

CH

**PONDICHERRY UNIVERSITY, KARAİKAL CAMPUS  
SCHOOL OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE**

**MCA First Year - Even Semester 2022-2023**

**CSCA 421: COMPUTER NETWORKS**

**CA Test 1**

**Max. Marks:30 Marks**

**Group I: Answer ALL the questions**

**5Q X 2M = 10**

1. How does a 'mesh' physical topology differ from a 'ring' topology? Also, write the maximum number of full-duplex physical channels required in both cases.
2. Write the expansion of 'ARPANET' and 'NSFNET'.
3. What is the difference between logical address and physical address?
4. Write any two drawbacks of Twisted-pair cable.
5. What is a minimum hamming distance of a set of words? Find the minimum hamming distance of the following codes. 00001,01101,11101,01110

**Group II: Answer any TWO questions**

**2Q X 10M = 20**

6. Explain the seven layers of OSI model by giving a detailed description of each layer.
7. Consider the following data word: 10110010110, and a divisor: 101011.  
Use the 'Cyclic Redundancy Check' concept to generate code words on the sender side. Also, ensure the correctness of the message on the receiver side.
8. Explain the working principles of the following data link layer protocols.  
a) Stop and wait   b) Stop and wait ARQ   c) Go-Back-N ARQ





**PONDICHERRY UNIVERSITY, KARAİKAL CAMPUS  
SCHOOL OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE**

**MCA First Year - Even Semester 2022-2023**

**CSCA 421: COMPUTER NETWORKS**

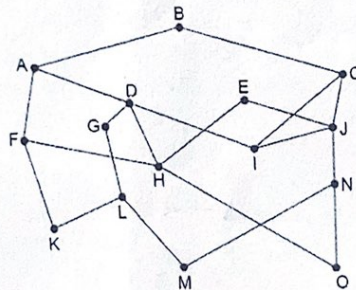
**CA Test 2**

**Max. Marks:30 Marks**

**Group I: Answer ALL the questions**

**5Q X 2M = 10**

1. Write any SIX properties of the routing algorithms.
2. How does a non-adaptive routing differ from an adaptive routing technique? Write the name of the example algorithm for each.
3. How does a sink tree relate to the optimality principle? Draw a sink tree for the router B of the given network.

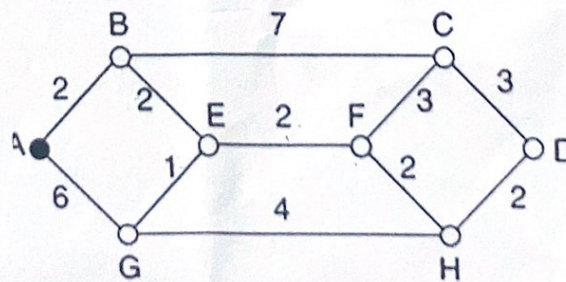


4. What is the role of 'sequence number' and 'hop counter' in the flooding algorithm?
5. In hierarchical routing, if a three-level hierarchy is chosen, with 10 clusters, each containing 20 regions of 5 routers, each router needs \_\_\_\_\_ entries for local routers, \_\_\_\_\_ entries for routing to other regions within its own cluster, and \_\_\_\_\_ entries for distant clusters, for a total of \_\_\_\_\_ entries.

**Group II: Answer any TWO questions**

**2Q X 10M = 20**

6. Explain the use of Dijkstra's shortest path routing algorithm to decide the shortest path from A to D. Show the workflow of the algorithm clearly on each phase of the given graph.



7. Explain the routing algorithms of 'broadcast routing' and 'multicast routing' with the **reverse path forwarding** concept. Illustrate with example(s).
8. What are the approaches used in Congestion Control? Explain the following with example(s).  
a) Network provisioning b) Traffic-aware routing c) Admission control d) Traffic throttling





**PONDICHERRY UNIVERSITY, KARAIKAL CAMPUS**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**MCA First Year**  
**Even Semester Examination, August 2023**

