



**DHARMSINH DESAI UNIVERSITY, NADIAD**  
**FACULTY OF TECHNOLOGY**  
**SECOND SESSIONAL**  
**SUBJECT: (CE-611) COMPUTER NETWORKS**

Examination : B.Tech Semester VI  
Date : 04/02/2025  
Time : 2:30 PM to 3:45 PM

Seat No. : 103  
Day : Tuesday  
Max. Marks : 36

**INSTRUCTIONS:**

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

- Q.1 Do as directed.** [12]
- CO4 N (a) Give the difference between Datagram subnet and Virtual circuit subnet with respect to following points: (1) Addressing (2) Effect of Router failure [2]
- CO4 E (b) Two popular routing algorithms are Distance Vector (DV) and Link State (LS) routing. Which of the following(s) is/are true? [2]
- (S1) Count to infinity is a problem only with DV and not LS routing  
(S2) In LS, the shortest path algorithm is run only at one node  
(S3) In DV, the shortest path algorithm is run only at one node  
(S4) DV requires lesser number of network messages than LS
- CO2 A (c) Consider a system generating 20 bit frames and connected through a shared 20 kbps channel. Find throughput if pure ALOHA is used and frame rate is 1000 fps. [2]
- CO4 A (d) What is the main purpose of using UDP over just raw IP? What is the maximum possible length of a UDP datagram? [2]
- CO2 R (e) Which events are needed to be addressed for implementing Go back n protocol? It uses 4 bits sequence number to transmit frames. [2]
- CO2 N (f) A TCP connection is transferring a file of 6482 bytes using two segments of equal size. The first byte of the second segment is numbered 12113. What is the sequence number of the first segment? [2]

- Q.2 Attempt *Any TWO* from the following questions.** [12]
- CO3 E (a) (i) The transmitter uses Hamming code to transmit the data. The receiver receives codeword 0 0 1 0 1 0 0 1 0 0 1. Find out the data. [6]
- (ii) A TCP connection is established virtually over the communication channel by using three way handshaking process. – is the given statement true/false? Justify your answer.
- CO3 U (b) Explain dynamic window management of TCP in detail. [6]
- CO3 N (c) The size of congestion window of a TCP connection be 64 KB when a timeout occurs. The propagation delay is 100 msec and the maximum segment size used is 4 KB. How much time is taken (in msec) by the TCP connection to get regain the congestion window which was before the timeout episode? Show the procedure. [6]

- Q.3 Answer the following questions.** [12]
- CO3 A (a) Consider a network with four routers: A, B, C, and D. The following distance table is provided at the start, where the numbers represent the cost to reach each destination: [6]

Router	A	B	C	D
A	0	3	$\infty$	7
B	3	0	2	$\infty$
C	$\infty$	2	0	4
D	7	$\infty$	4	0



Using the distance vector routing algorithm, update the routing table for router A and D after one round of distance vector exchange. Show all the intermediate steps. Now suppose the cost between Router B to C changes from 2 to 3. How does this change impact the routing tables of A and D in the network after one round of distance vector exchange?

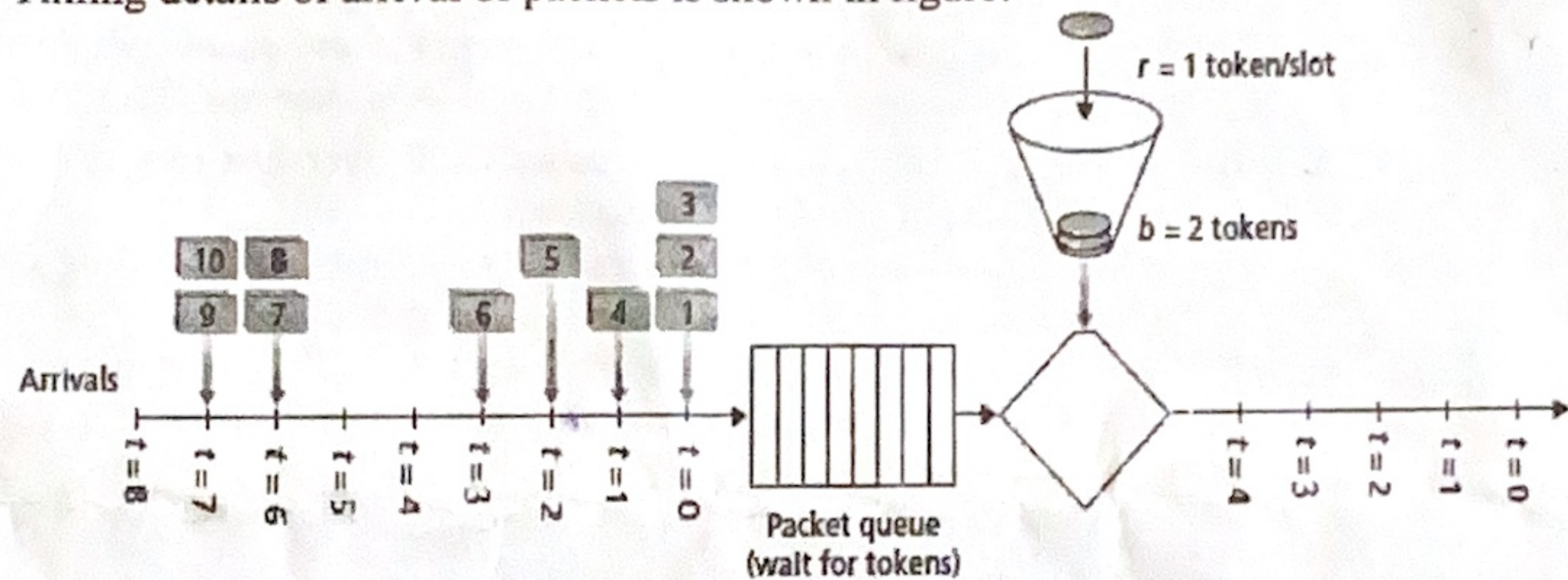
CO1 U (b) Explain hierarchical routing. [3]

