



# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India  
(Autonomous College Affiliated to University of Mumbai)

## End Semester Examination 2019-20

Max. Marks: 60

Duration: 180 Min

Class: T.E.

Semester: V

Course Code: CE51

Branch: Computer Engineering

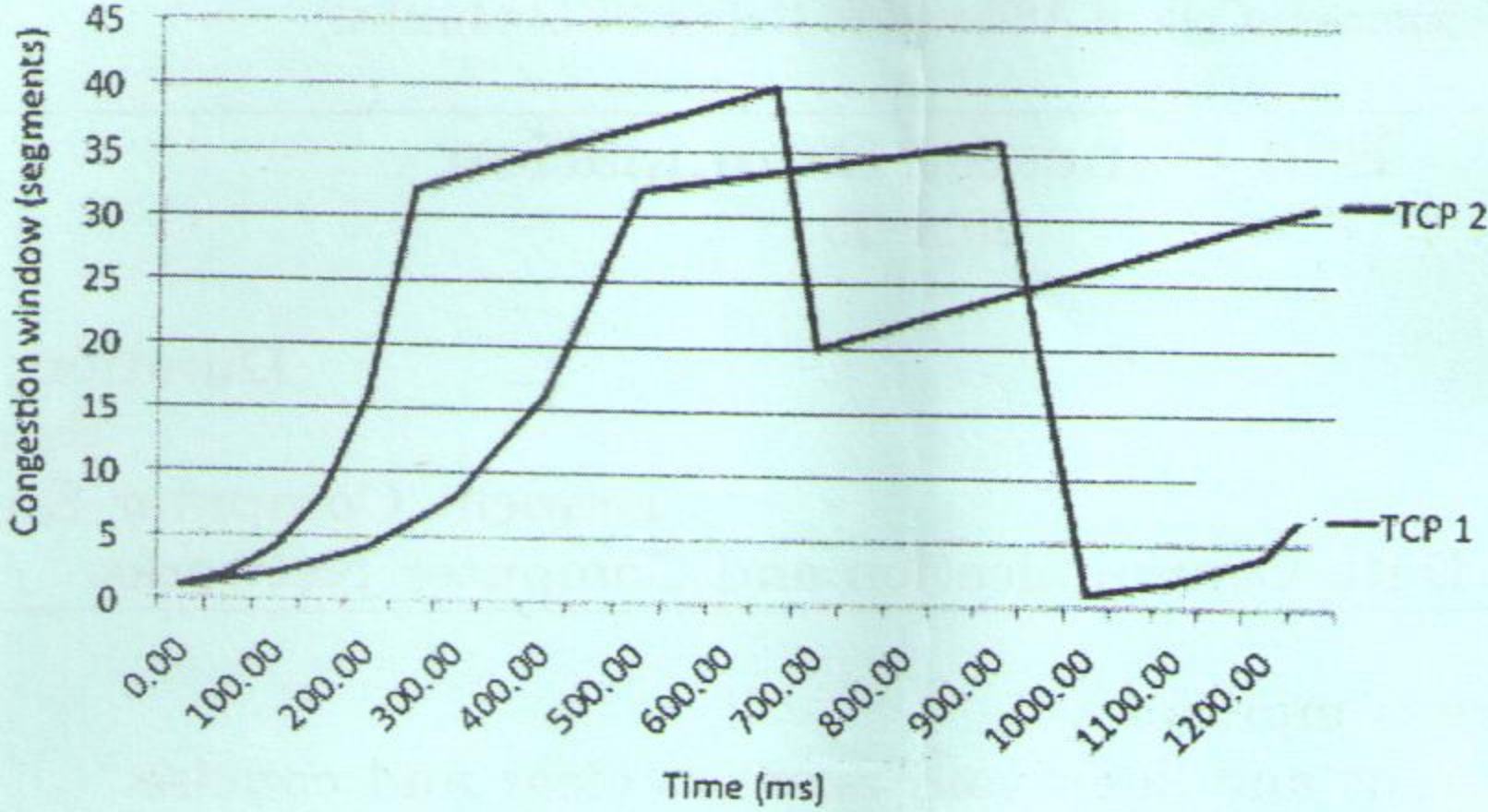
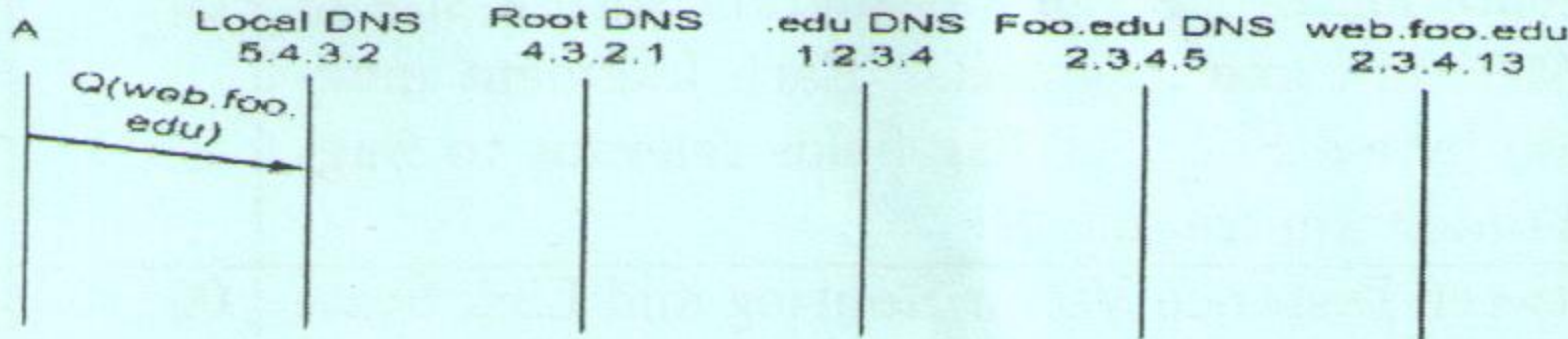
Name of the Course: Data Communication and Computer Networks

