**SIMATS ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**CHENNAI-602105**

**ASSIGNMENT - 2**

**CSA07 - COMPUTER NETWORKS**

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| **S.No.** | **Register Number** | **Name** | **Questions** |
| 1 | 192524212 | ADUSURU HARSHA VARDHAN | Scenario: A national bank has set up a network to sync transaction data between branches. Occasionally, customers report mismatches in balance updates due to transmission errors.Questions:Which error detection technique (CRC, checksum, or parity) would be most reliable in this scenario?How can Hamming Code be applied to correct detected errors in the banking application? |
| 2 | 192511137 | ARSHIYA A | **Scenario**: A hospital installs a wireless LAN to monitor patient vitals in the ICU. Real-time data must be transmitted with high reliability and minimal delay.  **Questions**: Why is retransmission not suitable in such a real-time monitoring network?Suggest an appropriate error control technique to maintain patient data integrity. |
| 3 | 192571057 | B S JAYANISANTH | **Scenario**: A manufacturing plant uses robotic systems that must receive continuous and timely commands over Ethernet.  **Questions**: Compare Stop-and-Wait and Sliding Window protocols for real-time robotic communication.What role does flow control play in preventing data congestion in this environment? |
| 4 | 192511160 | BANDREDDY MOKSHASREE | **Scenario**: A smart home integrates lights, fans, and cameras connected wirelessly. Multiple devices attempt to send signals simultaneously.  **Questions**:   1. Which multiple access method (TDMA, FDMA, or CSMA/CA) is most effective here and why? 2. How does CSMA/CA handle collisions in such a dense device environment? |
| 5 | 192572085 | CHAKALI MANOJ | **Scenario**: A company has departments like HR, Finance, and Development operating on the same physical network. They need traffic isolation and better security.  **Questions**:   1. How can VLANs improve network segmentation in this office setup? 2. What risks may arise without VLAN implementation in multi-department environments? |
| 6 | 192524260 | CHILLA PAVANI | **Scenario**: A university connects departments and libraries using a shared backbone. Redundancy and high-speed communication are priorities.  **Questions**:   1. What is the role of Spanning Tree Protocol (STP) in avoiding network loops? 2. Should the backbone use store-and-forward or cut-through switching? Why? |
| 7 | 192525115 | CHINNA THUMBALAM MOHAMMED UBED | **Scenario**: A logistics company uses Bluetooth-enabled devices to scan and track inventory in real-time.  **Questions**:   1. What are the limitations of Bluetooth for real-time, large-scale tracking? 2. Compare Bluetooth and Wi-Fi for reliability and range in warehouse environments. |
| 8 | 192511139 | DHANSHIKA R A | **Scenario**: A streaming company uses MPLS to prioritize live events over on-demand content in their backbone.  **Questions**:   1. How does MPLS help differentiate traffic types and maintain QoS? 2. What happens if labels are misconfigured in an MPLS network? |
| 9 | 192521216 | DHARSHAN SRINATH S | **Scenario**: A school implements Wi-Fi 6 to support hundreds of students connecting simultaneously during digital classes.  **Questions**:   1. What features of Wi-Fi 6 (802.11ax) help in dense user environments? 2. How does OFDMA enhance performance in classroom applications? |
| 10 | 192525228 | DUNNAPOTHULA NAGA BABU | **Scenario**: A network of hospitals shares patient records over a secure virtual circuit-based WAN to ensure consistency and confidentiality.  **Questions**:   1. How does a virtual circuit ensure reliable end-to-end communication? 2. Why is Frame Relay or ATM still considered in healthcare data transfer? |
| 11 | 192511164 | FURTHOSE SAMREEN S | **Scenario**: A live stock trading platform experiences small data losses due to link errors, which causes delays in order processing and user dissatisfaction.  **Questions**:   1. Why is immediate error detection crucial in financial systems? 2. Would CRC or FEC be more appropriate in this case? Justify. |
