Roll No.:.....

National Institute of Technology, Delhi

End Semester Examination (Autumn Semester 2022)

Branch	**: B. Tech. (ECE)**	**Semester**	**: 6**
Title of the Course	**: Computer Networks**	**Course Code**	**: CSB 342**
Time	**: 3 Hours**	**Maximum Marks**	**: 50**

- **All questions are compulsory.**
- This question paper comprises **two sections, A, B, and C.**
  - **Section A:** Contains 5 questions of 1 marks each.
  - **Section B:** Contains 3 questions of 5 marks each.
  - **Section C:** Contains 3 questions of 10 marks each.
- All questions should be answered in the same sequence as mentioned in the paper: You have to answer Q1 first, then Q2, so on. **ELSE QUESTIONS SHALL NOT BE EVALUATED.**

Section A

Q1. Peer-to-Peer network protocols are part of which layer **[1]**

1. Application layer
2. Network layer
3. Data link Layer
4. Session Layer

Q2. In the IPv4 addressing format, the number of networks allowed under Class C addresses is **[1]**

1. 2^{12}
2. 2^{21}
3. 2^{32}
4. 2^{24}

Q3. The subnet mask for a particular network is 255.255.31.0. Which of the following pairs of IP addresses could belong to this network? **[1]**

1. 172.57.88.62 and 172.56.87.233
2. 10.35.28.2 and 10.35.29.4
3. 191.203.31.87 and 191.234.31.88
4. 128.8.129.43 and 128.8.161.55

Q4. Protocols belonging to which of the following layer is used for flow and error controls **[1]**

1. Application layer
2. Network layer
3. Data link Layer
4. Session Layer

Q5. Which layer is concerned with bit by bit delivery of data **[1]**

1. Network layer
2. Data link layer
3. Transport layer
4. Physical layer

Section B

Q6. A coffee shop owner wants to determine how much furniture he has to buy for people waiting in the queue. The customer's statistics are as follows. Average time spent by customers in the queue is 6 minutes, and 40 customers arrive in the coffee shop per hour. Calculate the minimum chairs required for sitting of the customers according to above statistics. **[5]**

Q7. Describe the OSI model. Explain the function of all the layers. **[5]**

Q8. Explain the difference between channel capacity, bandwidth and data rate. **[5]**

Section C

Q9. **[6+2+2]**

I. Let us assume a shared channel. The time to access the channel is represented in terms of slot. In a slot there are 5 stations trying to access the channel. The stations are using p-persistent CSMA to transmit over the channel. Let the probability of transmitting the data is 0.2 (*i.e.* p). What is the probability that only one station will transmit in that slot?

II. Let us assume a channel of length 300m, where users are using CSMA/CD protocol. Calculate the maximum time for collision detection.

III. What is the purpose of jamming signal in the CSMA/CD protocol?

Q10. Let the IP address of one of the host (computer) in the network be 199.68.89139. The subnet mask is 255.255.255.224. Calculate **[10]**

1. Subnet ID.
2. IP address of the first host in the subnet.
3. IP address of the last host in the subnet.
4. Direct broadcast address (DBA of subnet)

Q11. **[10]**

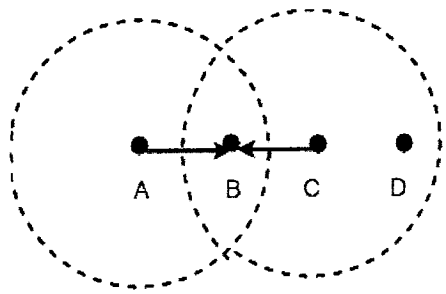

Fig. 1

I. Stations A, B, C, and D are wireless stations. The circles with point A and C as center are the respective ranges of stations A and C. A→B, implies station A is sending data to station B. Name and explain the scenario, in Fig. 1, when CSMA/CD protocol will not work properly.

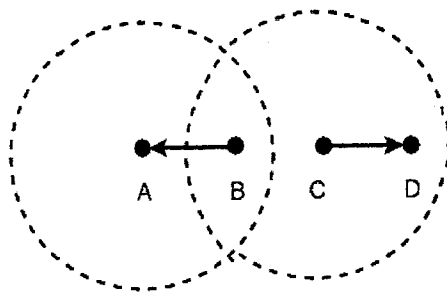

Fig. 2

II. Stations A, B, C, and D are wireless stations. The circles with point A and C as center are the respective ranges of stations A and C. B→A, implies station B is sending data to station A. Name and explain the scenario in Fig. 2, when CSMA/CD protocol will not work properly.