

Semester: January 2025 –April 2025		
Maximum Marks: 100	Examination: ESE Examination	Duration:3 Hrs.
Programme code: 01		
Programme: B. Tech COMP	Class: TY	Semester: V (SVU 2020)
Institute/School/Department: K. J. Somaiya School of Engineering	Name of the department: COMP	
Course Code:16U01C502	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 Four	20
i)	Explain in detail how router do differentiate between unicast, multicast, and broadcast IP packets..	5
ii)	Explain functions and services provided by Presentation Layer in detail.	5
iii)	Compare Connection Oriented and Connection Less services.	5
iv)	Discuss Checksum calculation in TCP protocol.	5
v)	Explain IEEE 802.3 frame structure in detail with the help of neat diagram.	5
vi)	Differentiate between forwarding table and routing table.	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following	10
i)	Explain working of Go-Back-N ARQ with the help of neat diagram.	5
ii)	A slotted ALOHA channel has a n average 10% of the slots idle. a. What is the offered traffic G? b. What is the throughput? c. Is the channel overloaded or underloaded?	5
OR		
Q2 A	a. Explain the concept of Hamming Distance and Minimum Hamming Also, derive the relation between minimum Hamming distance and error detection/correction capability of a code. b. A 4-bit data 1011 is to be transmitted using Hamming Code (7,4) for single-bit error detection and correction . a. Encode the data using Hamming Code. b. Assume the 3rd bit (from the left) of the transmitted codeword is flipped due to noise. i. Identify the error using Hamming parity check. ii. Correct the error and retrieve the original data.	10 (4+6)
Q 2 B	Solve any One <i>for carrier sensing</i>	10
i)	Explain in detail different Persistence Methods with the help of neat diagrams.	10
ii)	Explain working of CSMA/CD protocol with the help of neat diagram.	10

Que. No.	Question	Max. Marks												
Q3	Solve any Two	20												
i)	<p>You are given a Class C IP block: 192.168.50.0/24 Your task is to subnet this address space using VLSM to fulfil the IP address requirements of the following departments:</p> <table><tr><th>Department</th><th>Number of Hosts Required</th></tr><tr><td>IT</td><td>60</td></tr><tr><td>HR</td><td>30</td></tr><tr><td>Admin</td><td>14</td></tr><tr><td>R&D</td><td>6</td></tr><tr><td>Security</td><td>2</td></tr></table> <p>a. Allocate subnets to each department using VLSM, minimizing IP wastage. For each subnet, specify:</p> <ul style="list-style-type: none">- Subnet address- Subnet mask (CIDR and dotted decimal)- First usable IP- Last usable IP- Broadcast address <p>b. How many IP addresses are left unused after the allocations?</p> <p>c. Also, determine IP address 192.168.50.100 belong to which department?</p>	Department	Number of Hosts Required	IT	60	HR	30	Admin	14	R&D	6	Security	2	10
Department	Number of Hosts Required													
IT	60													
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ii)	Explain how ARP works when the source and destination hosts are in different IP networks. Include the ARP Request and Response packet formats used in this process. Support your answer with a diagram.	10												
iii)	Explain the Distance Vector Routing Algorithm used in network layer routing. Discuss the Count-to-Infinity problem associated with it. Illustrate your explanation with a suitable example and describe at least one technique used to overcome this problem.	10												

Que. No.	Question	Max. Marks
Q4	Solve any Two	20
i)	Explain the TCP state transition diagram with respect to connection establishment and termination . Provide a labelled diagram of the TCP state transition.	10
ii)	<p>You are provided with the following UDP packet dump that shows the transmission between a client and a server. The packet capture includes the following details in hexadecimal format:</p> <pre>45 73 74 20 6d 65 73 73 61 67 65 00 00 00 00 00 00 00 00 00 00</pre> <p>Extract the following information from the provided UDP packet:</p> <ol style="list-style-type: none"> i. Source IP Address ii. Destination IP Address iii. Source Port iv. Destination Port v. UDP Checksum 	10

iii)	With TCP's slow start and AIMD (Additive Increase/Multiplicative Decrease) for congestion control, show how the window size will vary for a transmission where every 5th packet is lost. Assume an advertised window size of 50 MSS.	10
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Que. No.	Question	Max. Marks
Q5	Solve any four (Short notes / Short question type)	20
i)	Write a short note on DHCP.	5
ii)	Write a short note on IGMP.	5
iii)	Write a short note on TCP Three-way Handshake.	5
iv)	Compare HTTP and FTP	5
v)	IP is connectionless and best-effort. Justify the statement.	5
vi)	Write a short note on Telnet.	5