B.E. COMPUTER SCIENCE & ENGINEERING 3RD YEAR 2nd SEMESTER EXAM- 2019

COMPUTER NETWORKS

Time: 3 hours | Full Marks: 100

Group A (Total Marks: 10) [CO1]
Answer Question No. 1 OR Question No. 2

1. Explain the data encapsulation and decapsulation concept in TCP/IP protocol suite. How this concept is defined in Ethernet, explain with the frame structure of IEEE 802.3. 4+6
2. Explain the MAC sublayers in IEEE 802.11 standard. Describe the hidden and exposed station problems and their effects with suitable diagram. 4+(3+3)

Group B (Total Marks: 30) [CO2]
Answer Question No. 3 (Compulsory) and Question No. 4 OR Question No. 5

3. a) What is the access method of standard Ethernet? For each of its features, give an explanation of what it is and why it is an improvement over aloha. Explain the access method of wireless LAN. 1+4+5

   b) How the slot time in Ethernet is defined? Why the choice of slot time is 512-bit for traditional 10-Mbps Ethernet? Explain for following two scenarios: (i) when the sender sends a minimum size packet of 512 bits (ii) when the sender sends a frame larger than the minimum size. What is the relationship between slot time and maximum network length? 2+3+3+2

4. Explain a data link multiple access protocol where one channel carries all transmissions simultaneously (illustrate with a simple example and the situations at multiplexer and demultiplexer). How CDMA is superior to FDMA and TDMA? Explain with a suitable example. 6+4

5. Explain the properties of orthogonal sequences which are suitable for CDMA. Show the Walsh table for W_{16}. Prove the second property and third property of orthogonal sequences for your CDMA example of W_{16}. 3+3+(2+2)

Group C (Total Marks: 30) [CO3]
Answer Question No. 6 (Compulsory) and Question No. 7 OR Question No. 8

6. Explain the Routing Information Protocol (RIP) with a flowchart of the steps involved. Describe the process of updating of routing table when a router receives a distance vector message from a neighbor (give an example). Explain the strategies to handle instability scenarios in distance vector routing a) two-node instability b) three-node instability. Contrast and compare distance vector routing with link state routing. 5+3+(4+4)+4

7. Explain how a router finds the network address to route the packet in following two cases: a) A router outside the department of CSE receives a packet with destination address 190.240.7.91 b) A router inside the department of CSE receives the same packet with destination address 190.240.33.91. Discuss what happens if this destination does not exist in these two cases. In present scenario, shortage of addresses is a serious problem. Discuss a solution to address this problem (explain with suitable example)? 2+2+2+4

8. Why dynamic address configuration is required? Explain a protocol to address this issue. What is MTU and how fragmentation is related to it? How the final destination resembles the original datagram from the fragments received? Explain with an example. (1+4)+2+3

Group D (Total Marks: 20) [CO4]
Answer Question No. 9 (Compulsory) and Question No 10 OR Question No. 11

9. Explain how UDP checksum calculation is different from the one for IP with suitable example. Explain with a timing diagram how TCP manages flow control. 5+5
10. How ports are implemented in UDP? Explain the background processes for *port unreachable* message in this context. How user datagram is encapsulated in IP datagram? Are both UDP and IP unreliable to the same degree? Explain why or why not. 2+2+3+3
11. Explain how TCP handles the scenario when the sending and receiving processes may not write or read data at the same speed. Explain the (i) connection establishment (ii) data transfer (iii) connection termination processes in TCP. 4+6

Group A (Total Marks: 10) [CO5]
Answer Question No. 12 OR Question No. 13

12. Explain the architecture of e-mail in respect to SMTP, POP3 and IMAP4 and HTTP. 10

13. Explain the File Transfer Protocol in respect to control connection and data connection. 10