**SIMATS ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**CHENNAI-602105**

**ASSIGNMENT - 3**

**CSA0735 - COMPUTER NETWORKS**

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| **S.No.** | **Register Number** | **Name** | **Questions** |
| 1 | 192524212 | ADUSURU HARSHA VARDHAN | **Scenario**: An ISP designs a packet-switched backbone with traffic prioritization and resilience in mind.  **Parameters**:   * Datagram switching * Delay calculation * Routing protocol behavior   **Questions**:   1. If 4 routers each add 3 ms delay, what is the total end-to-end delay? 2. Compare convergence times: RIP vs OSPF over a 5-router path. 3. If a 1000-byte packet experiences a 10% packet loss rate, how many retransmissions are needed for 100 packets? |
| 2 | 192511137 | ARSHIYA A | **Scenario**: A multinational bank rolls out dual-stack IPv4/IPv6 for secure inter-branch communication.  **Parameters**:   * Subnetting IPv4 * IPv6 prefix calculations * Dual-stack deployment   **Questions**:   1. If a /48 IPv6 prefix is provided, how many /64 subnets are possible? 2. Design a subnetting plan for 8 branches with 200 hosts each. 3. In dual-stack, how many entries in routing tables if there are 10 branches? |
| 3 | 192571057 | B S JAYANISANTH | **Scenario**: A CDN uses BGP to connect with multiple ISPs for low-latency content delivery.  **Parameters**:   * BGP policy routing * AS-PATH and MED * Convergence time   **Questions**:   1. If two BGP paths have the same AS-PATH, which one is preferred when MEDs differ (e.g., 10 vs 50)? 2. If a route traverses 3 AS hops with 5 ms each, what’s the latency? 3. If 3 BGP peers advertise the same prefix, how many routes are received and how is one selected? |
| 4 | 192511160 | BANDREDDY MOKSHASREE | **Scenario**: A smart city streams traffic feeds from 100 intersections to a central server.  **Parameters**:   * PIM-SM vs PIM-DM * Multicast efficiency * Bandwidth calculation   **Questions**:   1. If 100 intersections send 2 Mbps each, calculate total bandwidth saved using multicast vs unicast. 2. Compare total traffic in unicast vs multicast for 100 sources and 1 receiver. 3. If multicast uses 5% less bandwidth per stream, what’s the savings on 100 streams? |
| 5 | 192572085 | CHAKALI MANOJ | **Scenario**: A campus network uses Distance Vector routing across academic, admin, and research units.  **Parameters**:   * Count-to-infinity problem * Convergence delay * Update intervals   **Questions**:   1. If updates occur every 30s, what’s the worst-case convergence time in 3 hops? 2. If the count-to-infinity limit is 16 hops, how many iterations till convergence if 1 hop is added per 30s? 3. What’s the effect of split horizon on reducing routing loops in a 5-router network? |
| 6 | 192524260 | CHILLA PAVANI | **Scenario**: An e-commerce platform uses IPv4 subnetting for new hubs.  **Parameters**:   * Efficient block allocation * Fragmentation * Host usability   **Questions**:   1. From a /22 block, how many /25 subnets can be created? 2. If a /25 is used, how many usable hosts are available? 3. Subnet /22 into 6 subnets with 200+ IPs each — is it feasible? |
| 7 | 192525115 | CHINNA THUMBALAM MOHAMMED UBED | **Scenario**: A news network sends 1500-byte packets over a 512-byte MTU satellite link.  **Parameters**:   * Fragmentation logic * MTU constraints * IP header overhead   **Questions**:   1. How many fragments are created for a 1500-byte packet with a 20-byte header? 2. What is the size of each fragment payload (excluding headers)? 3. How much overhead is added due to fragmentation (in bytes)? |
| 8 | 192511139 | DHANSHIKA R A | **Scenario**: A company assigns /64 subnets to 300 departments.  **Parameters**:   * IPv6 space * Total address count * Prefix division   **Questions**:   1. How many total addresses are in a /64 subnet? 2. For 300 departments, how many bits are fixed in the prefix if using a /48? 3. How many /64 subnets are in a /48 block? |
| 9 | 192521216 | DHARSHAN SRINATH S | **Scenario**: A board connects 100 schools each with 3 segments: lab, admin, guest.  **Parameters**:   * Subnet planning * IPv4 address allocation * VLSM   **Questions**:   1. How many total subnets are needed for 100 schools x 3 subnets each? 2. What’s the total IP requirement if each subnet needs 60 hosts? 3. What is the subnet mask for 60 hosts? |
