

\therefore polynomial is of degree 4

$\Rightarrow \text{Message} = 111\ 000\ 100\ 0$

$$1001 \overline{) 1110001000}$$

$\therefore \text{Remainder} = 011$

CRC = 011

Message = 1110001011

Q. \Rightarrow Generator polynomial = 111
Message = 1001101
Bits = 3

\Rightarrow \therefore Append $3-1 = 2$ bits
Message =

\Rightarrow XOR Division

$$\begin{array}{r} 111 \overline{) 1001 \ 10100} \\ \underline{111} \\ 111 \\ \underline{111} \\ 0001 \\ \underline{111} \\ 110 \\ \underline{111} \\ 100 \end{array}$$

Remainder = 100

CRC = 100

Transmitted Message = 1001 1011 00

Message = 101001
 Polynomial = 11011
 Received Message = 1010 0110 01

\Rightarrow Polynomial Bits = ~~10~~ 5

Append bits = ~~10~~ 5 - 4 = 1

Message = 1010 0010 000

\Rightarrow Division

$$\begin{array}{r}
 11011 \overline{) 10100\ 01000\ 0} \\
 \underline{11011} \\
 101101 \\
 \underline{11011} \\
 10000100 \\
 \underline{11011} \\
 11010111 \\
 \underline{11011} \\
 100
 \end{array}$$

CRC = 0100

\Rightarrow Append 0100

Trans. Message = 101001 0100

Received = 101001 101

\therefore Message has an Error

Q >

data = 1011

Position 1 2 3 4 5 6 7
P1 P2 P3 0 1 1

Parity Bits

Bits covered Bits Parity value
P1 = 1, 3, 5, 7 = 1 0 1 = 0
P2 = 2, 3, 6, 7 = 1 1 1 = 1
P3 = 4, 5, 6, 7 = 0 0 1 = 0

Hamming code = 0110011

Q > Received code
= 1011101

Using Even parity

Pos. 1 2 3 4 5 6 7
Bit 1 0 1 1 1 0 1

P1 covers 1 3 5 7, = 1 1 1 1 = ✓ Even Parity

P2 " 2 3 6 7 = 0 1 0 1 = ✓ Even Parity

P3 " 4 5 6 7 = 1 1 0 1 X Odd Parity

⇒ Parity Bit is Wrong

∴ Data = 1101

