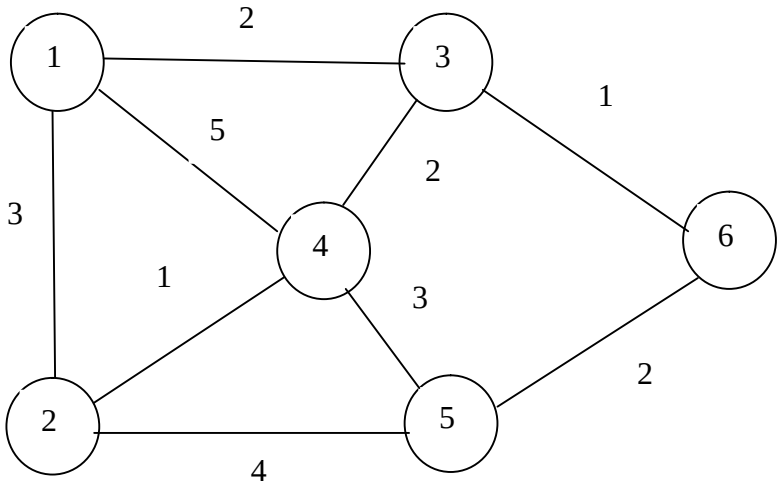
(b) Give the routing table for node 6 using distance vector routing algorithm.



(5 + 2) + 5 = 12

Group – E

8. (a) TCP opens a connection using an initial sequence number (ISN) 14,454. The other party opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment.

(b) A leaky bucket is used to control liquid flow. How many gallons of liquid are left in the bucket if the output rate is 5gal / min? Assume that there is an input burst of100 gal/min for 12 sec, and there is no input for 48 sec.

(c) Write short note on:
(i) DNS (ii) proxy ARP

3 + 3 + (2 × 3) = 12

9. (a) Explain how connection oriented service can be implemented in a network which provides connectionless service.

(b) How many RTT does a TCP connection take to transmit n packets?

(c) Write short note on:

(i) SMTP (ii) NCP

3 + 3 + (2 × 3) = 12

B.TECH/IT/6TH SEM/INFO 3202/2017
COMPUTER NETWORK
(INFO 3202)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Which of the following protocols uses both TCP and UDP?
(a) FTP (b) SMTP (c) Telnet (d) DNS.

(ii) You need 500 subnets, each with about 100 usable host addresses per subnet. What mask will you assign using a Class B network address?
(a) 255.255.255.252 (b) 255.255.255.0
(c) 255.255.255.128 (d) 255.255.254.0.

(iii) You have 10 hosts plus a server connected to a switch. Each device is running 10Mbps half duplex. What is the bandwidth available for each device when it communicates to the server?
(a) 1 Mbps (b) 10 Mbps (c) 2 Mbps (d) 100 Mbps.

(iv) Which is the correct order when data is encapsulated?
(a) Data, frame, packet, segment, bit
(b) Segment, data, packet, frame, bit
(c) Data, segment, packet, frame, bit
(d) Data, segment, frame, packet, bit.

(v) Which of the following protocol guides email receiving?
(a) SMTP (b) SCTP (c) TCP (d) POP3.

(vi) What protocol is used to find the hardware address of a local device?
(a) RARP (b) ARP (c) IP (d) ICMP.

(vii) What is the subnetwork address for a host with the IP address 200.10.5.68/28?
(a) 200.10.5.56 (b) 200.10.5.32 (c) 200.10.5.64 (d) 200.10.5.0.

(viii) In a Go-Back-N ARQ, if the window size is 63, what is the range of sequence numbers?
(a) 0 - 63 (b) 0 - 64 (c) 1 - 63 (d) 1 - 64.

(ix) TCP is a ..... protocol.
(a) packet oriented (b) message oriented
(c) byte oriented (d) bit oriented.

(x) Which of the following is true?
(a) Distance vector and link state routing has equal message complexity
(b) Distance vector has lower message complexity than link state routing
(c) Link state routing has lower message complexity than distance vector
(d) None of the above.

Group – B

2. (a) What are the two approaches of packet switching? Distinguish between them.

(b) Discuss the functions of physical and presentation layer with atleast one example.

(c) For each of the following networks, discuss the consequences if a connection fails:
i) Five devices arranged in a bus topology
ii) Five devices arranged in a ring topology.

(2 + 4) + (2 + 2) + (2 × 1) = 12

3. (a) Bridge and switch both works in data link layer. Why do we need different devices in the same layer? Differentiate between bridge and switch.

(b) Let the information sequence is 110110101010 and the divisor polynomial is $x^3 + x^2 + 1$. Find the sent codeword corresponding to the information sequence. Suppose that the codeword has a transmission error in the 4th bit from LSB. What does the receiver obtain when it does its error checking?

4 + (5 + 3) = 12

Group – C

4. (a) Let n_f is the number of bits in the information frame including n_0 number of overhead bits, n_a is the number of bits in the ACK frame and R is the bit rate of the transmission channel, and d is the propagation delay. Calculate the efficiency of Stop-and-Wait ARQ in the system.(Assume that P_f is the probability that a frame transmission has errors and needs to be retransmitted).

(b) Show the bit stream transmitted by the HDLC protocol, if message to be transmitted is : 101111111011111101010

(c) Prove that the minimum frame site in Ethernet is 64 Byte.

6 + 2 + 4 = 12

5. (a) Distinguish between non-persistent CSMA and 1-persistent CSMA, with respect to delay and collissions.

(b) Explain how the Slotted ALOHA improves the performance over Pure ALOHA.

(c) A CSMA/CD network has a bandwidth of 20×10^6 bps. The maximum signal propagation time from one node to another is 40 microseconds. What is the minimum frame size for this network?

4 + 4 + 4 = 12

Group – D

6. (a) Suppose a router receives an IP packet containing 600 data bytes and has to forward the packet to a network with maximum transmission unit of 200 bytes. Assume that the IP header is 20 bytes long. Show the fragments that the router creates and specify the relevant values in each fragment header (i.e., total length, fragment offset, and flag bits).

(b) Why do we need Hierarchical routing?

(c) What are the pros and cons of en-route reassembly and reassembly at the end host?

6 + 3 + 3 = 12

7. (a) An organization needs total 12 subnets divided into following blocks:--
2 subnets each with 128 addresses
2 subnets each with 64 addresses
2 subnets each with 32 addresses
3 subnets each with 16 addresses
3 subnets each with 4 addresses
An ISP provides an address 152.56.72.0/22, to them. Design the subnets. Find out how many addresses are still available after this allocation