



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

Name of the Course: Computer Networks

Duration: 60 Minutes

Semester: V

Branch: IT

Instructions:

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

Question No.	
Q 1 (a)	Formula: formula 1/2marks, answer ½ marks n =number of nodes $\text{Links required} = n(n-1)/2$ For 5 nodes, links required= $5(4)/2=10$
Q 1 (b)	PDU at various layers: Application layer-Application Transport layer-Segment Network layer-Packet Data link layer: frame Each PDU 1/2 marks
Q 1 (c)	P2P architecture wrt URI persistence: Resources are not removed from the network until they are no longer being requested Cost: Storage and bandwidth are distributed and provided by the entire network. Privacy: Very difficult to determine who is inserting or requesting content. Each point 1/2 marks , any 2 points
Q1 (d)	(a) Crosstalk refers to the picking up of electromagnetic signals from other adjacent wires by electromagnetic induction. (b) When a pair of wires is twisted together, the electromagnetic signals generated by the two wires cancel each other as these are of opposite polarity. This helps to reduce the susceptibility of interference to the adjacent wires. Each point ½ marks.
Q2 (a)	Each parity bit ½ marks, final code word ½ marks. 1010101 Generator function $x^8 + x^2 + x^1 + 1$ bit in frame check sequence-8 answer 1 marks.



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Q2 (b)	<p>Justification $\frac{1}{2}$ marks, answer $\frac{1}{2}$ marks , answer =16 Answer $\frac{1}{2}$ marks, Justification $\frac{1}{2}$ marks</p> <p style="text-align: center;">OR</p> <p>In the given 2D parity matrix, all rows except r1 have even parity. Therefore there must be atleast 1 bit error in this row. Also, there are three columns with odd parities (odd parity indicates errors), d5,d2,d0. So there must be a minimum of 3 bit errors. All three errors could have occurred in r1 or two of these errors could have occurred in any other row. Since r1 has an odd parity, there is at least one bit-error in this row.</p>
Q.2(c)	<p>One RTT. Any less and every packet will be retransmitted before an ACK can possibly be received.</p>
Q3 (a)	<p>A 2 km long broadcast LAN has 10^7 bps bandwidth and uses CSMA/CD. The signal travels along the wire at 2×10^8 m/s. What is the minimum packet size that can be used on this network?</p> <p>For CSMA/CD $T_t \geq 2T_p$ $T_t = 2 \times 2000 / 2 \times 10^8 = 2 \times 10^{-5}$ $T_t = L/B$ $L = T_t \times B$ $= 2 \times 10^{-5} \times 10^7 = 200 \text{ bits} = 25 \text{ byte}$</p> <p style="text-align: center;">OR</p> <p>Efficiency $= 1/1 + a = 1/1 + 1 = 1/2 = 0.5 = 50\%$ Effective bandwidth $= 1/2 \times 4 = 2 \text{ Mbps}$ $N \times 2 \text{ Kbps} = 2 \text{ Mbps}$ $N = 1000 \text{ station}$</p>
Q3 (b)	<p>CSMA/CD CSMA/CD uses exponential backoff after a collision is detected. It is used in Ethernet. If a collision occurs after 2 hosts try to transmit, hosts wait some time (determined by exp backoff) and then try transmitting again.</p> <p>CSMA/CA CSMA/CA uses exponential backoff before a collision occurs (in an attempt to avoid collisions completely). It is used in wireless (802.11). When a collision is inferred, hosts wait for some number of idle timeslots (determined by exp backoff) to pass before trying to send.</p>