Couse Code : CSCA 421  
Course Title: COMPUTER NETWORKS

Date: 07.08.2023  
Total Marks: 60  
Maximum Time: 3 hours

**Part A - Answer ALL the questions (10 x 2 = 20 Marks)**

1. What are the FIVE components of a data communication system?
2. Write any two advantages of 'Fiber-optic cable'.
3. Define the following framing concepts. a) Character count b) Character stuffing
4. What is the minimum hamming distance of a set of words? Find the minimum hamming distance of the following codes. 10001, 11101, 10001, 10010
5. Calculate the checksum for the following set of numbers (7, 11, 12, 0, 6). Use one's complement arithmetic with only four bits to compute the checksum.
6. In hierarchical routing, if a three-level hierarchy is chosen, with 30 clusters, each containing 15 regions of 20 routers, each router needs 20 entries for local routers, 24 entries for routing to other regions within its own cluster, and 29 entries for distant clusters, for a total of 73 entries.
7. What is the significant role of the 'hop counter' in the flooding algorithm?
8. What is the difference between logical address and physical address?
9. Define the following and write the usages of each. a) Socket b) Port number
10. What is the primary usage of the 'Domain Name System'?

**Part B - Answer any FOUR questions (4 x 5 = 20 Marks)**

11. Explain the concept of any FOUR physical topologies of a network with two advantages and limitations of each type.
12. Consider the following data word: 10110010110, and a divisor: 101011.  
Use the 'Cyclic Redundancy Check' concept to generate code words on the sender side. Also, ensure the correctness of the message on the receiver side.
13. How will the following be helpful in congestion control? Explain the concepts with example(s).  
a) Leaky bucket algorithm b) Token bucket algorithm
14. Explain the following scenarios for the 'three-way handshake' protocol in the Transport layer.  
a) Normal operation b) Duplicate connection request  
c) Duplicate connection requests and duplicate acknowledgment
15. Explain the architecture of the electronic mail system. Also, specify the role of the 'Simple Mail Transfer Protocol'.

**Part C - Answer any TWO questions (2 x 10 = 20 Marks)**

16. Explain the FOUR layers of the TCP/IP protocol by giving a detailed description of each layer.
17. Explain the working principles of the following data link layer protocols.  
a) Stop and wait b) Stop and wait ARQ c) Go-Back-N ARQ d) Selective Repeat ARQ

$$\begin{array}{r} 2161 \\ 2315 \\ \hline \end{array}$$

$$\begin{array}{r} 1001 \\ 1101 \\ \hline 1110 \\ 21100 \end{array}$$

$$\begin{array}{r} 1001 \\ 1001 \\ \hline 0000 \end{array}$$

$$\begin{array}{r} 1001 \\ 1001 \\ \hline 0001 \end{array}$$

$$\begin{array}{r} 1101 \\ 1001 \\ \hline 0100 \end{array}$$

$$\begin{array}{r} 1001 \\ 1001 \\ \hline 0000 \end{array}$$

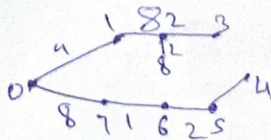
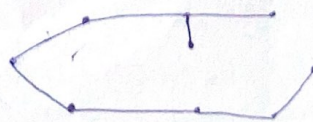
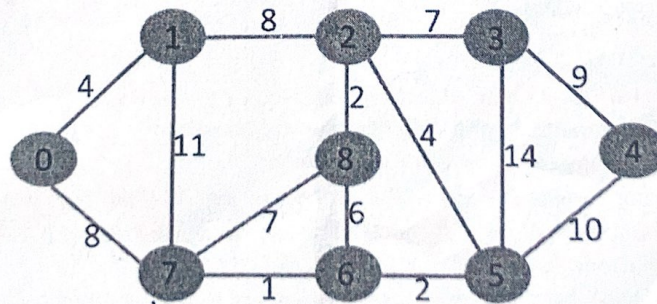
$$\begin{array}{r} 1001 \\ 1001 \\ \hline 0111 \end{array}$$

$$\begin{array}{r} 53 \\ 32 \\ 37 \\ 16 \\ 15 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ 30 \\ 45 \\ 60 \\ 75 \\ \hline \end{array}$$



18. Write the use of Dijkstra's shortest path routing algorithm to decide the shortest path from the node 0 to all other nodes of the given graph. Show the workflow of the algorithm clearly on each phase of the given graph.



~~078 = 15~~  
~~076 = 9~~  
~~012 = 12~~  
~~00765 = 11~~  
~~0768 = 15~~  
~~07652 = 15~~  
~~0128 = 14~~  
~~0123 = 19~~  
~~07653 = 25~~  
~~01234 = 28~~  
~~07654 = 21~~