

Nirma University

Institute of Technology

Semester End Examination (IR/RPR), December 2021

B. Tech. in Computer Science and Engineering, Semester V

2CS502 Computer Networks

Time: 2 Hours

Max. Marks: 50

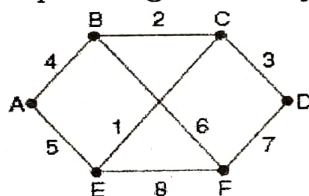
Instructions:

1. Attempt all questions.
2. Figures to the right indicate full marks.
3. Draw neat sketches wherever necessary.
4. Assume suitable data wherever necessary and specify them.
5. **Sub-questions of each of the three questions must be written together.**

Q.1 Do as Directed.

[18]

- A) Explain the Optimality Principle with the help of an example. For the CO2 figure given below, find the shortest path from A to D using Dijkstra's BL6 shortest path algorithm explaining each step of the algorithm in detail. (6)



OR

- A) What is a forbidden region? Which are the two scenarios in which CO2 senders can enter the forbidden region? Explain with diagrams. (6)

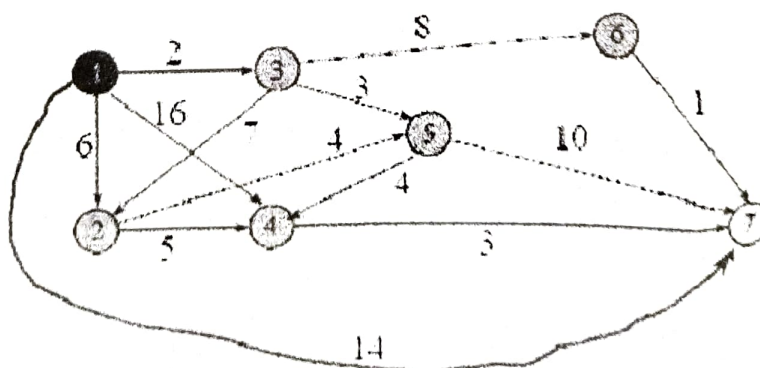
- BL4 B) What do you mean by count to infinity problem? Suggest an approach CO1 to overcome this problem. (4)

- BL4 C) Compare Bitmap and Adaptive Tree Walk protocols for shared channel CO1 access. (4)

- BL5 D) Write a pseudocode for bidirectional stop-and-wait data link layer CO2 protocol for reliable channel. (4)

- BL6 Q.2 Do as Directed. [16]

- A) What is the practical significance of a SINK tree in the area of CO2 communication? For a network given below, generate a SINK tree BL3 considering node 1 as sink. (6)



- ✓ **B)** A company is assigned the network address 172.10.0.0/17. The network is to be divided into four subnets having 1024, 4096 and 2048 and 8192 host computers. Please note that subnets are to be created in this order only. Calculate network address, subnet mask and range of IP addresses for each subnet. How many IP addresses will remain unallocated? (6)
- CO3
BL3

OR

- ✓ **B)** How does a router with a Weighted Fair Queueing (WFQ) ensure bandwidth and delay guarantees are met for a source whose traffic is shaped by (R, B) token bucket? (6)
- CO4
BL3
- C)** Connection oriented service does not always mean finding a path between sender and receiver and using same path for forwarding packets of that connection (True/ False). Justify. (4)
- CO1
BL4
- Q.3 Do as Directed.** [16]
- A)** Write pseudocode of a client application to send an email to an email server by implementing SMTP protocol using Berkeley Sockets API. (6)
- CO3
BL3
- ✓ **B)** A 1-km-long, 10-Mbps CSMA/CD LAN (not 802.3) has a propagation speed of 200 m/μsec. Repeaters are not allowed in this system. Data frames are 256 bits long, including 32 bits of header, checksum, and other overhead. The first bit slot after a successful transmission is reserved for the receiver to capture the channel in order to send a 32-bit acknowledgement frame. What is the effective data rate, excluding overhead, assuming that there are no collisions? (6)
- CO2
BL6
- C)** What is jitter? Why is it an important quality of service parameter? (4)
- CO3
BL4
- Why UDP is preferred over ~~UDP~~ TCP for better jitter performance?
- TCP