

Q1 Parity = Odd

Received code: 0011100101101

$D_{13}$	$D_{12}$	$D_{11}$	$D_{10}$	$D_9$	$P_8$	$D_7$	$P_6$	$D_5$	$P_4$	$D_3$	$P_2$	$P_1$
0	0	1	1	1	0	0	1	0	1	1	0	1

Parity bit  $P_1$ : 1, 3, 5, 7, 9, 11, 13

$$= 1 + 1 + 0 + 0 + 1 + 1 + 0$$

$$= 4 \text{ [EVEN]}$$

 $\therefore$  Error exists

$$\therefore P_1 = 1$$

Parity bit  $P_2$ : 2, 3, 6, 7, 10, 11

$$= 0 + 1 + 1 + 0 + 1 + 1$$

$$= 4 \text{ [even]}$$

 $\therefore$  Error Present

$$\therefore P_2 = 1$$

Parity bit  $P_4$ : 4, 5, 6, 7, 12, 13

$$= 1 + 0 + 1 + 0 + 0 + 0$$

$$= 2 \text{ [Even]}$$

 $\therefore$  Error Present

$$P_4 = 1$$

Parity bit  $P_8$ : 8, 9, 10, 11, 12, 13

$$= 0 + 1 + 1 + 1 + 0 + 0$$

$$= 3 \text{ [odd]}$$

 $\therefore$  NO error

$$\therefore P_8 = 0$$

$$\text{Error word (E)} = \begin{matrix} P_8 & P_4 & P_2 & P_1 \\ 0 & 1 & 1 & 1 \end{matrix}$$

decimal equivalency of  $E = (7)_{10}$

$\therefore 7^{\text{th}}$  bit is wrong

$\therefore$  Correct hamming code:

0 0 1 1 1 0 1 1 0 1 1 0 1

$\therefore$  Corrected Data : ~~00111011~~

0 0 1 1 0 1 1 0 1 1 0 1

without Parity = 0 0 1 1 0 1 1 0 1

Q2  $Y = AB + A(B+C) + B(B+C)$

$$= AB + AB + AC + BB + BC$$

[Distributive law]

$$= AB + AC + B + BC$$

[ $BB = B$  ;  $AB + AB = AB$ ]

$$= AB + AC + B(1 + C)$$

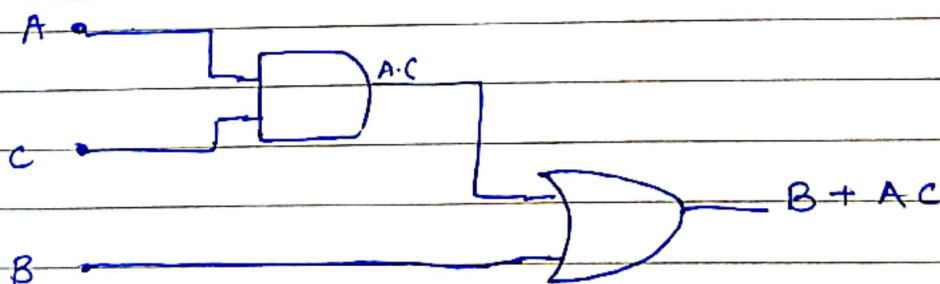
$$= AB + AC + B$$

[ $1 + C = 1$ ]  
IDENTITY

$$= B(1 + A) + AC$$

$$= B + AC$$

[ $1 + A = 1$ ]





Q3

SOP Form

3 variable K-Map

$$F = ABC' + AB'C' + A'B'C + AB'C$$

A \ BC				
	00	01	11	10
0	0	1	0	0
1	1	1	0	1

~~$$F = \Sigma(6, 4, 1, 5)$$~~

$$Y = \bar{B}C + A\bar{C}$$

The reduced equation using K-map is  $\bar{B}C + A\bar{C}$

$$= B'C + AC'$$