| 10 | 192525228 | DUNNAPOTHULA NAGA BABU | **Scenario**: A robotics firm multicasts command/video streams to 20 robots.  **Parameters**:   * PIM deployment * Multicast efficiency * Bandwidth optimization   **Questions**:   1. If one stream is 1 Mbps and 20 robots receive it via multicast, how much total bandwidth is consumed? 2. What if unicast was used instead? Compare. 3. Calculate bandwidth saved in multicast over unicast. |
| 11 | 192511164 | FURTHOSE SAMREEN S | **Scenario**: A disaster response team uses IPv6 routers to connect 50 temporary field units.  **Parameters**:   * IPv6 addressing * Topology change handling * Convergence delay   **Questions**:   1. How many /64 addresses can be generated from a /48 IPv6 block? 2. If each router sends 3 LSAs and there are 50 routers, how many LSAs total? 3. If a topology change is detected every 15s, what’s the total updates in 5 minutes? |
| 12 | 192525082 | GANGAVARAPU ABHINAY REDDY | **Scenario**: A multinational uses BGP with multiple ISPs to ensure route redundancy.  **Parameters**:   * AS-PATH comparison * Loop prevention * Traffic selection   **Questions**:   1. If one path has AS-PATH 200 300 and another has 200 400 500, which will BGP prefer and why? 2. If route filtering removes 15 out of 40 prefixes, how many remain? 3. What is the minimum AS-PATH length for loop detection? |
| 13 | 192511093 | JANANI SRI R | **Scenario**: A game platform needs low-latency routing for players across 5 countries.  **Parameters**:   * IPv6 vs IPv4 delay * Fragmentation impact * Hop-wise delay   **Questions**:   1. If 4 hops add 12 ms each, what’s total delay? 2. What is the size of the smallest MTU supported by IPv6 to avoid fragmentation? 3. If 1% jitter per hop, what’s the max jitter over 6 hops? |
| 14 | 192524224 | K BHASHITHA | **Scenario**: 100 schools each need subnets for lab, staff, guest users.  **Parameters**:   * Address planning * Subnet mask sizing * Broadcast domain control   **Questions**:   1. If each subnet requires 60 IPs, what is the subnet mask needed? 2. How many subnets can be derived from a /16 block for 300 subnets? 3. What is the total number of addresses consumed? |
| 15 | 192511125 | K RITHIKA | **Scenario**: Robots receive control streams using multicast.  **Parameters**:   * Multicast vs unicast * Bandwidth usage * Group synchronization   **Questions**:   1. One 1 Mbps stream is sent to 20 robots via multicast — what is the total network usage? 2. What is the bandwidth if sent via unicast? 3. How much bandwidth is saved? |
| 16 | 192512093 | KAMALI S I | **Scenario**: A telecom company supports IPv4 and IPv6 using dual-stack routers.  **Parameters**:   * Routing table entries * NAT elimination * Address separation   **Questions**:   1. If 100 IPv4 and 100 IPv6 subnets exist, how many routing entries are needed? 2. How does IPv6 eliminate the need for NAT — explain using address math? 3. What is the prefix length for a /64 IPv6 block? |
| 17 | 192525075 | KOTHAKOTA RAKESH | **Scenario**: A retail chain needs connectivity across 50 outlets with low routing overhead.  **Parameters**:   * RIP vs OSPF * Hop limit * Protocol comparison   **Questions**:   1. If a branch is 17 hops away, and RIP supports 15, will the route be reachable? 2. If OSPF converges in 2s per hop over 5 hops, what’s the total time? 3. Compare routing table sizes: RIP vs OSPF with 50 nodes. |
| 18 | 192524247 | KUNATI SAI LIKHITH | **Scenario**: A digital library connects legacy IPv4 and modern IPv6 LANs.  **Parameters**:   * NAT configuration * Address mapping * Router roles   **Questions**:   1. If 10 private IPs use 1 public IP with NAT, how many unique ports are needed? 2. How does IPv6 avoid this problem? 3. If one NAT device handles 100 connections, how many mappings are stored? |
| 19 | 192524071 | LATISHA S | **Scenario**: BGP is used to connect different regions in a financial company.  **Parameters**:   * BGP filters * Prefix control * Route propagation   **Questions**:   1. If 20 prefixes are advertised and 10 accepted, how many are filtered? 2. What is the impact on route table size if route summarization is enabled? 3. How does MED affect path selection between two same-length AS-PATHs? |