| 12 | 192525082 | GANGAVARAPU ABHINAY REDDY | **Scenario**: An online gaming server must handle thousands of concurrent player actions with minimal lag and error.  **Questions**:   1. How does ARQ (Automatic Repeat Request) impact delay in such a system? 2. Propose a suitable data link control protocol for this setup. |
| 13 | 192511093 | JANANI SRI R | **Scenario**: An airport terminal provides wireless internet to passengers, but interference from many devices causes access issues.  **Questions**:   1. How can CSMA/CA and RTS/CTS mechanisms resolve contention? 2. Why is collision avoidance more suitable than collision detection here? |
| 14 | 192524224 | K BHASHITHA | **Scenario**: A data center hosts different client servers and wants to ensure that one client’s traffic doesn’t affect another’s.  **Questions**:   1. How can VLANs be used to isolate traffic between tenants? 2. What risks arise if inter-VLAN routing is poorly configured? |
| 15 | 192511125 | K RITHIKA | **Scenario**: A smart city uses a hybrid network (fiber + wireless) for real-time CCTV monitoring across all intersections.  **Questions**:   1. What error detection methods ensure consistent video quality? 2. Compare reliability of wired vs wireless media for real-time streaming. |
| 16 | 192512093 | KAMALI S I | **Scenario**: A research campus backbone must connect labs with zero downtime during data-intensive simulations.  **Questions**:   1. How does STP help with loop prevention and redundancy? 2. Recommend a suitable switching method for high availability. |
| 17 | 192525075 | KOTHAKOTA RAKESH | **Scenario**: Smartwatches and insulin pumps in a hospital use Bluetooth to transmit health data to monitoring stations.  **Questions**:   1. What are the range and interference limitations of Bluetooth in a hospital? 2. How does frequency hopping improve communication reliability? |
| 18 | 192524247 | KUNATI SAI LIKHITH | **Scenario**: A national bank uses MPLS VPNs to isolate and secure branch traffic across the WAN.  **Questions**:   1. How does MPLS VPN ensure traffic segregation between branches? 2. Explain the role of VRF in such a setup. |
| 19 | 192524071 | LATISHA S | **Scenario**: A smart factory implements Wi-Fi 6 to support hundreds of IoT devices like sensors and robots.  **Questions**:   1. How do OFDMA and BSS coloring help reduce interference? 2. Why is latency reduction vital in factory automation? |
| 20 | 192565040 | LOGESHWARI S | **Scenario**: A broadcasting company uses ATM networks to deliver video signals with fixed latency.  **Questions**:   1. How does ATM's fixed-size cell format benefit streaming? 2. Compare ATM to Frame Relay for video performance. |
| 21 | 192521170 | LOKESH KUMAR V | **Scenario**: A school wants to isolate student traffic between Computer Lab, Robotics Lab, and Library.  **Questions**:   1. How do VLANs help in managing and securing such segmented traffic? 2. What additional configuration is needed to enable inter-VLAN communication? |
| 22 | 192525107 | M HEMANTH KUMAR | **Scenario**: A city traffic light control system transmits real-time signals via 4G WAN.  **Questions**:   1. How can FEC ensure consistency in real-time transmission? 2. Suggest an access control mechanism to reduce data collision. |
| 23 | 192511178 | MOHAMED SYED THOWFIQ S | **Scenario**: A government uses MPLS to transmit biometric and personal data securely across the country.  **Questions**:   1. How does MPLS provide security and traffic control in such sensitive systems? 2. What role does VRF play in logical separation of services? |
| 24 | 192521220 | MOHAMMAD ALEYAS | **Scenario**: A power utility company uses Frame Relay to connect control centers and power substations.  **Questions**:   1. How do virtual circuits in Frame Relay support consistent data flow? 2. Explain the significance of DLCIs in this system. |
| 25 | 192511188 | MOUNNILA S P | **Scenario**: Residents complain of slow Wi-Fi due to overlapping signals from nearby flats.  **Questions**:   1. How can Wi-Fi 6 features like BSS Coloring reduce interference? 2. Suggest channel planning techniques for minimizing overlap. |
