1. Consider the generator polynomial $G(x)=x^3+x+1$. A message $M(x)=11000$ (i.e., 5 bits) is to be transmitted using CRC. Determine the CRC check bits (remainder) and the final transmitted bit stream.

[MCQ]

A) 100 B) 110 C) 111 D) 101

Ans: A

2. Given a generator polynomial $G(x)=x^3+x^2+1$, find the CRC for the message $M(x)=10101$.

[MCQ]

A 001

B 110

C 111

D 101

Ans: C

3. Suppose a CRC scheme uses generator polynomial x^2+1 (i.e., 101). What will be the transmitted message for data 1001?

[MCQ]

A 10 B 11 C 00 D 01

Ans: B

4. A CRC scheme uses generator x^4+x+1 (i.e., 10011). If the message is 111000, what are the CRC bits and the transmitted data?

[MCQ]

A 1001 B 0100 C 0001 D 1101

Ans: B

5. A sender wants to transmit the following three 8-bit binary data words using checksum-based error detection:

Word 1: 11001001
Word 2: 01101101
Word 3: 10011011

[NAT]

Compute the 8-bit checksum that should be sent by the sender.

Ans: 0010 1101

6. At the receiver's end, the received words are:

Word 1: 11000001
Word 2: 01101101
Word 3: 10011011
Checksum: _____

[NAT]

Fill in the correct checksum value from QN:5 and verify if any error is detected at the receiver side.

Ans: Error Detected

7. A 2-D even parity scheme is used to detect errors in a data block consisting of **4 rows × 7 bits**. The sender constructs the 2-D parity matrix by first adding one **row parity bit** at the end of each row and then one **column parity bit** at the bottom of each column, including the parity bits.
The resulting **5×8 matrix** is sent over a noisy channel.
At the receiver's end, the received matrix is as follows: **[NAT]**

Row 1: 1 0 1 1 0 1 0 | 0
Row 2: 0 1 0 1 1 1 0 | 0
Row 3: 1 1 1 0 1 0 1 | 1
Row 4: 0 0 0 1 0 0 1 | 0
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0 0 0 1 0 0 0 | 1

Ans:

a) There is no any error
b) NA

(a) Has any error occurred during transmission?
(b) If yes, identify the bit position (row, column) where the single-bit error occurred.