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 - Synoptic

2019–20

Duration: 180 Min

Max. Marks: 60

Semester: V

Class: T.E.

Branch: Computer Engineering

Course Code: CE51

Name of the Course: Data Communication and Computer Networks

Instruction:

(1) All questions are compulsory.

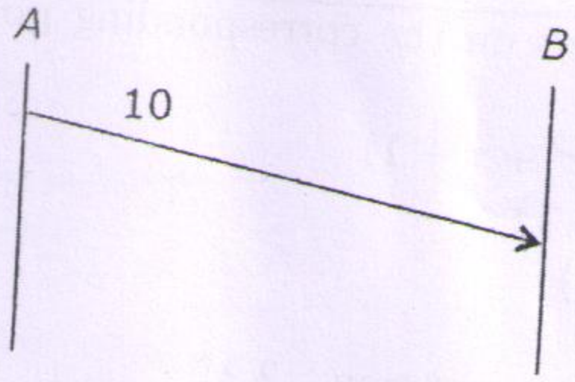
(2) Draw neat diagrams and keep your answers clear and concise.

(3) Assume suitable data if necessary.

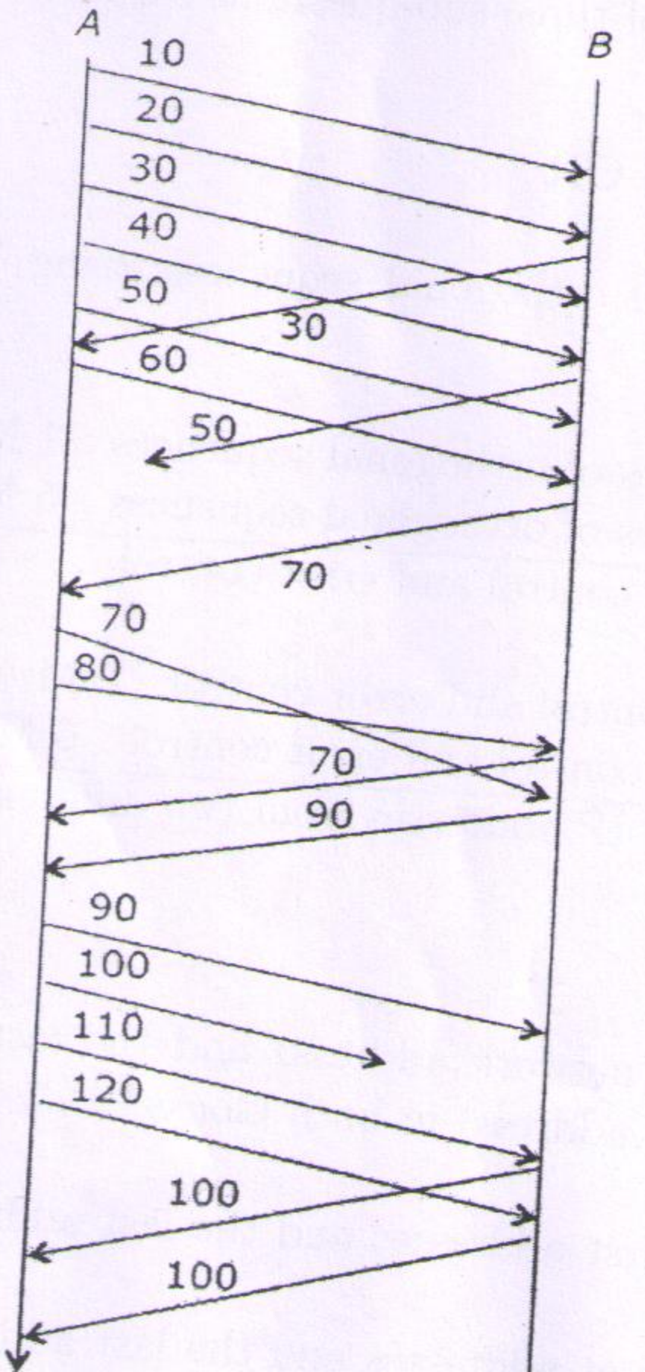
(4) Note there is no fractional marks for partly correct answer.