| 20 | 192565040 | LOGESHWARI S | **Scenario**: IoT devices with IPv4 communicate with IPv6 controllers.  **Parameters**:   * NAT64 * DS-Lite * Prefix delegation   **Questions**:   1. If 60 IPv4 devices send 128 bytes/sec, what’s the total incoming bandwidth? 2. How many addresses are needed for dual-stack configuration? 3. If each device needs 1 NAT mapping, how many mappings are needed? |
| 21 | 192521170 | LOKESH KUMAR V | **Scenario**: A smart campus segregates networks for labs, sensors, and classrooms.  **Parameters**:   * Subnetting * Broadcast control * Address planning   **Questions**:   1. Subnet a /20 block into 8 subnets. What is the subnet mask? 2. If each subnet needs 500 hosts, what prefix is required? 3. How many total hosts are supported by /20? |
| 22 | 192525107 | M HEMANTH KUMAR | **Scenario**: Smart homes use IPv6 and SLAAC for configuration.  **Parameters**:   * Address auto-configuration * Link-local use * Security concerns   **Questions**:   1. If 5000 homes get /64 subnets, how many bits are left for the prefix in /48? 2. How many total devices can connect in one /64 subnet? 3. If one device per home connects, how many addresses used? |
| 23 | 192511178 | MOHAMED SYED THOWFIQ S | **Scenario**: Real-time train updates are multicast to 5 control centers.  **Parameters**:   * Stream duplication * PIM-SM efficiency * Bandwidth   **Questions**:   1. If 50 trains each send 1 Mbps, what’s bandwidth with unicast? 2. What’s the bandwidth with multicast? 3. How much is saved? |
| 24 | 192521220 | MOHAMMAD ALEYAS | **Scenario**: A video platform uses OSPF + IPv6 for node routing.  **Parameters**:   * Link State database * Anycast routing * OSPF overhead   **Questions**:   1. If 20 routers each store 500 links, how many total links? 2. What’s the impact on memory usage? 3. How does anycast reduce routing hops? |
| 25 | 192511188 | MOUNNILA S P | **Scenario**: A test platform operates in 30 cities using /48 IPv6 blocks.  **Parameters**:   * Address aggregation * Routing scale * Compatibility   **Questions**:   1. How many /64 subnets are available in each /48? 2. What’s the total IPv6 addresses in a /48? 3. How does hierarchical addressing reduce BGP entries? |
| 26 | 192525059 | MUSTURI BALAJI | **Scenario**: A university uses OSPF to route between buildings.  **Parameters**:   * LSAs * Area 0 backbone * Route recalculation   **Questions**:   1. If 6 routers each send 10 LSAs, how many total? 2. What happens if a link fails between 2 routers? 3. How does area configuration reduce updates? |
| 27 | 192572086 | NITYA PRIYA P M | **Scenario**: BGP protects financial routing paths using filtering and dampening.  **Parameters**:   * Prefix control * Flap dampening * Policy enforcement   **Questions**:   1. If 60 updates/min are sent and 10% are flaps, how many flaps in 5 mins? 2. How many prefixes must be filtered to keep only 25 from 50? 3. What is the flap penalty threshold? |
| 28 | 192524244 | NUHA FATHIMA H | **Scenario**: A transport firm assigns IPs to bus terminals using subnetting.  **Parameters**:   * Redundancy * Address allocation * Static vs dynamic routing   **Questions**:   1. What subnet mask is needed for 125 IPs? 2. How many /25 subnets are in a /22? 3. How does OSPF find shortest path from 5 terminals? |
| 29 | 192524072 | PRASHANTH G | **Scenario**: One lab sends data to 10 institutions via multicast.  **Parameters**:   * Rendezvous Point * PIM * Bandwidth   **Questions**:   1. If 5 Mbps stream is sent, how much total traffic is used? 2. Compare with unicast to 10 destinations. 3. How many routes are needed in multicast? |
| 30 | 192525231 | PRATTIPATI HASINI | **Scenario**: A government uses /48 prefixes for agencies.  **Parameters**:   * Hierarchical addressing * Interface ID * Router compatibility   **Questions**:   1. How many /64s in a /48? 2. What portion of IPv6 is the interface ID? 3. How many addresses in one /64? |
| 31 | 192524267 | RIFA FATHIMA S | **Scenario**: A multinational video conferencing company uses IPv6 with BGP to ensure low latency and Quality of Service (QoS) across continents.  **Parameters**:   * BGP route tuning * IPv6 endpoint scaling * Bandwidth estimation   **Questions**:   1. If each video session requires 1.5 Mbps and 10,000 users are connected, what is the total required bandwidth? 2. How can LOCAL\_PREF and AS-PATH influence route selection in BGP for low latency? 3. If IPv6 allows /64 per user, how many addresses are assigned in 10,000 sessions? |
