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Question Paper Code: R4411

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 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. PDU of Data Link Layer is CO1-U
(a) Packets (b) Frames (c) Data (d) Segments
2. _____ frame in CSMA/CA handshake can prevent collision from a hidden CO1-U
station
(a) CTS (b) RTS (c) ACK (d) None of the above
3. What is the purpose of the DHCP server to provide CO1-U
(a) Storage for Email (b) URL (c) provide IP address to host (d) None of the above
4. In TCP, one end can stop sending data while still receiving data. This is called a CO1-U

(a) half-close (b) half-open (c) one-way termination (d) Termination.
5. In the DNS, the names are defined in _____ structure. CO1-U
(a) A linear list. (b) An inverted-tree. (c) A graph. (d) A List

PART – B (5 x 3= 15 Marks)

6. Calculate the bandwidth of the light for the following wavelength ranges (assume CO2-App
a propagation speed of 2×10^8 m): 1000 to 1200 nm
7. A CSMA/CD bus spans a distance of 1.5 km. If the data rate is 5 Mbps what is the CO2-App
minimum frame size?
8. If a router has 20 entries in its group table, should it send 20 different queries CO1-U
periodically or just one? Explain your answer.

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|-----|--------------------------------|-------|
| 9. | Compare TCP and UDP. | CO1-U |
| 10. | Difference between FTP & HTTP? | CO1-U |

PART – C (5 x 16= 80 Marks)

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| 11. | (a) Discuss the different network topologies in detail, with their Performance indicators. | CO1-U | (16) |
| | Or | | |
| | (b) Discuss in detail about OSI model with neat sketch. | CO1-U | (16) |
| 12. | (a) Draw and explain the frame structure of IEEE 802.3. Also find the minimum frame length for a network of 5 nodes connected using 10 BaseT cable. Assume the total propagation delay the network is 50 microsec. | CO2-App | (16) |
| | Or | | |
| | (b) (i) The timer of a system using the Stop-and-Wait ARQ Protocol has a time-out of 6 ms. Draw the flow diagram for four frames if the round-trip delay is 4 ms. Assume that the first frame is lost or damaged. | CO2-App | (8) |
| | (ii) A system uses the Go-Back-N ARQ Protocol with window size of 7. 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 2×10^8 m? Ignore transmission, waiting, and processing delays. We assume no data or control frame is lost or damaged. | CO2-App | (8) |
| 13. | (a) (i) Explain Address Resolution Protocol. | CO1-U | (8) |
| | (ii) A block of address is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first and last address in the block. And also find the number of addresses. | CO3-Ana | (8) |
| | Or | | |
| | (b) (i) Explain briefly about IPv6 addressing. | CO1-U | (8) |
| | (ii) 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. Assume no subnetting. | CO3-Ana | (8) |
| 14. | (a) Explain in detail about the techniques to improve QoS. | CO1-U | (16) |
| | Or | | |
| | (b) Explain in detail about services, features and Buffer system in TCP. | CO1-U | (16) |

15. (a) Assess the importance of Simple Network Management Protocol CO5-Eva (16)
Or
(b) Interpret and assess how SMTP protocol is used in E-mail applications. CO5-Eva (16)

