Assignment 3

Department: Computer Engineering & Applications	**Set:** I
Programme: B.Tech	**Branch: CSE**
Subject Name: Computer Network	**Subject Code:** BCSC0008
Year: II	**Semester:** III

Q1. Imagine you're a network engineer responsible for managing a company's network infrastructure. Your company heavily relies on real-time video conferencing for communication between remote offices. Recently, some employees have complained about poor video quality and frequent disconnects during their conference calls.
Upon investigation, you discover that the network traffic is experiencing congestion during peak hours, causing delays and packet loss. You realize that the current transport layer protocol being used, TCP (Transmission Control Protocol), might not be the best choice for real-time applications like video conferencing due to its congestion control mechanisms. Can you suggest better option with suitable justification?

Q2. Consider the following routing table at an IP router. For each IP address in Group-I identify the correct choice of the next hop from Group-II using the entries from the routing table below

Network No.	Net Mask	Next Hop
128.96.170.0	255.255.254.0	Interface 0
128.96.168.0	255.255.254.0	Interface 1
128.96.166.0	255.255.254.0	R2
128.96.164.0	255.255.254.0	R3
0.0.0.0	Default	R4

List-I	List-II
A. 128.96.171.92	1. Interface 0
B. 128.96.167.151	2. Interface 1
C. 128.96.163.121	3. R2
D. 128.96.165.121	4. R3
	5. R4

Q3. A n Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Which of the following is a valid allocation of addresses to A and B? GATE 2012
(A) 245.248.136.0/21 and 245.248.128.0/22
(B) 245.248.128.0/21 and 245.248.128.0/22
(C) 245.248.132.0/22 and 245.248.132.0/21
(D) 245.248.136.0/24 and 245.248.132.0/21

Q4. Consider three machines M, N, and P with IP addresses 100.10.5.2, 100.10.5.5, and 100.10.5.6 respectively. The subnet mask is set to 255.255.255.252 for all the three machines. Which one of the following is true? GATE 2019
A) M, N, and P all belong to the same subnet b) Only M and N belong to the same subnet

C) Only N and P belong to the same subnet d) M, N, and P belong to three different subnets

Q5. In the network 200.10.11.144/27, the fourth octet (in decimal) of the last IP address of the network which can be assigned to a host is _____. GATE 2015

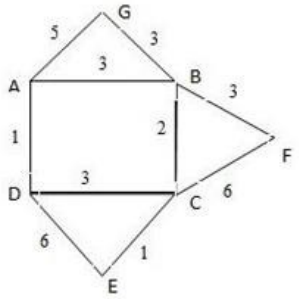
Q6. You have an interface on a router with the IP address of 192.168.192.10/29. What is the broadcast address the hosts will use on this LAN?

Q7. Your company has been using the network of 193.56.7.0 /24. You want to put each of the 6 floors in your building on a different subnet. What is the range of the last available subnet after doing Subnetting?

Q8. One employee came to you and he was saying that the internet was not working on his system, but other employees could work on the internet. You went to his system and check its IP configuration and you saw 172.29.97.127/26 was configured there. What will be your first step to solve this problem?

Q9. Consider the subnet given in the below diagram. Here, distance vector routing algorithm is used. The following vectors have just come in to router C:
From B: (3,0,6,5,3,8,3);
from D: (1,5,3,0,8,6,3);
from E: (4,3,1,1,0,4,6); and
from F: (3,8,3,6,4,0,9).
he measured delays to B, D, E and F are 2,3,1 and 6, respectively.
What is C′S new routing table?