CO1 N (c) Two hosts are connected via a packet switch with  $10^7$  bits per second links. Each link has a propagation delay of 20 microseconds. The switch begins forwarding a packet 35 microseconds after it receives the same. If 10000 bits of data are to be transmitted between the two hosts using a packet size of 5000 bits, the time elapsed between the transmission of the first bit of data and the reception of the last of the data in microsecond is \_\_\_\_\_. Show the procedure. [3]

OR

Q.3 Answer the following questions. [12]

CO3 A (a) Consider the figure below, the token buffer can hold at most two tokens and it is initially full at  $t=0$ . New token arrives at a rate of one token per slot. Packets (if any) arrive at the beginning of the slot. Thus in the figure, packets 1, 2, and 3 arrive in slot 0. Packets proceed towards the front of the queue in a FIFO manner. The output link speed is such that if two packets obtain tokens at the beginning of a time slot, they can both go to the output link in the same slot. Assume that initially queue is empty. Timing details of arrival of packets is shown in figure. [6]

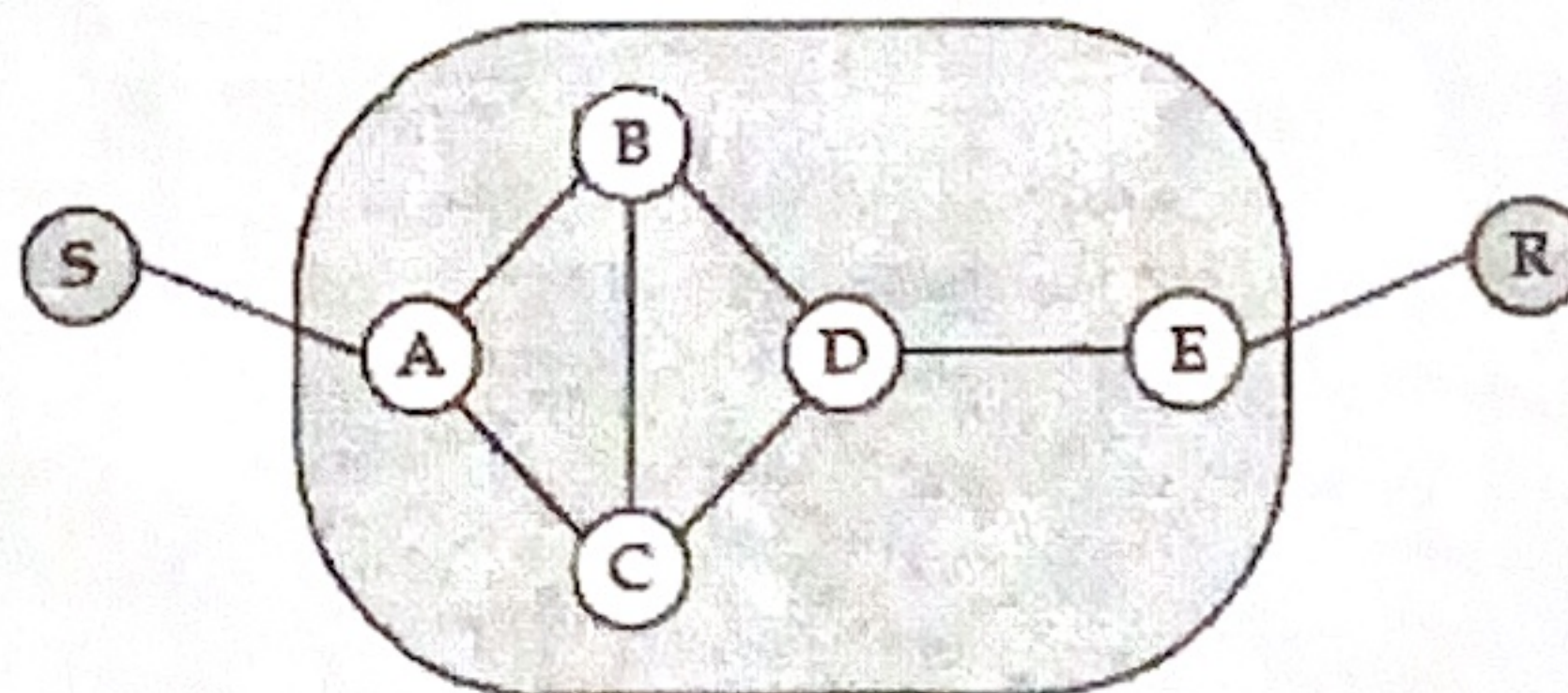


For each time slot, identify

1. The packet(s) that is in the queue.
2. The number of tokens in the bucket, immediately after the arrivals have been processed but before any of the packets have passed through the queue and removed a token.
3. The packet(s) that appears on the output after the token(s) has been removed from the queue.

CO1 U (b) Explain techniques to damp the flood. [3]

CO1 N (c) Consider the Network below : [3]



Suppose that it uses flooding as a routing algorithm. If a packet sent by A to E has a maximum hop count of 3, list all the routes it will take and find the total number of packets generated.