

JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
Electronics and Communication Engineering
Telecommunication Networks (15B11EC611)
Tutorial Sheet: 3

Q. 1 [CO2] Given the dataword 1010011010 and the divisor 10111,

- a) Show the generation of the codeword at the sender site (using binary division).
- b) Show the checking of the codeword at the receiver site (assume no error).
- c) Show the checking of the codeword at the receiver site (assume 1-bit error in the codeword).

Q. 2 [CO2] Determine the CRC generated codeword for the given dataword $x^8+x^7+x^5+x+1$ and divisor x^3+x+1 . Also check the codeword at the receiver side, assuming 1 bit error at the 3rd bit from the MSB.

Q. 3 [CO2] The following character encoding is used in a data link protocol:

A: 01000111, B: 11100011, FLAG: 01111110, and ESC: 11100000. Show the bit sequence transmitted (in binary) after bit stuffing for the four-character frame:

A B FLAG ESC

Q. 4 [CO2] A bit string, 011110111110111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing?

Q. 5 [CO2] A channel has a data rate of 4 Kbps and a propagation delay of 20 ms. For what range of frame sizes does stop-and-wait give an efficiency of at least 50%?

Q. 6 [CO2] As shown in below figure frames are generated at node A and sent to node C through node B. Considering full-duplex lines between the nodes with no errors having data rate between A and B is 100 kbps, propagation delay is 10 μ sec/mile for both lines, all data frames are 1000 bits long (ACK frames are separate frames of negligible length), a sliding-window protocol with a window size of 3 is used between A and B, and stop-

and-wait is used between B and C . Determine the minimum transmission rate required between nodes B and C so that the buffers of node B are not flooded.

