C **Reg. No. :** | | | | | | | | | | | | |

**Question Paper Code: R4411**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Fourth Semester

Electronics and Communication Engineering

R21UEC411- DATA COMMUNICATION AND NETWORKING PROTOCOLS

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Traffic Problem can be minimized using CO1- U

   (a)Mesh (b) Star (c) Bus (d) Ring

2. Pipelining is used in CO1- U

   (a) Stop and wait (b) Stop and wait ARQ (c) Go-Back-NARQ (d) None of the above

3. If prefix length is 28, then the number of addresses is CO1- U

   (a) 16 (b)8 (c) 32 (d)12

4. UDP packets have a fixed-size header of --------bytes. CO1- U

   (a) 16 (b) 8 (c) 40 (d) 16

5. In a URL, the__is the client-server program used to retrieve the document. CO1- U

   (a) Path (b) Protocol (c) Host (d) Link

PART – B (5 x 3= 15 Marks)

6. Compare and contrast OSI and TCP/IP model. CO1- U

7. What are the advantages of IPv6 over IPv4? CO1- U

8. An SNMP client residing on a host with IP address 122.45.12.7 sends a message to an SNMP server residing on a host with IP address 200.112.45.90. What is the pair of sockets used in this communication? CO2- App

9. What is the flow characteristics related to QoS? CO1- U

10. State advantages of stateless server of HTTP? CO1- U

PART – C (5 x 16= 80 Marks)

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| 11. | (a) | With neat diagram explain the functions of each layer in a TCP/IP reference model and compare it with ISI OSI model. | CO1- U | (16) |
| | | Or | | |
| | (b) | Write a short note on various types of transmission media, highlighting their merits and Demerits. | CO1- U | (16) |
| 12. | (a) | i) The timer of a system using the Stop-and-Wait ARQ Protocol has a time-out of 8 ms. Draw the flow diagram for four frames if the round-trip delay is 6 ms. Assume that the first frame is lost or damaged. (8m)<br>ii) A system uses the Stop-and-Wait ARQ Protocol. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 5000 Km and the propagation speed is $2 \times 10^8$ m? Ignore transmission, waiting, and processing delays. We assume no data or control frame is lost or damaged. (8m) | CO2-App | (16) |
| | | Or | | |
| | (b) | In a CSMA/CD network with a data rate of 10 Mbps, the minimum frame size is found to be 512 bits for the correct operation of the collision detection process. What should be the minimum frame size if we increase the data rate to a) 100 Mbps? B) 1 Gbps? C) 10 Gbps? | CO2-App | (16) |
| 13. | (a) | A router with IPv4 address 125.45.23.12 and Ethernet physical address 23:45: AB:4F:67:CD has received a packet for a host destination with IP address 125.11.78.10. Show the entries in the ARP request packet sent by the router and ARP Packet sent in response. Assume no subnetting. | CO3-Ana | (16) |
| | | Or | | |
| | (b) | Show the autonomous system with the following specifications: There are eight networks (Nl to N8), eight routers (Rl to R8), Nl, N2, N3, N4, NS, and N6 are Ethernet LANs, N7 and N8 are point-to-point WANs, Rl connects Nl and N2, R2 connects Nl and N7, R3 connects N2 and N8, R4 connects N7 and N6, RS connects N6 and N3,R6 connects N6 and N4,R7 connects N6 and NS,R8 connects N8 and N5. Draw the graphical representation of the autonomous system as seen by Distance vector routing | CO3-Ana | (16) |

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| 14. | (a) | Explain in detail about Transmission Control Protocol (TCP) segment format with a neat diagram. | CO1- U | (16) |
| | | Or | | |
| | (b) | Describe in detail about Congestion control techniques in transport layer. | CO1- U | (16) |
| 15. | (a) | Describe in detail about DNS and HTTP | CO1- U | (16) |
| | | Or | | |
| | (b) | Draw and construct the scenario of Electronic mail. | CO1- U | (16) |