VASAVI COLLEGE OF ENGINEERING (Autonomous) IBRAHIMBAGH, HYDERABAD-500031

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Name of the Course: **Computer Networks**

ASSIGNMENT - 1

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| Name of the Faculty: **Dr M Jithender Reddy** | Date of Submission: **018-12-23** |
| Class : **B.E.** Section: **A** Sem: **V**  Academic Year: **2023-24** | Time: **10.40 AM** -**11.40 AM** |

Set-I (1602-21-733-005,012,013,020,026,029,032,036,037,063)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | Discuss the challenges and strategies for implementing Quality of Service (QoS) in IPv6 networks. How does IPv6 handle QoS compared to IPv4, and what adjustments are needed to prioritize traffic effectively?  Design an IPv6 addressing plan for a large multinational corporation with multiple branches and a remote workforce. Consider factors such as hierarchical addressing, route aggregation, and ease of management. | 3 | 3 | 3 | 1,2,  3 |

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| 2 | Explain the concept of AIMD (Additive Increase, Multiplicative Decrease) in TCP congestion control. How does it contribute to network stability and fairness? | 2 | 03 | 4 | 1,2,  3 |

SET-II (1602-21-733-001 to 004, 006,007,008)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
|  | Explore the concept of IPv6 multicast and its applications in modern networking. Provide examples of scenarios where IPv6 multicast is beneficial, and explain how it improves resource utilization and scalability. | 3 | 3 | 3 | 1,2,  3 |
|  | Examine the role of Explicit Congestion Notification (ECN) in TCP congestion control. How does ECN enhance the responsiveness of TCP to network congestion, and what challenges does it pose in real-world implementations? | **2** | **3** | 4 | **1,2,3** |

SET-III (1602-20-733-009 to 011, 014 to 017)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
|  | Given a network with an IPv4 address range of 192.168.10.0/24, design subnets to accommodate three departments with different requirements: Department A (50 hosts), Department B (25 hosts), and Department C (10 hosts). Optimize the subnetting to conserve address space. Provide the network addresses and subnet masks for each department. | 3 | 3 | 3 | 1,2,  3 |
|  | Explore the implications of deploying TCP congestion control in large-scale data center networks. How do characteristics such as short-lived flows, incast congestion, and high-speed links impact the performance of traditional TCP algorithms in this context? | **2** | **3** | 4 | **1,2,3** |

SET-IV (1602-21-733-018,019,021 to 025)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
|  | Analyze the challenges associated with TCP congestion control in the context of high-speed networks. What adjustments or innovations are necessary to ensure the effectiveness of congestion control algorithms in networks with gigabit or terabit speeds? | 3 | 3 | 4 | 1,2,  3 |
|  | Explain Variable Length Subnet Masking (VLSM) and how it addresses the inefficiencies of fixed-size subnetting. Provide an example of VLSM in action, demonstrating how it allows for more efficient use of IP address space. | 2 | 3 | 3 | 1,2,  3 |

SET-V (1602-21-733-027 to 028, 030,031, 033 to 035)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
|  | Explain the concept of Fast Recovery in TCP congestion control. How does it work, and what advantages does it offer in terms of reducing the impact of packet loss on network throughput? | 3 | 3 | 4 | 1,2,  3 |
|  | Given a network with the address range 10.0.0.0/8, design subnets to accommodate a mix of large, medium, and small-sized networks. Address security concerns by implementing proper subnetting strategies. Provide examples of network addresses and subnet masks for each category. | **2** | 3 | 3 | 1,2,  3 |

**SET-VI (1602-21-**733**-038 to 044)**

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | You are tasked with subnetting a Class B network (172.16.0.0) into multiple subnets to support various departments in a large organization. Each department has different size requirements. Develop a subnetting plan that optimally allocates IP addresses while minimizing waste. Include the subnet masks for each department. | 3 | 3 | 3 | 1,2,  3 |
| 2 | Discuss the challenges and considerations involved in subnetting a network that spans multiple geographical locations. How can Variable Length Subnet Masking be employed to accommodate different requirements in each location? | 2 | 3 | 3 | 1,2,  3 |

SET-VII (1602-21-733-046 to 049 051, 052 to 054)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | Examine the implications of IPv6 on network security. How does the removal of Network Address Translation (NAT) in IPv6 impact security practices, and what measures should be implemented to secure IPv6 networks? | 2 | 3 | 3 | 1,2,  3 |
| **2** | Design a scalable and fault-tolerant DNS architecture for a large e-commerce platform with a global user base. Consider aspects such as load balancing, geographically distributed DNS servers, and the use of anycast to enhance performance and reliability. | 3 | 3 | 5 | 1,2,  3 |

**SET-VIII (1602-21-733-055 to 061)**

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | Compare and contrast the auto-configuration mechanisms in IPv6, such as Stateless Address Autoconfiguration (SLAAC) and DHCPv6. Evaluate their strengths and weaknesses in different network scenarios. | 3 | 3 | 3 | 1,2,  3 |
| 2 | Discuss the impact of DNS over HTTPS (DoH) and DNS over TLS (DoT) on privacy and security. How do these protocols enhance the confidentiality of DNS queries, and what considerations should network administrators | 2 | 3 | 5 | 1,2,  3 |

SET-IX (1602-21-733-062, 064 to 067, 135, 136)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | Explain the benefits and challenges of transitioning from IPv4 to IPv6 on a global scale. Consider factors such as address space exhaustion, security enhancements, and the coexistence of IPv4 and IPv6. | 2 | 3 | 3 | 1,2,  3 |
| 2 | Explain the concept of DNSSEC (DNS Security Extensions) and its significance in securing the DNS infrastructure. How does DNSSEC prevent various types of attacks, and what challenges does it introduce in terms of key management and DNS zone signing? | 3 | 3 | 5 | 1,2,  3 |

SET-X (1602-21-733-301 to 307)

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| **Q.No.** | **Description of the Question** | **Mar ks** | **BTL**  **(1/2/3/ 4/5/6)** | **Mapped** | |
| **CO** | **PO** |
| 1 | Discuss the role of IPv6 in the Internet of Things (IoT) era. How does the larger address space of IPv6 contribute to the scalability and growth of IoT networks? What security considerations should be taken into account in IPv6-enabled IoT environments? | 3 | 3 | 3 | 1,2,  3 |
| 2 | Examine the security challenges associated with the Domain Name System. How do issues like DNS spoofing, cache poisoning, and DDoS attacks impact the integrity and availability of DNS services? What strategies and technologies can be employed to mitigate these security risks? | 2 | 3 | 5 | 1,2,  3 |