



CBCS SCHEME

15EC64

Sixth Semester B.E. Degree Examination, July/August 2021

Computer Communication Networks

Time: 3 hrs.

Max. Marks:80

Note: Answer any FIVE full questions.

- 1 a. Explain different types of switched networks used in computer networks with relevant diagrams. (04 Marks)
b. Explain layers of TCP/IP protocol suite with relevant diagram. (10 Marks)
c. Assume a system uses five protocol layers. If the application program creates a message of 100 bytes and each layer adds a header of 10 bytes to the data unit, what is the efficiency of the system? (02 Marks)
- 2 a. Explain with necessary diagram show ARP protocol finds link layer address of next node in a network. (07 Marks)
b. Explain the need for sequence number and acknowledgment numbers in stop-and-wait protocol with FSM and flow diagram. (07 Marks)
c. Unstuff the following frame where payload in which 'E' is Escape byte, 'F' is the flag byte, and 'D' is a data byte other than an escape or a flag character.

E	E	D	E	F	D	D	E	F	E	E	D	D	D
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(02 Marks)

- 3 a. Explain behavior of three persistence methods with timing and flow diagram. (06 Marks)
b. Show with frame exchange time diagram, how CSMA/CA solves hidden station problem. (06 Marks)
c. Assume that there are three active stations in a slotted ALOHA network : A, B and C. Each station generates a frame in a time slot with the corresponding probabilities $P_A = 0.2$, $P_B = 0.3$, $P_C = 0.4$ respectively.
i) What is the throughput of each station?
ii) What is the throughput of the network? (04 Marks)

- 4 a. Explain IEEE 802.3 frame format with neat diagram. (06 Marks)
b. Explain with suitable diagram, 10 base 2 and 10 base 5 physical layer implementations in 10 Mbps Ethernet. (06 Marks)
c. A network with one primary and four secondary station uses polling. The size of a data frame is 1000bytes. The size of the poll, ACK and NAK frames are 32 bytes each. Each station has 5 frames to send. How many total bytes are exchanged if there is no limitation on the number of frames a station can send in response to a poll? (04 Marks)

- 5 a. Explain with neat diagram IEEE802.11 addressing mechanism. (06 Marks)
b. Show with examples how redundant switches create loops in transparent switches. (06 Marks)
c. In an 802.11 communication, the size of the payload is 1200 bytes. The station decides to fragment the frame into three fragments, each of 400 payload bytes. Answer the following questions :
i) What would be the size of the data frame with fragmentation?
ii) What is the size of each frame after fragmentation?
iii) How many total bytes are sent after fragmentation?
iv) How many extra bytes are sent because of fragmentation? (04 Marks)

- 6 a. Explain with a neat diagram, three types of baseband layer formats. (06 Marks)
 b. Explain DHCP message format with neat diagram. (04 Marks)
 c. An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 fixed length subnets
 i) Find the subnet mask
 ii) Find the number of addresses in each subnet
 iii) Find the first and last address in subnet 1
 iv) Find the first and last address in subnet 500. (06 Marks)
- 7 a. Show general formats of ICMP messages and explain query messages. (08 Marks)
 b. With neat diagram, mention three phases in remote host and mobile host communication. (04 Marks)
 c. In a IPv4 datagram, the M bit is 0, the value of HLEN is 5, the value of total length is 200, and the offset value is 200, what is the number of the first byte and number of the last byte? Is this the last fragment? (04 Marks)
- 8 a. Explain methods to overcome count-to-infinity problem considering two-node instability example with neat diagram. (06 Marks)
 b. Using Dijkstra's algorithm find the shortest path tree and the forwarding table for node 'A' in Fig.Q8(b).

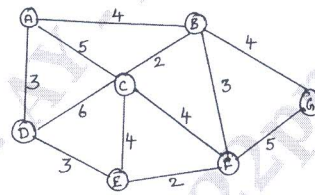


Fig.Q8(b)

(10 Marks)

- 9 a. Why window size in selective repeat protocol should be equal to $2^{(m-1)}$, prove your answer with flow diagram. (06 Marks)
 b. Design Go-Back-N sliding-window protocol for a network in which the bandwidth is 100Mbps and the average distance between the sender and receiver is 10,000km. Assume the average packet size is 100,000 bits and the propagation speed in the media is 2×10^8 m/s. Find the maximum size of the send and receive windows, the number of bits in the sequence number field (m), and an appropriate time-out value for the timer. (06 Marks)
 c. Show TCP segment format with neat diagram. (04 Marks)
- 10 a. Explain steps involved in three-way handshaking during connection establishment in TCP protocol. (08 Marks)
 b. A client use UDP to send data to a server. The data length is 16 bytes. Calculate the efficiency of this transmission at the UDP level. (02 Marks)
 c. The following is part of a TCP header dump (contents) in hexadecimal format :

E2930017	00000001	00000000	500207FF
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- i) What is the source port number?
 ii) What is the destination port number
 iii) What is sequence number?
 iv) What is the acknowledgment number?
 v) What is the length of the header?
 vi) What is the type of the segment?
 vii) What is the window size?

(06 Marks)
