

## Module 1 : Introduction to Computer Networks

1. What is computer network and explain basics characteristics of it. [5M]
2. Explain elements of the protocol with suitable examples. [5M]
3. Compare LAN, MAN and WAN. [10 M]
4. In a network with 6 devices connected in a mesh topology, the cost of creating one link is Rs.100. Calculate the total cost of implementing this topology. Also, calculate how many redundant links are present compared to a ring topology with the same number of devices. [5M]
5. In a ring topology with 8 devices, each device communicates with every other device using the ring path. How many unique signal paths are possible between pairs of devices in the network? [5M]
6. A company has 15 computers connected in a star topology. The cost of connecting each computer to the central hub is 200 per cable. Calculate the total cost of the cables needed to connect all computers to the hub. [5M]
7. Define IP, MAC and port address with examples along with their jurisdiction. [5M]
8. What is the need of switching and explain different techniques of switching.
9. Compare connection oriented services and connection less services. [10 M]
10. Explain OSI model with functions of each layer. [10M]
11. Compare OSI and TCP/IP model. [5/10 M]
12. Write short notes on Difference between Hubs and Switches. [5 M]

## Module 2 : Data Link Layer

1. Explain service provided by data link layer. [5 M]
2. Explain different framing methods? What are the advantage of variable length frame over fixed layer frame. [5M]
3. List and explain different types of error with example. [5/10 M]
4. Explain hamming code with example. [10M]
5. Justify Hamming code is error detection and correction code. [5/10 M]
6. What is hamming distance for each of the following codeword. [5M]  
d(10000,01000)  
d(10101,10010)  
d(1111,1111)  
d(0000,0000)
7. Received code word is 1011011, assuming even parity hamming code. State that the received code is correct or incorrect. If it is incorrect then do the correction in the received code using hamming code error correction technique. [10M]
8. If the data unit to be transmitted is 1010100100111001. Computer 4 bit checksum and perform error detection at the receiver end. For case 1] without error case 2] with

error. [10M]

assume appropriate value for received codeword.

9. Consider a message 11010011101100, divisor 1011. Compute n bit binary CRC. [10M]
10. Write short note on Sliding window protocol. [10M]
11. Compute the Hamming Code for the data 1001101. [5M]
12. Explain ALOHA in detail. [10M]
13. Explain collision detection procedure in CSMA/CD. [5/10M]
14. Explain the different Framing Methods. [10M]
15. Explain sliding window protocol using Go back . N technique.[10M]
16. What are the advantages of a variable length frame over fixed length frames? Explain the different framing methods.[10M]
17. Explain sliding window protocol. Draw the sender and receiver windows for a system using Go-Back-N sliding (window size =8) given that
  - i. frame 0 is sent; frame 0 is ACK
  - ii. frame 1 and 2 are sent; frames 1 and 2 are ACK
  - iii. frame 3, 4, 5 are sent; frame 4 is ACK
  - iv. timer for frames 5 expires
  - v. sender resets the window and 4 more frames are sent [10M]
18. What is Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocol? Explain with timing diagram. [10M]
19. Explain framing, flow and error control Data Link Layer. [10M]
20. Consider a message 11010011101100, divisor 1011. Compute n bit binary CRC. [10M]
21. Explain Stop and wait protocol and sliding window protocol with example and suitable diagram. [10M]
22. What is Framing ? Use suitable framing techniques to perform framing for the following data:
  1. 1010110101111100
  2. ABC ESE ESC DLE
  3. ABC DLE ETX
  4. ESC DLE ABC DLE PQR
  5. 10101111
23. Explain sliding window protocol using Go Back-N technique. [10M]
24. Explain Go-Back-n ARQ with appropriate diagram and compare it with selective repeat.[10M]