Q No.	Question	Max. Marks	CO-BL-PI
Q.1 (a)	Apply the following operations on the corresponding polynomials: i) $(x^3 + x^2 + x + 1) - (x^4 + x^2 + x + 1)$ ii) $(x^3 + x^2) \times (x^4 + x^2 + x + 1)$ iii) $(x^3 + x^2 + x + 1)/(x^2 + 1)$ **Answer:** Correct polynomial of each sub-question : 2 M Three Correct polynomials of three sub-questions : 6 M	06	1-3-2.4.1
	OR		
	Prove the five properties of orthogonal sequences using W2 walsh table. **Answer:** Statements of five properties of orthogonal sequences : 1 M Five proofs of five properties of orthogonal sequences : 5 M	06	
Q.1 (b)	Compare and contrast flow control and error control **Answer:** Each comparison of flow control and error control : 2 M Three comparisons of flow control and error control : 6 M	06	3-4-2.2.4
Q.2 (a)	Consider the following two IP addresses from two different IP blocks of addresses i) 25.34.12.56/16 ii) 182.44.82.16/26 Find the first addresses (network address) and the last addresses (limited broadcast address) in both blocks? **Answer:** Calculation and correct first addresses and the last addresses of 25.34.12.56/16 : 3 M	06	2-3-2.4.1

Q.2 (b)	A sender sends a series of packets to the same destination using 5-bit sequence numbers. If the sequence number starts with 0, what is the sequence number after sending 100, 200 and 301 packets? **Answer:** Correct sequence number after sending 100 packets : 2 M Correct sequence number after sending 200 packets : 2 M Correct sequence number after sending 301 packets : 2 M	06	3-3-2.4.1
Q.3 (a)	Consider Following figure 1 where a TCP sender that sends 10 bytes per packet. Suppose that the sender transmits six packets one right after another (including the one shown at right). (i) Show the packets and the corresponding acks that TCP would return in a typical situation. Label the data packets with the sequence number and the ack packets with the ack number.If the second of the acks is lost, will the sender retransmit any packets? Why or why not? (ii) Continuing the example, suppose that the next two packets sent arrive out of order and that the sender transmits four more packets after these and that the second packet in this group of four is lost. Extend the diagram to show these packets and the resulting acknowledgments. You need not show the retransmission of the lost packet.	06	4-3-2.2.3



