U –52011

Register No. | | | | | | | | |

BE/BTech Degree Examination October 2019

Fifth Semester

Common to Information Technology and Computer Science and Engineering

14ITT51 – COMPUTER COMMUNICATION NETWORKS

(Regulations 2014)

Time: Three hours Maximum: 100 marks

Answer all Questions

Part – A (10 × 2 = 20 marks)

1. Distinguish between data rate and signal rate. [CO1,K2]
2. Compare between simplex, Half duplex and full duplex systems. [CO1,K2]
3. Specify the use of each type of frame used by HDLC protocol. [CO3,K1]
4. A bit stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. The output bit-string after stuffing is 01111100101. Find the input bit string. [CO3,K3]
5. The address of a class B host is to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and maximum number of hosts in each subnet? [CO4,K3]
6. Which of the fields of an IP header are modified by a typical IP router? [CO4,K1]
7. What is the maximum window size for data transmission using the selective repeat protocol with n-bit frame sequence number? [CO5,K1]
8. How does the size of the congestion window change in the slow start phase of the TCP congestion control algorithm? [CO5,K1]
9. Identify the transport layer protocol and application layer protocol used to support electronic mail. [CO6,K1]
10. List the four types of characteristics that are attributed to a data flow in a network. [CO6,K1]

Part – B (5 × 16 = 80 marks)

11. a. i) Draw the graph of binary data 001101100010 using the following schemes, assuming that the last signal level has been positive (10) [CO1,K2]

1) RZ 2) NRZ-I 3) NRZ-L 4) AMI 5) Differential Manchester

ii) Identify the advantages and disadvantages of optical fiber over coaxial and twisted pair cables. (6) [CO2,K2]

(OR)

b. i) For each of the following four networks, discuss number of cables and ports needed and discuss the consequences if a connection fails: (10) [CO1,K2]

1) Five devices arranged in mesh topology
2) Five devices arranged in bus topology
3) Five devices arranged in star topology
4) Five devices arranged ring topology

ii) Compare between circuit switched networks and packet switched networks. (6) [CO1,K2]

12. a. i) Given the networks dataword 101001111 and the divisor 10111. Show the generation of the CRC codeword at the sender site. (8) [CO3,K3]

1) If no error occurs during transmission how can it be detected by the receiver?

2) How does the receiver detect the error if 2nd LSB bit is corrupted while transmitting the code word to the receiver?

ii) Illustrate the operation of ARP protocol with a neat diagram. (8) [CO3,K1]

(OR)

b. i) Demonstrate the operation of stop-and-wait protocol using the following scenarios: (8) [CO3,K3]

First frame is sent and acknowledged,

2nd frame is sent but lost,

2nd frame is resent and acknowledged

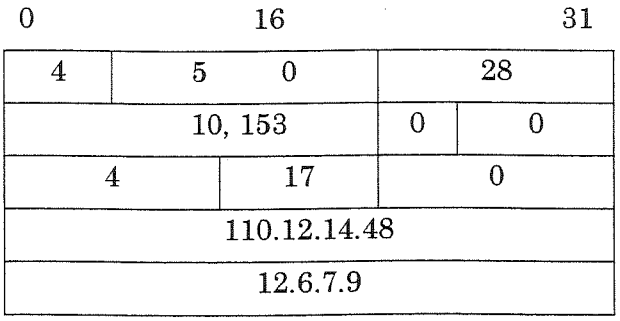
3rd frame is sent and acknowledged but the acknowledgement is lost

3rd frame is resent and acknowledged.

ii) Explain the function of CSMA/CD with a flow diagram. (8) [CO3,K1]

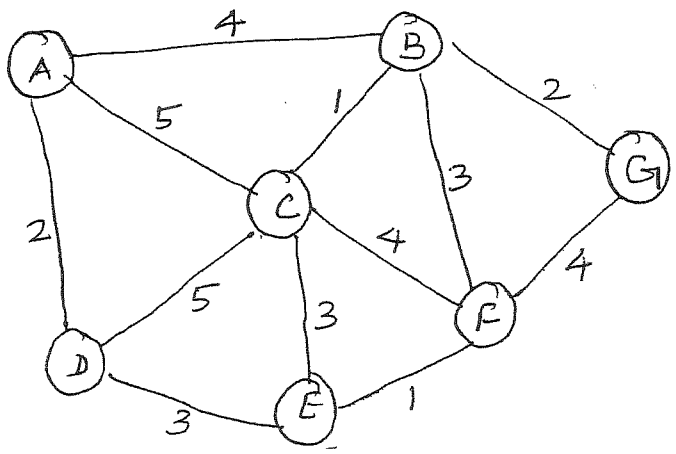
13. a. i) An organization is granted a block of addresses with a beginning address 14.24.74.0/24. The organization needs to have 4 sub blocks of addresses to use in its four subnets: one sub block of 10 addresses, one sub block of 58 addresses, one sub block of 122 addresses and one sub block of 20 addresses. Design the sub blocks. (8) [CO4,K3]

ii) In the following figure, show how the sum, wrapped sum, and checksum can be calculated (8) [CO4,K3]



(OR)

b. Write Dijkstra's algorithm. Apply this algorithm to find the least cost tree and the forwarding table for node B for the figure given below (16) [CO4,K3]



14. a. i) Distinguish between IPv4 and IPv6. (8) [CO5,K2]

ii) Assume we need to design a Go-back-N sliding window for a network with send window size 7. Draw the flow diagram when the sender sends 5 packets (0,1,2,3 and 4). Packets 0, 1 and 2 are sent and acknowledged in a single ACK, which arrives at the sender site after all the packets have been sent. Packet 3 is received and acknowledged in a single ACK. Packet 4 is lost and resent. (8) [CO5,K3]

(OR)

b. i) Explain the process involved in TCP connection establishment, data transfer and connection termination with a neat diagram. (8) [CO5,K2]

ii) The following is a dump (contents) of a UDP header in hexadecimal format. (8) [CO5,K3]

0045DF0000580000

i) What is the source port number?

ii) What is the destination port number?

iii) Find the length of the user datagram.

iv) Identify the length of the user data.

v) Is the packet directed from a client to a server or vice versa?

vi) Has the sender calculated a checksum for this packet?

15. a. i) Elaborate the basic model of File Transfer Protocol (FTP) with a neat diagram. (6) [CO6,K1]

ii) Alice and Bob are connected via a LAN or a WAN to two mail servers. Alice wants to send a simple e-mail to Bob. Enumerate various steps involved in sending of mail from Alice to Bob with suitable diagram. (10) [CO6,K2]

(OR)

b. i) Illustrate various scheduling mechanisms to improve quality of service of a network. (6) [CO6,K1]

ii) The client needs to access a file that contains one link to an image. The text file and image are located on the same server. Demonstrate how this file is download to client using HTTP with: (10) [CO6,K2]

1) Persistent connection

2) Non persistent connection.

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	26	38	36	–	–	–