



## MAKE UP EXAMINATIONS - APRIL 2021

Program : **B.E. : Computer Science and Engineering**  
Course Name : **Computer Networks**  
Course Code : **CS53**

Semester : **V**  
Max. Marks : **100**  
Duration : **3 Hrs**

### Instructions to the Candidates:

- Answer one full question from each unit.
- Write figures wherever necessary.

### UNIT- I

- Discuss the need for web cache and explain the process involved in client requesting the object from web cache with an example. CO1 (06)
  - Describe HTTP request and response message formats with neat figure. CO1 (08)
  - Determine the file distribution time for client server architecture and illustrate the problem with file distribution in client server architecture. CO1 (06)
- Explain with an example interaction with various DNS servers for obtaining IP address. CO1 (06)
  - Differentiate between FTP and SMTP. CO1 (06)
  - Identify the problem circular DHT and write appropriate solution and discuss the need for peer churn in DHT with an example. CO1 (08)

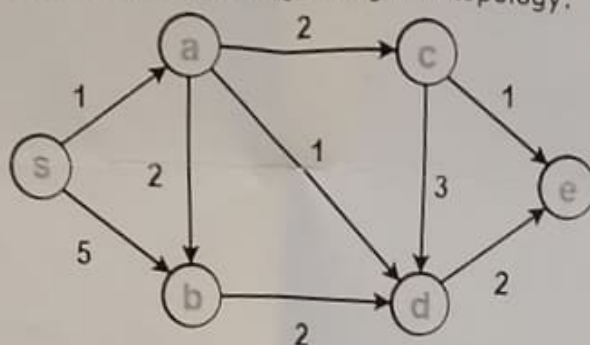
### UNIT - II

- Identify the 3 phases of TCP congestion control. Suppose the TCP congestion window is set to 18KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful? Assume that the maximum segment size is 1KB. CO2 (06)
  - With a neat UDP segment structure explain all its fields. Also, discuss the use of the following flags of TCP segment  
i) PUSH ii) URG iii) SYN iv) RST. CO2 (07)
  - Discuss the fast retransmit with the advantage of using it. TCP waits until it has received three duplicate ACKs before performing a fast retransmit. Why do you think the TCP designers chose not to perform a fast retransmit after the first duplicate ACK for a segment is received. CO2 (07)
- Illustrate with neat figures the sequence of TCP states visited by the TCP client and TCP server. Explain the events that make the client and server to transition into these states. CO2 (08)
  - Answer the following True or False problems. If it's False, explain why. CO2 (06)
    - Host A is sending host B a large file over a TCP connection. Assume host B has no data to send to A. Host B will not send acknowledgements to host A because host B cannot piggyback the acknowledgement on data.
    - Suppose host A is sending host B a large file over a TCP connection. If the sequence number for a segment of this connection is  $m$ , then the sequence number for the subsequent segment will necessarily be  $m+1$ .

- iii) Suppose host A sends host B one segment with sequence number 38 and 4 bytes of data. Then in the same segment the acknowledgement number is necessarily 42.
- iv) Suppose that the last sample RTT in a TCP connection is equal to 1 second. Then timeout for the connection will necessarily be set to a value  $\geq 1$  second.
- v) Consider congestion control in TCP. When a timer expires at the sender, the threshold is set to one half of its previous value.
- c) Give brief description about the flow control. What is the relationship between the variable LastByteSent and the variable LastByteRcvd in TCP congestion control with suitable formula? CO2

### UNIT - III

- 5. a) Write an algorithm for routing information protocol. CO3
- b) An ISP is granted the block 80.70.56.0/21. The ISP needs to allocate addresses for two organizations each with 500 addresses, two organizations each with 250 addresses, and three organizations each with 50 addresses. CO3
  - i. Find the number and range of addresses in the ISP block.
  - ii. Find the range of addresses for each organization and the range of unallocated addresses.
  - iii. Show the outline of the address distribution and the forwarding table.
- c) Write an algorithm for Dijkstra's. Using Dijkstra's algorithm, find the least-cost path from node 's' to node 'e' for the given topology. CO3 (09)



- 6. a) What is the need of packet fragmentation? Suppose Host A is sending a 3500-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. The packet has an IP header of 20 bytes plus another attached header of 20 bytes. Fragment the packet, and specify the ID, MF, and offset fields of all fragments. CO3 (08)
- b) Discuss the two examples of Non-Least-Cost-Path Routing algorithm. CO3 (06)
- c) Discuss the three strategies used in transition from IPv4 to IPv6. CO3 (06)

### UNIT - IV

- 7. a) Identify the advanced capabilities of 802.11. CO4 (04)
- b) Illustrate the process of registration with home agent with a neat figure. CO4 (08)
- c) Discuss Protocol Independent Multicast protocol and write the algorithm for the same. CO4 (08)
- 8. a) Explain 3G cellular network architecture with a neat figure. CO4 (08)
- b) With a neat figure explain indirect routing to a mobile node. CO4 (06)
- c) Differentiate between sparse mode and dense mode multicast tree algorithm. CO4 (06)



## UNIT - V

9. a) Apply the knowledge on RTCP concepts to solve the problem. Consider an RTP session consist of 4 users, all of which are sending and receiving RTP packets in to the same Multicast address, each user sends video at 100 kbps. CO5 (05)

(i) What is the rate of RTCP to limit the traffic?

(ii) How much RTCP bandwidth will be allocated for particular receiver?

- b) We have five packets to transmit in real time. The estimated average jitter until the time of first is 0.02 ms. Below table shows the timestamp of RTP data packets indicated by source,  $t_i$ , and the arrival times of RTP packets at receiver  $a_i$ . Assume that the normalizing coefficient  $k$  is 0.2. CO5 (07)

I	$a_i$	$T_i$
1	43	69
1	45	74
1	47	73
1	49	91
1	51	99

- c) Discuss four major components of traffic conditioner and explain the operation of differentiated services with neat figure. CO5 (08)

10. a) Explain the role of the DNS in CDN with an example. CO5 (06)

- b) Consider a token-bucket traffic shaper. Let the bucket size be  $b$  bits and the token arrival rate be  $v$  b/s; let the maximum output data rate be  $z$  b/s. CO5 (07)

i. Derive an equation for  $T_b$ , the time consumed for flow to be transmitted at the maximum rate.

ii. Find  $T_b$  when the bucket size is  $b=0.5\text{Mb}$ ,  $v=10\text{Mb/s}$ , and  $z=100\text{Mb/s}$ .

- c) Describe the need of providing QoS for streaming with an example and providing QoS at the main router connecting to an internet service provider. CO5 (07)

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