, 2023

EXPLORING THE NETWORKS

*Time : 3 Hrs.**Maximum Marks : 60*

Note: *Attempt questions from all sections as directed
Use of scientific calculator is allowed.*

SECTION – A (24 Marks)

*Attempt any **four** questions out of five.*

*Each question carries **06** marks.*

1. Can you describe a scenario where knowing the difference between LANs and WANs would influence network design decisions? Provide an example of a specific network setup?
2. Explain the concept of data encapsulation in network communication. How does it relate to the OSI model, and what role does it play in ensuring data integrity during transmission?

3. Explain the differences between half-duplex and full-duplex Ethernet communication, and why full-duplex is commonly used in modern networks.
4. Explain the TCP three-way handshake process, including the purpose of each step and how it establishes a connection between two devices.
5. Explain the concept of Application Layer protocols and their significance in network communication. Provide three examples of well-known Application Layer protocols and briefly describe the services they offer. Finally, discuss the potential impact on network functionality if these protocols were not implemented correctly or were unavailable.

SECTION – B

(20 Marks)

Attempt any two questions out of three.

Each question carries 10 marks.

6. (a) Compare and contrast the advantages and disadvantages of different network media (e.g., copper, fiber-optic, wireless) in terms of speed, reliability, and cost. (5)
- (b) Compare and contrast the advantages and disadvantages of using a console cable, Telnet, and SSH for accessing Cisco IOS devices in a network. (5)

7. (a) Suppose you are tasked with securing remote access to a Cisco router. Describe the steps you would take to enable SSH for secure remote management. (5)
- (b) Describe a scenario in which a specific network protocol suite (e.g., TCP/IP) is used for communication. Explain the key protocols within the suite and their respective functions in ensuring successful data exchange. (5)
8. (a) Suppose you are setting up a web server. Describe the process of selecting and configuring the appropriate port numbers for TCP and UDP services to ensure proper communication with clients. (5)
- (b) Analyze the advantages and disadvantages of UDP in comparison to TCP for different types of applications, such as online gaming, VoIP, and file transfers. (5)

SECTION – C**(16 Marks)***(Compulsory)*

9. You are a network administrator tasked with designing a subnetting scheme for a company's IPv4 network. The company has a single Class B IP address block,

and they need to efficiently allocate IP addresses to various departments and subnets. They have provided the following requirements:

(i) Department A requires 150 host addresses.

(ii) Department B requires 75 host addresses.

(iii) Department C requires 30 host addresses. *8 subnets*

(iv) Department D requires 45 host addresses.

(v) Department E requires 60 host addresses.

Design an IPv4 subnetting plan that meets the company's requirements while optimizing IP address usage. Be sure to include the following in your plan:

(i) The subnet mask(s) to be used.

(ii) The network address for each subnet.

(iii) The usable IP address ranges for each subnet.

(iv) The broadcast address for each subnet.

(a) Additionally, provide a brief explanation of your subnetting decisions, such as why you chose a particular subnet mask and how you ensured efficient utilization of IP addresses. (8)

(b) Analyze a scenario where ARP issues are causing network connectivity problems. Describe the symptoms, potential causes, and troubleshooting steps to resolve the issue. (8)