OR	iii.	Given the IP address 192.168.1.25/27, calculate the subnet address, broadcast address, and range of valid host addresses.	**8**	03	01 -07, 10 - 12	03	01 02 03
Q.4	i.	Identify the main design issues in network layer functionality.	**3**	02	01 -08 10, 12	02	01 02 03 04
	ii.	Explain the RSVP protocol and its role in integrated services for achieving QOS.	**7**	02	01 -08 10, 12	02	01 02 03 04
OR	iii.	Describe the Bellman-Ford algorithm and its applications in network routing.	**7**	02	01 -08 10, 12	02	01 02 03 04
Q.5	i.	List the steps involved in TCP connection management.	**4**	01	01 -05, 10	01	01 03 04
	ii.	Draw and explain the differences between UDP header format and TCP header format.	**6**	03	01 -07, 10 - 12	03	01 02 03
OR	iii.	What is the role of TCP timers in network reliability? Discuss congestion management.	**6**	03	01 -07, 10 - 12	03	01 02 03
Q.6		Attempt any two:					
	i.	Describe the FTP protocol and its role in file transfers.	**5**	02	01 -08 10, 12	02	01 02 03 04
	ii.	Discuss SSH and its application for secure communication over the internet.	**5**	02	01 -08 10, 12	02	01 02 03 04
	iii.	Discuss the architecture of email services, including SMTP and their roles.	**5**	02	01 -08 10, 12	02	01 02 03 04

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering/Science

End Sem Examination Dec 2024

CS3CO43 / BC3CO41 / BC3CO67 Computer Networks

Programme: B.Tech./B.Sc. Branch/Specialisation: CSE All

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

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**BL**	**PO**	**CO**	**PSO**
Q.1	i.	In Ethernet, which technique is used to manage retransmission after a collision has occurred, by doubling the waiting time for each consecutive collision? (a) Binary Exponential Back-off Algorithm (b) Limited Contention Protocol (c) Collision-Free Protocol (d) Slotted ALOHA	**1**	01	01 -05, 10	01	01 03 04
	ii.	Which of the following statements is true about Fast Ethernet compared to standard Ethernet? (a) Fast Ethernet has a maximum data transfer rate of 10 Mbps, similar to Ethernet (b) Fast Ethernet operates at 1 Gbps, ten times faster than standard Ethernet (c) Fast Ethernet provides a maximum data transfer rate of 100 Mbps, ten times faster than standard Ethernet (d) Fast Ethernet operates at the same speed as Gigabit Ethernet but uses different cabling	**1**	01	01 -05, 10	01	01 03 04
	iii.	Which of the following protocols supports the exchange of routing information within an Autonomous System (AS) in IP networks? (a) BGP (b) OSPF (c) DHCP (d) ARP	**1**	01	01 -05, 10	01	01 03 04

iv.	In CIDR (Classless Inter-Domain Routing), how is subnetting different from traditional class-based addressing? (a) CIDR restricts IP addresses to classes (A, B, and C) (b) CIDR allocates IP addresses only for private networks (c) CIDR allows flexible subnetting by using variable-length subnet masks, regardless of IP classes (d) CIDR assigns only public IP addresses to networks	**1**	02	01 -08 10, 12	02	01 03 04
v.	In the RSVP (Resource Reservation Protocol), what is the primary purpose of the protocol in a network? (a) To reserve resources along a network path to guarantee QoS for specific data flows (b) To dynamically assign IP addresses to hosts (c) To regulate the priority of packets in a queue (d) To route packets using the shortest path available	**1**	01	01 -05, 10	01	01 03 04
vi.	Which of the following QoS techniques ensures a minimum level of performance for specific network traffic by classifying and prioritizing data? (a) Integrated Services (b) Differentiated Services (c) RSVP (d) Traffic Policing	**1**	01	01 -05, 10	01	01 03 04
vii.	In TCP, which field in the header is used for flow control to prevent the sender from overwhelming the receiver? (a) Sequence Number (b) Acknowledgment Number (c) Window Size (d) Checksum	**1**	01	01 -05, 10	01	01 03 04
viii.	Which transport layer protocol is most suitable for applications requiring low latency and can tolerate some packet loss, such as VoIP or online gaming? (a) TCP (b) UDP (c) RTP (d) SCTP	**1**	01	01 -05, 10	01	01 03 04

ix.	In the context of the World Wide Web, what does a URL specify? (a) A server's IP address (b) The address and location of a specific resource on the internet (c) A user's email address (d) The network configuration settings for a website	**1**	02	01 -08 10, 12	02	01 02 03 04
x.	Which component of DNS stores information about domain names and their associated IP addresses? (a) Name Resolver (b) URL (c) Resource Record (d) DHCP	**1**	01	01 -05, 10	01	01 03 04
Q.2	i.	Define static and dynamic channel allocation in LANs with example.	**2**	01	01 -05, 10	01	01 03 04
	ii.	Compare CSMA/CA and CSMA/CD protocols with examples.	**3**	04	01 -07 09 -12	04	01 02 03 04
	iii.	Explain what the binary exponential back-off algorithm is and analyse how it impacts Ethernet performance.	**5**	04	01 -07 09 -12	04	01 02 03 04
OR	iv.	Differentiate between Fast Ethernet and Gigabit Ethernet in terms of speed, usage, and cabling.	**5**	04	01 -07 09 -12	04	
Q.3	i.	Identify the main functions of tunnelling and fragmentation in networking.	**2**	02	01 -08 10, 12	02	01 02 03 04
	ii.	Discuss the packet format of BOOTP and DHCP, with a particular focus on the mechanisms for address allocation used in each protocol.	**8**	03	01 -07, 10 - 12	03	01 02 03

