Total number of printed pages: 03 **Programme(UG)/5th Semester/UCSE501**

2024

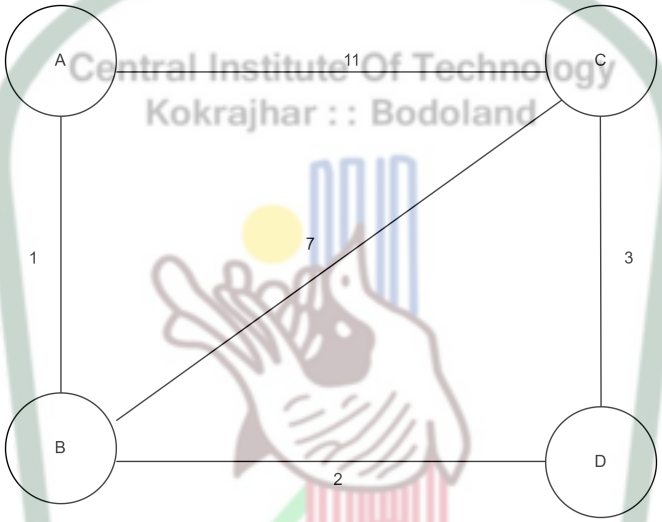
Computer Networks

Full Marks : 100

Time : Three hours

*Answer **any five** questions.*

1. a) For the network topology given below 5x3=15



i) Find the initial distance vectors(routing table) of all the routers.

ii) Show the updates in the routing table of C after it receives the partial table from B.

iii) Find the final distance vectors(routing table) of all the routers.

b) Explain three node instability (Count to Infinity) problem in Distance Vector Routing with a diagram. 5

2. a) Explain various fields of TCP Header with a diagram. 10

b) Explain Three Way Handshaking of TCP with a diagram. 10

3. Consider an IP packet with a length of 4500 bytes excluding the IP header. The packet is forwarded to a router with MTU of 600 bytes. Assume IPv4 header size to be 20 bytes. 2+18=20

a) Find the total number of fragments.

b) Find total length, offset, flags, identification, data part of all the fragments.

4. a) Using Hamming Code computation, for the dataword 10110 5+10=15

   i) Find the Codeword

   ii) Introduce an error in 5th bit, and show error correction in the receiver.

   b) What is the total delay (latency) for a frame of size 10 million bits that is being sent on a link with 15 routers each having a queuing time of 2 μs and a processing time of 1 μs. The length of the link is 3000 Km. The speed of light inside the link is $2x10^8$ m/s. The link has a bandwidth of 6 Mbps. Which component of the total delay is dominant? Which one is negligible? 5

5. a) An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 fixed length subnets. 4x4=16

   i) Find the subnet mask.

   ii) Find the number of addresses in each subnet.

   iii) Find the first and last address in subnet 1.

   iv) Find the first and last address in subnet 500.

   b) For the following IP address 200.17.21.135/27 4

   i) Find the size of the block.

   ii) Find the network address.

   iii) Find the broadcast address.

   iv) Find the network id and host id part of the address.

6. a) Find the full form of the following protocols and the corresponding layer. 2x5=10

   i) ARP

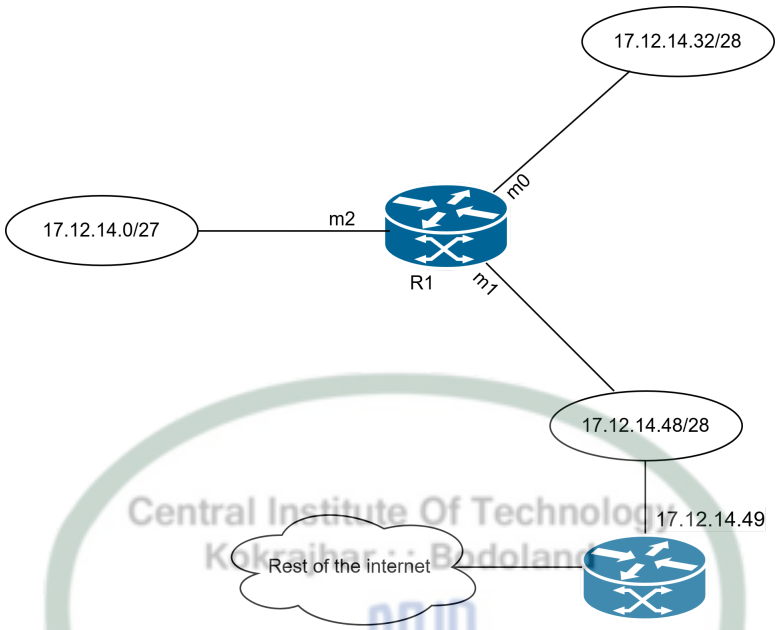
   ii) BGP

   iii) ICMP

   iv) OSPF

   v) Ethernet

b) 5+5=10



Using the configuration in figure above,

i) Make a routing table for router R1 showing Mask, Network Address, Next Hop Address and Interface.

ii) Show the forwarding of a packet with the ip address 17.12.14.50 considering longest mask matching

7. Write short notes on (Any two) 10x2=20

a) Domain Name System

b) HTTP/WWW

c) Network Topology

-------xxx-------