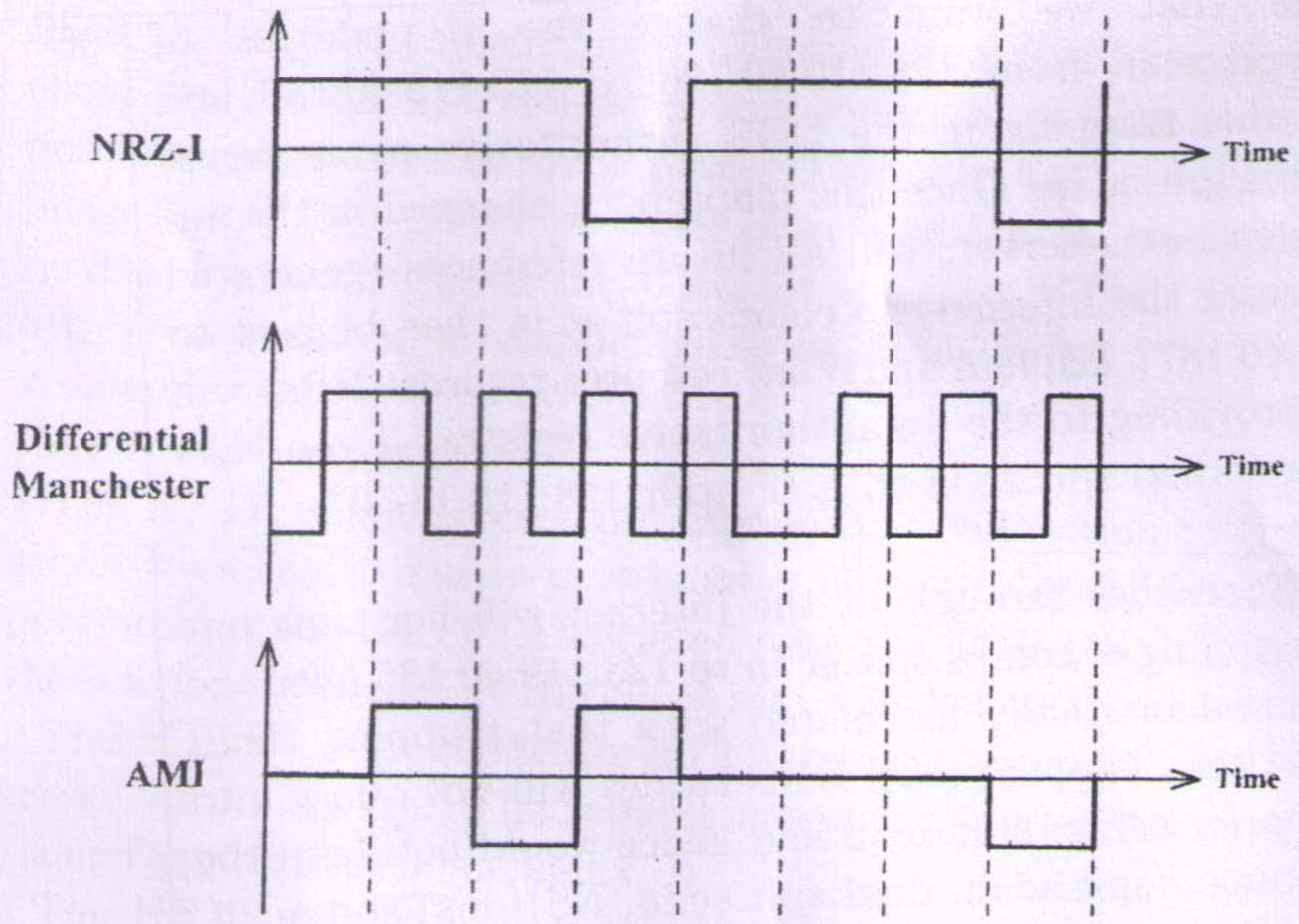
Answer:



Q.3 (b)	A computer on a 6-Mbps network is regulated by a token bucket. The token bucket is filled with a rate 1 Mbps. The bucket is initially filled to capacity with 1 Mb. How long can the computer transmit at the full 6 Mbps? **Answer:** The net outflow from the token bucket is 5Mbps. As a result, the time it takes for the full bucket to empty is 1Mb/5Mbps=0.2sec. Thus, during the first 0.2 seconds the computer transmits at the maximum 6-Mbps rate and then it switches to 1-Mbps.	06	4-3-2.2.3
Q.4 (a)	A user in Mumbai, connected to the internet via a 5 Mb/s connection retrieves a 50KB (B=bytes) web page from a web server in Delhi, where the page references 4 images of 300 KB each. Assume that the one way propagation delay is 20ms. (i) Approximately how long does it take for the page (including images) to appear on the user's screen, assuming persistent HTTP? **Answer:** 3RTT + transmission time3RTT= 120 ms transmission time = (50KB + 1.2MB) /5 Mb/s =10 Mb/5 Mb/s = 2 secondstotal = 2.12 seconds (ii) How long would it take using non-persistent HTTP(assume a single connection)? **Answer:** 2(1 + number of objects in page)RTT plus transmission time400 ms + 2 seconds = 2.4seconds	06	4-3-2.2.2