Marking Scheme
CS3CO43 (T) Computer Networks (T)

Q.1 i) In Ethernet, which technique is used to manage retransmission after a collision has occurred, by doubling the waiting time for each consecutive collision? **1**

A. Binary Exponential Back-off Algorithm

ii) Which of the following statements is true about Fast Ethernet compared to standard Ethernet? **1**

C. Fast Ethernet provides a maximum data transfer rate of 100 Mbps, ten times faster than standard Ethernet.

iii) Which of the following protocols supports the exchange of routing information within an Autonomous System (AS) in IP networks? **1**

B. OSPF

iv) In CIDR (Classless Inter-Domain Routing), how is subnetting different from traditional class-based addressing? **1**

C. CIDR allows flexible subnetting by using variable-length subnet masks, regardless of IP classes.

v) In the RSVP (Resource Reservation Protocol), what is the primary purpose of the protocol in a network? **1**

A. To reserve resources along a network path to guarantee QoS for specific data flows.

vi) Which of the following QoS techniques ensures a minimum level of performance for specific network traffic by classifying and prioritizing data? **1**

B. Differentiated Services

vii) In TCP, which field in the header is used for flow control to prevent the sender from overwhelming the receiver? **1**

C. Window Size

viii) Which transport layer protocol is most suitable for applications requiring low latency and can tolerate some packet loss, such as VoIP or online gaming? **1**

B. UDP

ix) In the context of the World Wide Web, what does a URL specify? **1**

B. The address and location of a specific resource on the internet

x) Which component of DNS stores information about domain names and their associated IP addresses? **1**

C. Resource Record

Q.2 i. Define static and dynamic channel allocation in LANs with example. **2**

Definition of Static channel allocation and example: 1 mark
Definition of Dynamic channel allocation and example: 1 mark

ii. Compare CSMA/CA and CSMA/CD protocols with examples. **3**

Compare on basis of their mechanism, Collision Handling, usage, efficiency, response to collision, example. ½ mark each

iii. Explain what the binary exponential back-off algorithm is and analyse how it impacts Ethernet performance. **5**

Explanation of binary exponential back-off algorithm: 3 marks
Its role in ethernet performance: 2 marks

OR iv. Differentiate between Fast Ethernet and Gigabit Ethernet in terms of speed, usage, and cabling. **5**

5 differences 1 mark each

Q.3 i. Identify the main functions of tunnelling and fragmentation in networking. **2**

Tunnelling 1 mark
Fragmentation 1 mark

ii. Discuss the packet format of BOOTP and DHCP, with a particular focus on the mechanisms for address allocation used in each **8**

protocol.

BOOTP format and address allocation 4 marks

DHCP format and address allocation 4 marks

OR iii. Given the IP address 192.168.1.25/27, calculate the no of subnets, no of host/subnet, subnet addresses, broadcast addresses, and range of valid host addresses. **8**

No of subnets 2^3=8 1 mark

No of Hosts/Subnet 2^5-2=30 1 mark

Subnet addresses -192.168.1.0 1.5 marks

Broadcast addresses -192.168.1.31 1.5 marks

Valid host addresses 3 marks

No of subnets 2^3=8

No of Hosts/Subnet 2^5-2=30

Subnet addresses -192.168.1.0

Broadcast addresses -192.168.1.31

Range=192.168.1.1-192.168.1.30& 31 also

Q.4 i. Identify and explain the main design issues in network layer functionality. **3**

At least 3 issues with description 3 marks

ii. Explain the RSVP protocol and its role in integrated services for achieving QOS. **7**

OR iii. Describe the Bellman-Ford algorithm and its applications in network routing with example. **7**

Bellman ford Algorithm 3 marks

Bellman ford application 2.5 marks

Example 1.5 marks

Q.5 i. List the steps involved in TCP connection management. **4**

TCP connection Establishment 1.5 marks

TCP Data transfer 1 mark

TCP connection termination 1.5 marks

ii. Draw and explain the differences between UDP header format and TCP header format. **6**

UDP header format explanation 3 marks

TCP header format explanation 3 marks

OR iii. What is the role of TCP timers in network reliability. Discuss congestion management. **6**

TCP timers and its roles 3 marks

Congestion management 3 marks

Q.6 Attempt any two:

i. Describe the FTP protocol and its role in file transfers. **5**

Discuss FTP architecture. 3 marks

File transfer mechanism of FTP 2 marks

ii. Discuss SSH in details and its application for secure communication over the internet. **5**

Definition of SSH 2.5 mark

Applications 2.5 mark

iii. Discuss the architecture of email services, including SMTP and their roles. **5**

4 scenarios of SMTP 4 marks

Role of SMTP in email 1 mark

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