



# Sardar Patel Institute of Technology

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

## Mid Semester Examination

September 2018

Max. Marks: 20

Class: TE

Course Code: IT52 Branch: IT

Name of the Course: Computer Networks

Duration: 60 Minutes

Semester: V

### Instructions:

- (1) All Questions are Compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

Question No.		Max. Marks	CO																																																						
Q.1. (a)	Describe with formula how many links are required to connect 5 nodes in a mesh topology?	1	1																																																						
Q.1. (b)	State the PDU used at any 4 layers of OSI model.	2																																																							
Q.1. (c)	Describe p2p architecture w.r.t. URI persistence, cost and privacy. (Any 2)	1																																																							
Q.1. (d)	What is crosstalk? How is it minimized in case of twisted-pair of wire?	2	2																																																						
Q.2. (a)	<p>Apply Hamming code to transmit data bits 1011 and write down the codeword generated.</p> <p>Consider the Cyclic Redundancy Check (CRC) generator function <math>x^8 + x^2 + x^1 + 1</math>. How many bits will the resulting frame check sequence be?</p> <p style="text-align: center;"><b>OR</b></p> <p>Data transmitted on a link uses the following 2D parity scheme for error detection:</p> <p>Each sequence of 28 bits is arranged in a 4×7 matrix (rows r0through r3, and columns d7 through d1) and is padded with a column d0 and row r4 of parity bits computed using the Even parity scheme. Each bit of column d0 (respectively, row r4) gives the parity of the corresponding row (respectively, column). These 40 bits are transmitted over the data link.</p> <table border="1"><tr><td></td><td>d7</td><td>d6</td><td>d5</td><td>d4</td><td>d3</td><td>d2</td><td>d1</td><td>d0</td></tr><tr><td>r0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>r1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td></tr><tr><td>r2</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>r3</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>r4</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr></table> <p>The table shows data received by a receiver and has n corrupted bits. What is the minimum possible value of n?</p>		d7	d6	d5	d4	d3	d2	d1	d0	r0	0	1	0	1	0	0	1	1	r1	1	1	0	0	1	1	1	0	r2	0	0	0	1	0	1	0	0	r3	0	1	1	0	1	0	1	0	r4	1	1	0	0	0	1	1	0	2+1	4
	d7	d6	d5	d4	d3	d2	d1	d0																																																	
r0	0	1	0	1	0	0	1	1																																																	
r1	1	1	0	0	1	1	1	0																																																	
r2	0	0	0	1	0	1	0	0																																																	
r3	0	1	1	0	1	0	1	0																																																	
r4	1	1	0	0	0	1	1	0																																																	



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Q.2. (b)	Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and go back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost) then what is the number of packets that A will transmit for sending the message to B?	2	4
Q.2. (c)	What should the minimum value of the retransmission timer be in an ARQ protocol and why?	2	
Q.3. (a)	A 2 km long broadcast LAN has $10^7$ bps bandwidth and uses CSMA/CD. The signal travels along the wire at $2 \times 10^8$ m/s. What is the minimum packet size that can be used on this network?  <b>OR</b> Transmission time 1ms, propagation delay 1 ms, bandwidth 4Mbps. Calculate efficiency. If n stations are connected to TDM network and each station needs 2Kbps, how many station can be connected to this network?	4	4
Q.3. (b)	Compare how exponential backoff algorithm is used in CSMA/CD versus CSMA/CA?	3	4