VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. (CSE & AIML) V-Semester Main & Backlog Examinations, Jan./Feb.-2024

Computer Networks

Time: **3 hours**   Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List hardware requirements for building a simple Network.	2	1	1	1
2.	In a fully connected mesh network with six computers, what is the total number of cables required?	2	2	1	1,2
3.	Differentiate between TCP and UDP protocol?	2	1	2	1,2
4.	Write short notes on CSMA/CD?	2	2	2	1
5.	Explain the fundamental operation of the Dynamic Host Configuration Protocol (DHCP) in a computer network.	2	2	3	1,2
6.	Define a subnet mask? What is the mask applied for classes A,B, and C?	2	1	3	1,2
7.	What are the key features of TCP that make it suitable for reliable transfer?	2	1	4	1
8.	List elements of TCP protocol.	2	1	4	1
9.	Write short notes on FTP and specify the port numbers used for data connections and control connections.	2	1	5	1
10.	Describe the significance and classification of top-level domains (TLDs) in the Domain Name System.	2	2	5	1,2

Part-B (5 × 8 = 40 Marks)

11. a)	Explain the ISO OSI model with a neat block diagram? State the similarities and differences between OSI and TCP/IP?	5	2	1	1,2
b)	Discuss the key design issues and considerations in the design of the data link layer in a computer network. Provide examples of protocols or techniques that address these design issues,	3	2	1	1,2
12. a)	A bit stream of 1001000 is transmitted from source to destination. Apply the CRC error detection method using the polynomial number X3 + 1 as a divisor. 1. What is the actual bit stream transmitted after applying CRC? 2. Apply the same divisor and detect errors at the destination end.	4	3	2	1,2

b)	Explain the roles and functions of key internetworking devices such as routers, switches, and hubs in a computer network. Provide examples of scenarios where each device is most appropriately used.	4	2	2	1

13. a) Consider a network with 6 routers R1 to R6 connected with links having weights as shown in the following diagram | 4 | 3 | 3 | 1 |

i. All the routers use the distance vector-based routing algorithm to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbour with the weight of the respective connecting link.

After all the routing tables stabilize, how many links in the network will never be used for carrying any data

ii. Suppose the weights of all unused links in the previous question are changed to 2 and the distance vector algorithm is used again until all routing tables stabilize. How many links will now remain unused?

b)	Compare and contrast IPv4 header with IPv6 header?	4	2	3	1,2,3
14. a)	Discuss applications of UDP protocol and elaborate why UDP is designed as an unreliable protocol?	4	3	4	1,2
b)	Explain the three-way handshake process in the Transmission Control Protocol (TCP). Provide a step-by-step description of the sequence of messages exchanged between a client and a server during the establishment of a TCP connection. Highlight the purpose of each step and the significance of the SYN and ACK flags.	4	3	4	1,2
15. a)	Explain the role and functioning of the Domain Name System (DNS) in computer networks. Highlight the key components of DNS, the process of domain name resolution, and the significance of DNS in enabling communication over the Internet.	4	3	5	1,2
b)	Write brief remarks about FTP SMTP TELNET	4	1	5	1,2,3

16.	a)	Compare and contrast different types of transmission media used in computer networks, including twisted pair cables, coaxial cables, and fiber optics. Discuss the advantages, disadvantages, and specific use cases for each type of transmission medium.	4	2	1	1,2
	b)	Explain the structure and components of an Ethernet frame. Discuss the purpose of each field and how they contribute to the reliable and efficient communication in Ethernet networks.	4	3	2	1,2
17.		Answer any *two* of the following:				
	a)	You are given the IP address 192.16.1.0/24. Subnet this address into eight subnets. Determine the Number of hosts in each subnet? Determine the New Subnet Mask? Calculate Subnet Ranges?	4	3	3	1
	b)	Examine the structure of the TCP header and identify and explain the significance of control bits. How do the fields contribute to the reliable and ordered delivery of data over a TCP connection?	4	3	1	1,2
	c)	In the context of DNS, explain the significance of the tuple in a DNS query. What role does each field play, and how do they contribute to the process of resolving domain names to IP addresses?	4	3	2	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	35%
iii)	Blooms Taxonomy Level – 3 & 4	45%

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