A. (5,2,0,2,5,5,5)
B. (4,4,0,3,1,6,5)
C. (5,4,0,3,5,6,6)
D. (4,2,0,2,1,5,5)

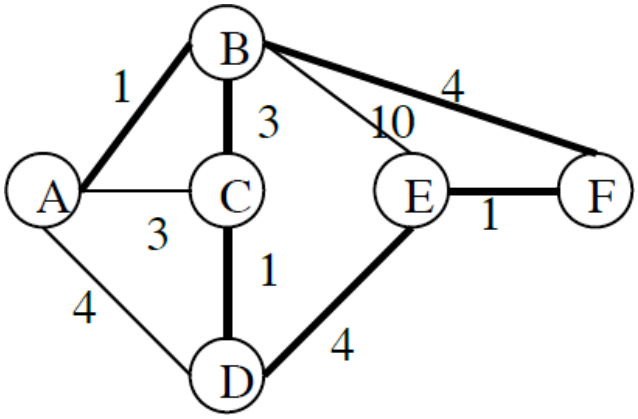


Q10. TCP is a connection oriented protocol, Show the connection establishment process in TCP. In the connection termination phase, suppose the FIN segment from the client-side contains data ranging from sequence no 100 to 200, So will the ACK no from the server start from 201 or 202?

Q11. An IP datagram of size 1000 bytes arrives at a router. The router has to forward this packet on a link whose MTU (maximum transmission unit) is 100 bytes. Assume that the size of the IP header is 20 bytes. The number of fragments that the IP datagram will be divided into for transmission is.

Q12. An IP router with a Maximum Transmission Unit (MTU) of 1500 bytes has received an IP packet of size 4404 bytes with an IP header of length 20 bytes. The values of the relevant fields in the header of the third IP fragment generated by the router for this packet are.

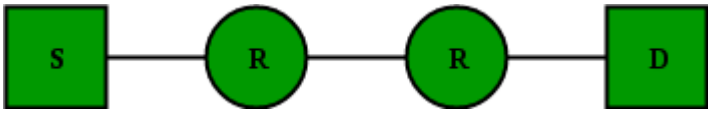
Q13. Consider the network shown below.



(a) Show the operation of Dijkstra's (Link State) algorithm for computing the least cost path from F (the rightmost node in the figure below) to all destinations. Also explicitly list all the shortest path routes from F to all destinations that are the result of the algorithm's computation.

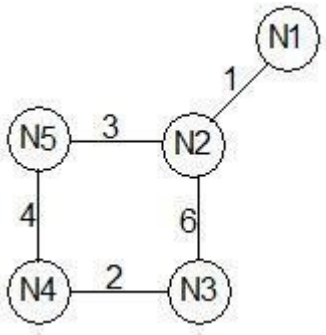
(b) Show the distance table that would be computed by the distance vector algorithm in B. (Note: you do not have to run the distance vector algorithm; you should be able to compute the table by inspection.)

Q14. Assume that source S and destination D are connected through two intermediate routers labeled R. Determine how many times each packet has to visit the network layer and the data link layer during a transmission from S to D.



Q15. In a RSA cryptosystem a particular A uses two prime numbers p = 13 and q =17 to generate her public and private keys. If the public key of A is 35. Then the private key of A is.

Q16. Consider a network with five nodes, N1 to N5, as shown below The network uses a Distance Vector Routing protocol. Once the routes have stabilized, the distance vectors at different nodes are as following.
N1:(0, 1, 7, 8, 4)
N2:(1, 0, 6, 7, 3)
N3:(7, 6, 0, 2, 6)
N4:(8, 7, 2, 0, 4)
N5:(4, 3, 6, 4, 0)
Each distance vector is the distance of the best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both directions. In each round, all nodes exchange their distance vectors with their respective neighbours. Then all nodes update their distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors.
The cost of link N2-N3 reduces to 2 (in both directions). After the next round of update what will be the new distance vector at node, N3?(GATE-2011)



Q17. Suppose a network with IP Address 192.16.0.0. is divided into 2 subnets, find number of hosts per subnet. Also for the first subnet, find-

1. Subnet Address
2. First Host ID
3. Last Host ID
4. Broadcast Address

Q18. You have an interface on a router with the IP address of 192.168.192.10/29. What is the broadcast address the hosts will use on this LAN?

Q19. An IPv4 packet has arrived with the first 8 bits as shown: 01000010. The receiver discards the packet. Why?

Q20. In an IPv4 packet, the value of HLEN is 1000 in binary. How many bytes of options are being carried by this packet?