| 32 | 192511104 | S LEKHA | **Scenario**: An education network deploys IPv6 while supporting IPv4 legacy apps using tunneling and dual-stack.  **Parameters**:   * Dual-stack vs tunneling * Address transition * Subnet delegation   **Questions**:   1. Compare address space availability between dual-stack and NAT64 configurations. 2. If 50 schools receive /60 prefixes, how many /64s per school? 3. How many IPv6 addresses are in one /60 block? |
| 33 | 192525222 | SAKA CHANDRA SIDDHARDHA | **Scenario**: A cloud provider interconnects data centers using OSPF and minimizes routing table entries using summarization.  **Parameters**:   * OSPF convergence * Summarization * Routing table optimization   **Questions**:   1. If 16 /24 networks are summarized into a /20, how many routes are saved? 2. What is the total number of IPs in a /20 subnet? 3. How does OSPF cost metric influence route selection between two 1 Gbps links? |
| 34 | 192511172 | SAMRAKSHINI G | **Scenario**: A government exam board connects 1,000 centers using IP hierarchy and secure routing.  **Parameters**:   * VLSM planning * Route authentication * IP aggregation   **Questions**:   1. If 800 centers need 64 IPs and 200 need 32 IPs, what is the total address space required? 2. How does OSPF MD5 authentication prevent route injection? 3. How many /26 and /27 blocks are needed for the above requirement? |
| 35 | 192521169 | SARATH B | **Scenario**: An AI institute connects branches using MPLS and inter-domain BGP with routing policy enforcement.  **Parameters**:   * MPLS core * BGP route filtering * Policy compliance   **Questions**:   1. If 30 prefixes are received and only 20 are accepted due to filtering, how many are dropped? 2. How do BGP communities tag routes for AI workload prioritization? 3. How does MPLS reduce latency compared to traditional IP routing? |
| 36 | 192521204 | SHAROON STONE M | **Scenario**: A social media platform uses IPv6 hierarchical addressing and BGP tuning for global data flow.  **Parameters**:   * IPv6 prefix summarization * BGP attributes * Global routing optimization   **Questions**:   1. If 10 sites each advertise 256 /64s, but summarize them as one /60, how many prefixes are reduced? 2. How does changing LOCAL\_PREF help prioritize faster routes? 3. How many IPv6 addresses are in a /60 block? |
| 37 | 192572096 | SHRAAVANI N | **Scenario**: A surveillance company streams video to 40 city monitors using IP multicast.  **Parameters**:   * PIM-SM scaling * Source-Specific Multicast * Bandwidth savings   **Questions**:   1. If each stream is 8 Mbps and 40 sites receive it via multicast, what’s the bandwidth at the source? 2. Compare this with the bandwidth needed in unicast. 3. What is the benefit of using Source-Specific Multicast (SSM) in this case? |
| 38 | 192525060 | SYED ARSHAD | **Scenario**: A game provider uses BGP and IP anycast to dynamically route players to nearest servers.  **Parameters**:   * AS-PATH control * IP geolocation * Load distribution   **Questions**:   1. If three servers advertise the same prefix, and one has the shortest AS-PATH, which will be chosen? 2. How does anycast minimize latency? 3. If each server supports 5000 connections, how many are supported globally with 4 servers? |
| 39 | 192572091 | TALARI VISHNUVARDHAN | **Scenario**: A research university interconnects campuses with OSPFv3 for IPv6.  **Parameters**:   * OSPFv3 multi-area * Loop prevention * ABR calculation   **Questions**:   1. If Area 0 connects to 4 other areas, what’s the minimum number of ABRs needed? 2. How many LSAs are generated if each router sends 5 LSAs and 20 routers exist? 3. How does OSPFv3 prevent loops compared to RIPng? |
| 40 | 192524236 | THANUSHREE P | **Scenario**: A national smart grid system uses IPv6-enabled devices for meter communication.  **Parameters**:   * IPv6 device addressing * SLAAC auto-config * Prefix assignment   **Questions**:   1. If each meter gets a /64 block and there are 1 million meters, how many /64s are needed? 2. How does SLAAC reduce manual configuration in large networks? 3. What is the total address space used in bits for 1 million /64 subnets? |