### Instruction:

- (1) All questions are compulsory.
- (2) Draw neat diagrams and keep your answers clear and concise.
- (3) Assume suitable data if necessary.
- (4) Note there is no fractional marks for partly correct answer.

Q No.	Question	Max. Marks	CO-BL-PI
Q.1 (a)	Given the dataword 1010011110 and the divisor 10111, i) Show the generation of the codeword at the sender site (using binary division). ii) Show the checking of the codeword at the receiver site (assume no error).	06	3-3-2.1.2
	OR		
	Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols? i) Stop-and-Wait ARQ ii) Go-Back-N ARQ iii) Selective-Repeat ARQ	06	4-3-2.1.2
Q.1 (b)	Compare and contrast the Go-Back-N ARQ Protocol with Selective-Repeat ARQ.	06	4-4-2.4.2
Q.2 (a)	An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets. i) Find the subnet mask. ii) Find the number of addresses in each subnet. iii) Find the first and last addresses in subnet 1. iv) Find the first and last addresses in subnet 32.	06	4-3-2.4.2
	OR		
	Show the fragmentation process of a datagram with a size of 4000 bytes (0-3999) in three fragments. Each fragment maximum size is 1400 bytes. Show all flag fields relevant to fragmentation of all datagram fragments.	06	4-3-2.3.1
Q.2 (b)	Differentiate between Distance Vector Routing and Link State Routing.	06	4-1-2.4.1



Q.3 (a)	<p>For this problem consider Figure 4 and answer the following questions. In all cases provide a short discussion justifying your answer</p>  <p>(i) For the TCP1 transmission, identify the time intervals when TCP slow start is operating.</p> <p>ii) For the TCP2 transmission, identify the time intervals when TCP slow start is operating.</p> <p>iii) For TCP1 transmission, identify the time intervals when congestion avoidance is operating.</p> <p>iv) For TCP2 transmission, is the segment loss detected by triple duplicate ACK or by timeout?</p> <p>v) What is the initial value of ssthresh?</p> <p>vi) There are two ways to terminate a TCP connection, what are they?</p>	06	4-3-2
Q.3 (b)	<p>i) How traffic characterization in leaky bucket differ from token bucket</p> <p>ii) Consider the arrival traffic characterized by a token bucket with the following parameters: <math>r</math> (average rate) = 5 Mbps, <math>R</math> (maximum rate) = 10 Mbps, and <math>b</math> (token depth) = 100 Kb. Compute the duration of time for which a flow can send at rate <math>R</math> before exhausting its tokens.</p> <p>iii) Using your previous answer, compute the number of bits transmitted before the flow depletes its tokens.</p>	06	4-3-2.2.3
Q.4 (a)	<p>i) The diagram below shows a DNS query from a host A to its local DNS server. The IP addresses of all hosts are shown in the diagram. The label "Q(web.foo.edu)" specifies the query string. Complete the diagram showing all packets sent to resolve the name and continuing through the opening of a TCP connection to the web site and the first GET request. All arrows that represent DNS queries should have a label of the form "Q(a.b.edu)" and replies should have a label of the form "R(b.edu=2.3.7.11)". TCP connection packets should be labeled with the appropriate flags and HTTP packets with the request type. Assume that the local DNS server performs recursive processing and has nothing in its cache, while the others perform iterative processing. You may assume that all queries and responses are for A records.</p> 	06	4-3-2.2