**Module 3 : IP Addressing & Network Layer**

1. What is subnet address if the destination address is 198.47.34.31 and subnet mask is 255.255.240.0 [5M]
2. Find the class of each address: [5M]
  - a. 00000001 00001011 00001011 11101111
  - b. 11000001 10000011 00011011 11111111
  - c. 10100111 11011011 10001011 01101111
  - d. 11110011 10011011 11111011 00001111
  - e. 227.12.14.87
  - f. 193.14.56.22
  - g. 14.23.120.8
  - h. 252.5.15.111
3. An address in a block is given as 73.22.17.25. Find the number of addresses in the block, the first address, and the last address.[5M]
4. An address in a block is given as 200.11.8.45. Find the number of addresses in the block, the first address, and the last address.[5M]
5. An address in a block is given as 180.8.17.9. Find the number of addresses in the block, the first address, and the last address.[5M]
6. What is subnetting? What are the default subnet masks?[5M]
7. Explain Classless Inter Domain Routing (CIDR) [10M]
8. A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle? Explain.[5M]
9. Draw & explain IPV4 Packet Format.[10M]
10. Describe Fragmentation concept with an example. [5M]
11. Draw & explain IP Package. [10M]
12. Write a short note on Classful Addressing.[10M]
13. What is Supernetting & Subnetting?[5M]
14. Write a short note on Classless Addressing.[5M]
15. Explain the different kinds of classes along with their network mask for IPv4 addresses.[5M]
16. What is fragmentation? Which fields changes over datagram during fragmentation in routing? Explain.[10M]
17. Find the netID of the following IP address:
  - (i) 114.34.2.8 (ii) 132.56.8.6 (iii) 208.34.54.12 (iv) 251.34.98.5 (v) 129.14.6.8 [5M]
18. Find the errors and rewrite the following IPV4 addresses: [5M]
  - (i) 427.45.12.47 (ii) 40.040.35.7.8 (iii) A0.37.27.255 (iv) 27.01010101256.23 (v) 27.56.78.256
19. Change the following IP address from dated decimal notation to hexadecimal notation
  - (i) 114.34.2.8 (ii) 129.14.6.8 (iii) 208.34.54.12 (iv) 238.34.2.1 (v) 192.177.23.15

**20.** Draw and explain the structure of IP Frame Header. [ 5M]

**21.** Explain classful addressing in IPV4. [5M]

#### **Module 4 : Routing Protocols**

1. What is count to infinity problem in distance vector routing. [5M]
2. Define following terms. [5M]
  - (i) Intra & Inter Domain Routing
  - (ii) Autonomous System
  - (iii) Static and Dynamic Routing.
3. Explain RIP & why it is called Distance Vector Routing. [5M]
4. Explain the Distance Vector algorithm used in Routing Information Protocol. [5M]
5. With suitable example explain the distance vector routing algorithm. [5M]
6. What are the three main functions performed by network layer? What is routing. Explain distance vector counting. [10M]
7. How Bellman-Ford algorithm helps to find least cost between any two nodes? Explain.
8. All the numerical problems solved in class. [10 M]

#### **Module 5 : Transport Layer**

1. Compare the TCP and UDP. [5/10M]
2. Draw & explain TCP Segment Format. [10M]
3. Explain Silly Window Syndrome Problem. [10M]
4. Explain Nagle's Algorithm. [5M]
5. Explain Clark's Solution. [5M]
6. Explain the TCP timers. [5M]
7. Explain the following fields with respect to TCP segment. [10M]
  - (i) Sequence number
  - (ii) Acknowledgement number
  - (iii) Header Length
  - (iv) Window size
  - (v) Urgent pointer
8. Explain the control flags, window size and urgent pointer fields in the TCP header. [10M]
9. What is the concept of 3-way handshaking in TCP Connection establishment? Explain [10M]
10. A TCP connection is to the ESTABLISHED State. The following events occur one after another. [10M]
  - (i) A FIN segment is received
  - (ii) The application sends a "close" messageWhat is the state of the connection after each event? What is the action after each event?

**Module 6: Application layer**

1. Define DHCP & explain its working (operation) on same & different n/w. [10M]
2. Define DNS & its purpose (working).[10M]
3. Write a note on HTTP. [10M]
4. Define Telnet & its working (Remote Login).[10M]
5. Define FTP & it's working.[10M]