Q.4 (b)	Show the steps of transferring a Web page from SPIT server to client for the case of non-persistent connections. Let's suppose the page consists of a base HTML file and 10 JPEG images, and that all 11 of these objects reside on the same server. Further suppose the URL for the base HTML file is http://www.spit.ac.in/compenigneering/home.index **Answer:** Here is what happens: 1.The HTTP client process initiates a TCP connection to the server www. spit.ac.in on port number 80, which is the default port number for HTTP. Associated with the TCP connection, there will be a socket at the client and a socket at the server. 2.The HTTP client sends an HTTP request message to the server via its socket. The request message includes the path /someDepartment/home.index. 3.The HTTP server process receives the request message via its socket, retrieves the object / someDepartment/ home.index from its storage, encapsulates the object in an HTTP response message, and sends the response message to the client via its socket. 4.The HTTP server process tells TCP to close the TCP connection. 5.The HTTP client receives the response message. The TCP connection terminates. The message indicates that the encapsulated object is an HTML file. The client extracts the file from the response message, examines the HTML file, and finds references to the 10 JPEG objects. 6.The first four steps are then repeated for each of the referenced JPEG objects.	06	4-2-2.2.2
	OR		
Q.4 (a)	What is the main striking difference between FTP and HTTP? Explain thoroughly. **Answer:** The most striking difference HTTP and FTP is that FTP uses two parallel TCP connections to transfer a file, a control connection and a data connection. The data connection is used to actually send a file. The control connection is used for sending control information between the two hosts— information such as user identification, password, commands to change remote directory, and commands to " put" and " get" files.	06	4-3-2.2.3

Q.4 (b)	Suppose that we want to change the IP address of comps.spit.ac.in from 128.119.40.186 to 128.119.40.187 and change this mapping in the DNS authoritative name server for comps.spit.ac.in. Once this mapping is changed in the authoritative name server, will all future references (generated anywhere in the Internet) to comps.spit.ac.in then be sent to 128.119.40.187? Explain andWhat resource records (RRs) will you be providing to the .in authoritative registrar if you have dns server: dns1.spit.ac.in with IP addr 128.118.13.50? **Answer:** Local DNS caches throughout the Internet will not time out the old mapping of comps.spit.ac.in to 128.119.40.186 until the valid interval originally associated with that mapping times out. Until that happen, local DNS caches will not query into the system for comps.spit.ac.in and hence would not learn the new mapping. (spit.ac.in, dns1.spit.ac.in, NS)(dns1.spit.ac.in, 128.118.13.50, A)	06	4-2-2.2.2
Q.5 (a)	**Answer ANY TWO** (i) Suppose that a receiver in its effort to control the bursts from the transmitter it delays sending ACKs until it has enough empty buffers. What is a possible problem with such a strategy? How can these problems be resolved? **Answer:** Delaying the acknowledgements may be interpreted as lost packet and/or congestions thus it will trigger unwanted actions (e.g., packet retransmissions) at the sending side. A possible solution is to allow the receiver to explicitly tell the transmitter how much data to send (e.g., use a flow control window as in TCP). (ii) Name reservation styles used by RSVP and indicate their type of reservation options they use. **Answer:** Fixed filter: Distinct reservation option, Wildcard filter and shared explicit : Shared reservation (iii) In a DNS server, what fields are represented by four-tuple of resource record? **Answer:** Name, Value, Type, TTL. The meaning of Name and Value depend on Type: • If Type= A, then Name is a hostname and Value is the IP address for the host-name. Thus, a Type A record provides the standard hostname-to-IP address mapping. As an example, (relay1.bar.foo. com, 145.37.93.126, A) is a Type A record. • If Type= NS, then Name is a domain and Value is the host-name of an authoritative DNS server that knows how to obtain the IP addresses for hosts in the domain. This record is used to route DNS queries further along in the query chain. As an example, (foo.com, dns.foo.com, NS) is a Type NS record.	06	3-2-2.2.2
Q.5 (b)	Find the 8-bit data stream for each case depicted in Figure.	06	1-3-2.4.1



Answer:
Correct 8-bit stream of NRZ-I : 2M
Correct 8-bit stream of Differential Manchester : 2M
Correct 8-bit stream of AMI : 2M