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Question Paper Code : 20875

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fourth/Fifth Semester

Computer Science and Engineering

CS 3591 — COMPUTER NETWORKS

(Common to : Computer Science and Engineering (Cyber Security)/Computer and Communication Engineering/Artificial Intelligence and Data Science/Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the basic tasks of a communications system?
2. What is the meaning of stateful and stateful of a protocol? Give an example for each one.
3. An IP datagram is carrying a TCP segment destined for address 130.14.16.17. The destination port address is corrupted and it arrives at destination 130.14.16.19. How does the receiving TCP react to this error?
4. We need three types of addresses, i.e. each computer has 3 addresses IP, MAC and port number while working with the internet. Why?
5. Consider a subnet with prefix 128.119.40.128/28. Give the "range" of IP addresses that can be assigned to this network.
6. What type of switching is used in present digital communications?
7. A home user upgrades from a dial-up connection to high-speed broadband, but does not see much improvement in Internet performance for visiting a Web site. Give one reason why this might happen, even if the network and the Web server have ample capacity.
8. What are the important attributes for a good routing algorithm?
9. List the responsibilities of Data Link Layer.
10. What is an Virtual Lan?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail how data is transmitted as data units from source to destination in a layered approach using the TCP/IP protocol Suite.

Or

- (b) Briefly explain the necessary protocols for a message to transfer from aaa@xxx.com to bbb@yyy.com.
12. (a) Give an overview of Flow control and Congestion control TCP.

Or

- (b) Explain in detail congestion avoidance techniques in TCP.
13. (a) Suppose an ISP owns the block of addresses of the form 128.119.40.96/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets? Draw the network diagram for the same.

Or

- (b) Briefly explain the ARP in detail. A host with IP address 130.23.43.20 and physical address B2:34:55:10:22:10 has a packet to send to another host with IP address 130.23.43.25 and physical address A4:6E:F4:59:83:AB (which is unknown to the first host). The two hosts are on the same Ethernet network. Show the ARP request and reply packets that are encapsulated in Ethernet frames.
14. (a) Consider the network shown below. Show the operation of Dijkstra's (Link State) algorithm for computing the least cost path from router F to all destinations. Explain the process. [Figure: network of routers A to F with link costs A-B 1, A-C 3, A-D 4, B-C 3, C-D 1, B-E 10, D-E 4, E-F 1, B-F 4]

Or

- (b) Consider two routers exchanging information via BGP protocol. Explain BGP Sessions and packet formats in detail between two routers.
15. (a) Elaborate on the CSMA protocols. What is the main downfall of the Carrier Sense Multiple Access (CSMA) method? How does Collision Detection (CD) methods will help to alleviate this problem?

Or

- (b) Discuss in detail about wireless LAN (802.11).

PART C — (1 × 15 = 15 marks)

16. (a) (i) Briefly explain the error control techniques in data link layer. (8)
- (ii) Consider the cyclic redundancy check (CRC) based error detecting scheme having the generator polynomial $X^3 + X + 1$. Suppose the message 11000 is to be transmitted. Find the codeword. Show your evaluation work for the same. (7)

Or

- (b) Suppose you open a startup company "foo" and want to set up your company network your network has the following servers: DNS server "dns1.foo.com" with IP as "140.112.30.40"; Web server: "foo.com" with two IP as "140.112.30.55" and "140.112.30.56". The web server also has a name as www.foo.com; Email server: "galaxy.foo.com" with IP as "140.112.30.60"; Your company's email address is "username@foo.com"
- (i) Briefly explain in detail about the working of DNS. (8)
 - (ii) What resource records (RRs) do you need to provide to the upper-level ".com" Registrar? (3)
 - (iii) What RRs do you need to put in your company's DNS server? (4)
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