Statetech University

Department of Computer Science
Midterm Examination – Computer Networks
Course Code: CN-301
Date: [Insert Date]
Time Allowed: 2 Hours
Total Marks: 100

Instructions:

1. Attempt all questions.
2. Clearly mention question numbers in your answer sheet.
3. Assume any missing information and justify your assumptions.

Section A – Multiple Choice Questions (MCQs) (10 × 2 = 20 Marks)

1. Which layer of the OSI model is responsible for end-to-end communication?
a) Physical Layer
b) Transport Layer
c) Data Link Layer
d) Application Layer

2. What is the primary function of a router?
a) Convert analog signals to digital
b) Forward data packets between networks
c) Control data flow within a LAN
d) Encrypt data for secure transmission

3. IPv4 addresses are:
a) 32-bit long
b) 64-bit long
c) 128-bit long
d) 256-bit long

4. Which protocol is used for secure file transfer?
a) FTP
b) HTTP
c) SSH
d) SFTP

5. What is the main purpose of the ARP protocol?
a) Assign IP addresses
b) Resolve IP addresses to MAC addresses

c) Route data across networks
d) Encrypt network traffic

Section B – Short Answer Questions (5 × 6 = 30 Marks)

6. Differentiate between circuit switching and packet switching.
7. Explain the key differences between TCP and UDP.
8. What is subnetting? Why is it used in IP addressing?
9. Describe the working of the CSMA/CD protocol in Ethernet networks.
10. What is the purpose of DNS? Explain how DNS resolves domain names.

Section C – Long Answer Questions (5 × 10 = 50 Marks)

11. (a) Explain the OSI model in detail with functions of each layer. (5 Marks)
(b) Compare it with the TCP/IP model. (5 Marks)
12. What is a VLAN? Discuss its advantages and how it improves network performance.
13. Describe how the three-way handshake process works in TCP communication. Why is it important?
14. Explain the differences between unicast, multicast, and broadcast communication in computer networks. Provide real-world examples for each.
15. Design an IP addressing scheme for a network that requires 4 subnets with at least 50 hosts each. Show calculations and explain your approach.