| 26 | 192525059 | MUSTURI BALAJI | **Scenario**: Hospitals share medical records over a WAN using virtual circuit networks.  **Questions**:   1. What are the benefits of a connection-oriented virtual circuit over datagram services? 2. How does error control differ in a virtual circuit model? |
| 27 | 192572086 | NITYA PRIYA P M | **Scenario**: A shopping mall uses Bluetooth beacons for guiding visitors via a mobile app.  **Questions**:   1. What access method should be used to avoid collisions in Bluetooth beacons? 2. Explain how data integrity is maintained in such a system. |
| 28 | 192524244 | NUHA FATHIMA H | **Scenario**: Aircraft use wireless data links for cockpit-to-ground communication.  **Questions**:   1. Why is proactive error correction necessary over ARQ in flight systems? 2. Suggest an error correction scheme that balances speed and reliability. |
| 29 | 192524072 | PRASHANTH G | **Scenario**: Media studios need real-time full-HD video transfers over LAN during editing.  **Questions**:   1. How does full-duplex Ethernet reduce collision and increase throughput? 2. What cable types are best suited for this setup? |
| 30 | 192525231 | PRATTIPATI HASINI | **Scenario**: Students appear for online tests in large halls using Wi-Fi access.  **Questions**:   1. What MAC-layer access method prevents collision during mass login? 2. How does Wi-Fi 6 improve speed and stability under load? |
| 31 | 192524267 | RIFA FATHIMA S | **Scenario**: Attackers are spoofing MAC addresses to bypass Wi-Fi restrictions in a café.  **Questions**:   1. What link-layer security measures can prevent MAC spoofing? 2. How can port security be used to enhance control? |
| 32 | 192511104 | S LEKHA | **Scenario**: A data center LAN connects servers and switches with 10 Gbps links.  **Questions**:   1. Which switching method is best—store-and-forward or cut-through—for such speed? 2. How can bit error rate be minimized in this environment? |
| 33 | 192525222 | SAKA CHANDRA SIDDHARDHA | **Scenario**: Smartwatches use both Wi-Fi and Bluetooth, often facing interference.  **Questions**:   1. How can coexistence mechanisms avoid signal degradation between the two? 2. Compare performance in 2.4 GHz crowded bands. |
| 34 | 192511172 | SAMRAKSHINI G | **Scenario**: An old building uses token ring for local communication between devices.  **Questions**:   1. How does token passing ensure fair access in this system? 2. What are the drawbacks compared to Ethernet? |
| 35 | 192521169 | SARATH B | **Scenario**: A remote village uses sensors for water level monitoring transmitting data via LoRa and ALOHA.  **Questions**:   1. Why is slotted ALOHA better than pure ALOHA in this setup? 2. How is synchronization achieved in slotted transmission? |
| 36 | 192521204 | SHAROON STONE M | **Scenario**: A malicious actor floods a switch with fake MAC addresses.  **Questions**:   1. How does MAC flooding disrupt LAN operations? 2. What link-layer protections can prevent it? |
| 37 | 192572096 | SHRAAVANI N | **Scenario**: Researchers run real-time simulations that demand near-zero delay across compute nodes.  **Questions**:   1. Should cut-through or fragment-free switching be used? Why? 2. How does error detection affect simulation performance? |
| 38 | 192525060 | SYED ARSHAD | **Scenario**: A digital library supports hundreds of simultaneous e-book downloads over Wi-Fi.  **Questions**:   1. How does Wi-Fi 6 handle concurrent user demand better than Wi-Fi 5? 2. What link-layer strategies manage bandwidth per user? |
| 39 | 192572091 | TALARI VISHNUVARDHAN | **Scenario**: A company accesses its ERP hosted on a private cloud using MPLS.  **Questions**:   1. How does MPLS support application-level traffic prioritization? 2. Explain how MPLS reduces latency in long-distance traffic. |
| 40 | 192524236 | THANUSHREE P | **Scenario**: A university upgrades to IPv6 but retains its Ethernet infrastructure.  **Questions**:   1. What are the changes required at the link layer for IPv6 addressing? 2. How does NDP replace ARP in this setup? |