Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1. Attempt any FOUR **[20]**

a Explain with example bit stuffing and byte stuffing in HDLC protocol. **[05]**

b Differentiate between IPv4 and IPv6. **[05]**

c Draw IPv4 header and explain its fields. **[05]**

d Differentiate between TCP and UDP protocol. **[05]**

e Explain Piggybacking in error control. **[05]**

Q2. a Explain CLOS non-blocking switching fabric with proper diagram. **[10]**
Sketch the three stage Space Division switch with N=18, group size of n=6, k=2. What is the condition required to make it non-blocking?

b Explain virtual circuit approach and datagram approach in packet switching. **[10]**

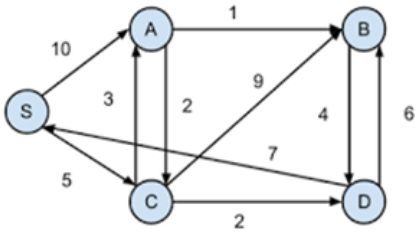
Q3. a Compare error control and flow control. **[05]**
Consider the use of 1000 bit frames on a 1 Mbps satellite channel with a 270ms delay. What is the maximum link utilization for **[05]**

a. Stop-and-wait flow control?
b. Continuous flow control with a window size of 7?
c. Continuous flow control with a window size of 127?
d. Continuous flow control with a window size of 255?

b Explain the need for the nonpersistent, 1-persistent and p-persistent CSMA and their working with neat diagrams. **[10]**

Q4. a Explain the classful addressing in IPv4. **[05]**
An address in a block is given as 194.146.24.50/25. Find the subnet mask, number of addresses in the block, the first address, and the last address in the block **[05]**

b **[10]**



Find and draw the shortest route from source node 's' to all other nodes using Dijkstra's and Bellman-Ford algorithm

Q5. a Discuss simple ALOHA and slotted ALOHA protocols with proper diagrams. Compare their throughput. **[10]**

b A is the primary station connected to the two secondary stations B and C in a half-duplex data transfer mode. Sketch the sequence of HDLC frames issued to implemented the data transfer for the following events: **[10]**

i) A sends a command to set up the NRM mode to B and C stations.
ii) The secondary stations B and C respond positively.
iii) A selects station C for initiating data transfer.
iv) C responds positively.
v) A sends frames 0, 1, 2, 3 to C and C acknowledges all the frames except 3.
vi) Station C sends positive acknowledgement for frame 3.

A sends a command to disconnect the data transfer mode and C acknowledges it properly.

Q6. a Explain domains and domain name space in DNS protocol. **[10]**

b Discuss the closed-loop congestion control mechanisms. **[10]**

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