	<p>ii) List all the mappings in the local DNS server's cache after the query has been processed.</p> <p>iii) List the mappings in the local server's cache if the .edu server did recursive processing rather than iterative.</p>		
Q.4 (b)	<p>Suppose Wallace wants to send email message to Gromit. This will involve 4 entities: Wallace's mail client (for email composition and sending), Wallace's outgoing mail server, Gromit's incoming mail server and Gromit's mail client (for email retrieving and viewing). Between which of these four entities SMTP protocol will operate? What about the IMAP protocol? Draw suitable schematic diagram and explain.</p>	06	4-2-2.2.2
	OR		
Q.4 (a)	<p>A user in Mumbai, connected to the internet via a 100 Mb/s (b=bits) connection retrieves a 250 KB (B=bytes) web page from a server in Singapore, where the page references three images of 500 KB each. Assume that the one way propagation delay is 75 ms and that the user's access link is the bandwidth bottleneck for this connection.</p> <p>i) Approximately how long does it take for the page (including images) to appear on the user's screen, assuming non-persistent HTTP using a single connection at a time (for this part, you should ignore queueing delay and transmission delays at other links in the network)?</p> <p>ii) How long does it take if the connection uses persistent HTTP (single connection)?</p> <p>iii) Suppose that user's access router has a 4 MB buffer (B=byte) on the link from the router to the user. How much delay does this buffer add during periods when the buffer is full?</p>	06	4-3-2.2.3
Q.4 (b)	<p>What is the primary difference between HTTP 1.0 and HTTP 1.1? Draw suitable diagram with notations. Draw suitable figure and Explain the difference carefully, not just name it. What is the benefit of this difference?</p>	06	4-2-2.2.2
Q.5 (a)	<p><b>Answer any TWO ONLY</b></p> <p>i) Name the layer of OSI reference model where following protocol services running HTTP, FTP, SMTP, DNS, ICMP, OSPF, TLS, TCP, ICMP, IGMP</p> <p>ii) Suppose we send into the Internet two IP datagrams, each carrying a different UDP segment. The first datagram has source IP address A1, destination IP address B, source port P1, and destination port T. The second datagram has source IP address A2, destination IP address B, source port P2, and destination port T. Suppose that A1 is different from A2 and P1 is different from P2. Assuming that both datagrams reach their final destination, will the two UDP datagrams be received by the same socket? Why or why not? Justify your answer.</p> <p>iii) For each of the following, annotate it with "IS" if it applies to Integrated Services (IntServ), "DS" if it applies to Differentiated Services (DiffServ), and "BE" if it applies to Best Effort. (A given statement can apply to more than just one type of service.)</p>	06	3-2-2.2.2



	<p>a) Among the three, requires the most state in routers.</p> <p>b) Is widely available in the Internet today.</p> <p>c) Provides isolation and guarantees among aggregated flows but not individual connections</p>		
Q.5 (b)	<p><b>Answer Any TWO only</b></p> <p>i) State the control fields of I-Frame, S-Frame and U-Frame of HDLC protocol.</p> <p>ii) Differentiate between RIP and OSPF.</p> <p>iii) Exemplify NRZ-L and NRZ-I Line Coding Schemes</p>	06	<p>1-1-2.3.1</p> <p>4-4-2.3.1</p> <p>3-3-2.3.1</p>