



**SOMAIYA**  
VIDYAVIHAR UNIVERSITY

4.12.2023(E)

Semester: July 2023 –October 2023		
Maximum Marks: 100	Examination: ESE Examination	Duration:3 Hrs.
Programme code: 01	Class: TY	Semester: V (SVU 2020)
Programme: B Tech in Computer Engineering		
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: Computer Engineering
Course Code: 116U01C502	Name of the Course: Computer Networks	
Instructions: 1)Draw neat diagrams 2) All questions are compulsory		
3) Assume suitable data wherever necessary		

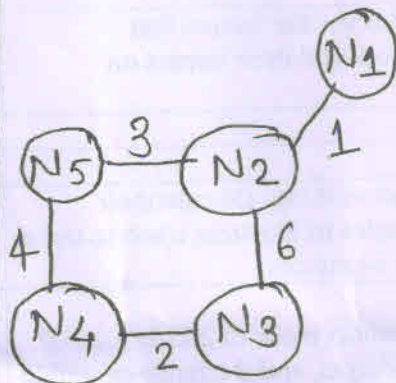
Que. No.	Question	Max. Marks
Q1	Solve any <b>Four</b>	<b>20</b>
i)	Discuss similarities and differences between OSI reference model and TCP/IP.	5
ii)	Distinguish between the processes of forwarding and routing.	5
iii)	Differentiate between TCP and UDP.	5
iv)	Explain any two ICMP commands with syntax and their use in troubleshooting and network management	5
v)	Discuss the advantages and disadvantages of using ALOHA for random access.	5
vi)	Describe the DNS (Domain Name System) resolution process. Highlight the role of DNS servers in this process.	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following	<b>10</b>
i)	Determine the CRC (Cyclic Redundancy Check) for the dataword 110110101 using the divisor 1011.	5
ii)	Consider the 4-bit dataword: 1011. Encode the given dataword using Hamming Code (7, 4). Show the steps involved in the encoding process.	5
	<b>OR</b>	
Q2 A	Discuss OSPF as unicast routing protocol. Also discuss the factors that influence the choice of routing protocol in a network and their impact on routing efficiency.	<b>10</b>
Q 2 B	Solve any <b>One</b>	<b>10</b>
i)	Differentiate between a router and a gateway in networking. Discuss their respective roles and functionalities. Provide examples to illustrate when to use a router and when a gateway is more appropriate in a network.	<b>10</b>
ii)	A. Explain different network classes. B. Given an IP address 192.168.1.25 with a subnet mask of 255.255.255.0, calculate the network address, broadcast address, and the range of usable IP addresses.	<b>5+5</b>

Que. No.	Question	Max. Marks
Q3	Solve any <b>Two</b>	<b>20</b>
i)	Discuss queuing disciplines in the context of TCP. Explore different queuing mechanisms used in routers or switches to manage and prioritize TCP traffic. Explain the impact of queuing disciplines on network performance.	<b>10</b>



ii)	<p>Design a Small Office Network Topology for the given scenario with routers, switches, and hosts.</p> <p>A. Use IP block 192.168.10.0/26 for the given network scenario.</p> <p>B. <u>Draw and explain</u> with diagram how the devices are interconnected.</p> <p>Imagine you are a network architect tasked with designing the network topology for a small office. The office has 30 employees distributed across four departments: Sales, Marketing, Finance, and IT. Each department has its own set of workstations, and there is a need for centralized internet access and communication between departments.</p> <p>Consider the following requirements:</p> <ol style="list-style-type: none"> <li>1. Each department should have a dedicated switch to connect all workstations within that department.</li> <li>2. All switches should be interconnected to a central router for internet access and communication between departments.</li> <li>3. The IT department requires a separate subnet and enhanced security measures due to the sensitive nature of their work.</li> <li>4. A file server is needed for centralized file storage, accessible by all departments.</li> </ol>	10
iii)	<p>Assume a Selective-Repeat Protocol is implemented in a network. The window size is 4, and frames are numbered from 0 to 15. Answer the following questions for the given problem instance. Support your answers in neat diagram(s).</p> <ol style="list-style-type: none"> <li>a. Frame 6<sup>th</sup> is lost during transmission. Determine the specific frames that need to be retransmitted due to the loss.</li> <li>b. If the sender has already received acknowledgments for frames 0 to 3 and 7 and 8, explain with a neat diagram, the specific frames that need to be retransmitted due to the loss.</li> </ol>	10

Que. No.	Question	Max. Marks
Q4	Solve any Two	20
i)	<p>Consider a network with routers and link costs. Apply the distance vector routing algorithm to compute the distance vectors for each router. Show the contents of final routing tables for all nodes.</p> 	10
ii)	Explain the concept of congestion control in TCP. Explain leaky bucket algorithm with a suitable diagram and example.	10
iii)	Explore the concept of Network Address Translation (NAT). Discuss the purpose of NAT in conserving public IP addresses and enabling private network communication. Provide examples to illustrate how NAT functions.	10

Que. No.	Question	Max. Marks
Q5	(Write notes / Short question type) on any <b>four</b>	<b>20</b>
i)	Write a short note on : Different types of Networks	5
ii)	Discuss the role of the Transport Layer in the OSI model	5
iii)	Discuss the key features and advantages of IPv6 over IPv4.	5
iv)	Explain the purpose of the CSMA/CD (Carrier Sense Multiple Access with Collision Detection) protocol. In what type of network is CSMA/CD most effective, and why?	5
v)	Explain the key concepts and functionalities of DVMRP (Distance Vector Multicast Routing Protocol) in the context of multicast routing	5
vi)	Write a short note on: HTTP Methods and Status Codes	5