

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q1. a) The following character encoding is used in a data link protocol:

A: 01000111 B: 11100011 FLAG: 01111110 ESC: 11100000

Show the bit sequence transmitted (in binary) for the four-character frame A B ESC FLAG when each of the following framing methods is used: [3][CO4]

- (i) Flag bytes with byte stuffing.
- (ii) Starting and ending flag bytes with bit stuffing

b) Provide the algorithm and design for data link layer simplex and stop-and-wait protocol for noiseless channel. [2][CO4]

Q2 a) Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocols. [1][CO-3]

b) Differentiate between pure ALOHA and slotted-ALOHA protocol along with proper design and procedural description. Suppose a pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the requirement to make this frame collision-free? [2+1][CO-4]

Q3. a) A slotted ALOHA network transmits 400-bit frames using a shared channel with a 400-kbps bandwidth. Find the throughput if the system (all stations together) produces: [2][CO-4]

- (i) 1000 frames per second
- (ii) 500 frames per second
- (iii) 250 frames per second

Also find the case which leads to maximum throughput in this scenario.

b) How the collision detection is possible in CSMA/CD protocol? Explain. A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal) is 25.61 μs, what is the minimum size of the frame? [1+2][CO-4]

Q4. a) Compare and contrast between two different routing tables. For the given network in Fig. 1, find the routing table available at each node from A to E. The cost is mentioned along with arrow. In how many steps routing table would be completed. Provide the routing table updation at each step through distance vector routing. [1+4][CO4]

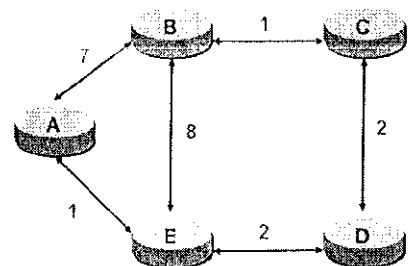


Fig. 1

b) How you define address space for IPv4 and IPv6? Differentiate between classfull and classless addressing scheme of IPv4 and provide the nomenclature for the same. [3][CO-5]

Q5. a) The following is the content of UDP header in hexadecimal notation: CB84000D001C001C.

- (i) What is the source port number?
- (ii) What is the destination port number?
- (iii) What is the total length of the user datagram?
- (iv) What is the length of the data?

[2][CO-4]

b) What is IEEE 802.11? Differentiate between DCF (Distributed Coordination Function) and PCF (Point Coordination Function) of MAC layer along with the timing diagram. [5][CO-5]

Q6. a) Compare piconet and scatternet. Provide the detailed description of the formation of Bluetooth network. Also define its radio layer and link layer. [5][CO-6]

b) Provide the specifications for Zigbee and Wi-MAX network. [1][CO-6]