USN | | | | | | | | | | **21EC53**

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Computer Communication Networks

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Describe the layers of the TCP/IP protocol suite and explain the service provided by each layer with the help of a neat diagram. **(10 Marks)**
     b. With neat diagrams, explain the working of ARP. Describe the structure and functions of various fields in the ARP packet. **(10 Marks)**

OR

2   a. With neat diagrams, explain the salient features, advantages and disadvantages of various physical topologies used in computer networks. **(12 Marks)**
     b. Explain with neat diagrams, the concepts of encapsulation and decapsulation at various layers of the TCP/IP protocol suite, during communication between two hosts. **(08 Marks)**

Module-2

3   a. With clear examples, illustrate the following concepts and explain:
        (i)   Byte stuffing and unstuffing
        (ii)   Bit stuffing and unstuffing **(10 Marks)**
     b. An ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. Calculate the throughput of the system if it produces 1000 frames per second in case of:
        (i) Pure ALOHA   (ii) SLOTTED ALOHA **(06 Marks)**
     c. Explain the Ethernet Frame Format with a neat diagram. **(04 Marks)**

OR

4   a. With relevant flow diagrams, explain 1-persistent, non-persistent and p-persistent methods in CSMA. **(10 Marks)**
     b. Explain the working of CSMA/CA protocol with a neat flow diagram. Describe how CSMA/CA overcomes the problems of collision during handshaking and hidden stations. **(10 Marks)**

Module-3

5   a. Explain virtual circuit approach used in packet switching. With neat diagrams and an example, illustrate the 3 stages of virtual circuit approach. **(10 Marks)**
     b. With a neat diagram, explain the IPv4 datagram. **(10 Marks)**

OR

6   a. Explain distance vector routing algorithm, using Bellman-Ford equations. Illustrate the same with an example. **(10 Marks)**
     b. Describe how the IPV4 address space is occupied in classful addressing. **(04 Marks)**
     c. An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its 3 subnets: one subblock of 10, one subblock of 60, and one subblock of 120 addresses. Design the subblocks. **(06 Marks)**

Module-4

7 a. Describe the connectionless and connection-oriented services provide by the transport layer in TCP/IP. **(10 Marks)**

  b. With a neat diagram, explain the TCP segment format, including the pseudoheader. **(10 Marks)**

OR

8 a. Explain the selective repeat protocol with neat diagrams and illustrate with an example. **(10 Marks)**

  b. The content of a UDP header format is given as CB84000D001C001C. Determine the following:
  - (i) The source port number
  - (ii) The destination port number
  - (iii) Total length of the user datagram
  - (iv) Length of the data
  - (v) Is the packet directed from client to server or vice-verse? **(05 Marks)**

  c. Explain Checksum calculation in UDP using pseudoheader. **(05 Marks)**

Module-5

9 a. Explain the architecture of Electronic Mail, with a neat diagram. **(10 Marks)**

  b. Explain persistent and non-persistent connections in HTTP, with example. **(10 Marks)**

OR

10 a. With a neat taxonomy, describe various security attacks in communication networks. **(08 Marks)**

  b. With neat diagrams, explain the following with respect to DNS:
  - (i) Name space
  - (ii) DNS in the internet
  - (iii) Name Address Resolution **(12 Marks)**

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