

# Fault Tolerant Computing and VLSI Testing

## Assignment 3

1.

2.

$$3. FC = 80\% \implies DL = 1 - 0.9^{1-0.8} = 0.020852 = 20852PPM$$

$$FC = 90\% \implies DL = 1 - 0.9^{1-0.9} = 0.010481 = 10481PPM$$

$$FC = 99\% \implies DL = 1 - 0.9^{1-0.99} = 0.001053 = 1053PPM$$

$$DL = 20PPM = 2 * 10^{-5} = 1 - 0.7^{1-FC}$$

$$0.6^{1-FC} = 1 - 2 * 10^{-5} = 0.99998$$

$$1 - FC = \log_{0.6} 0.99998 = 3.915 * 10^{-5}$$

$$FC = 1 - 3.915 * 10^{-5} = 0.99996 = 99.996\%$$

4.

AB	00	01	10	11
Z	1	1	1	0
$P_0$ stuck open	1	LastZ	1	0
$P_0$ stuck short	1	1	1	$I_{DDQ}$
$P_1$ stuck open	1	1	LastZ	0
$P_1$ stuck short	1	1	1	$I_{DDQ}$
$N_0$ stuck open	1	1	1	LastZ
$N_0$ stuck short	1	$I_{DDQ}$	1	0
$N_1$ stuck open	1	1	1	LastZ
$N_1$ stuck short	1	1	$I_{DDQ}$	0

$$5. a \oplus (a + b) = a\overline{(a + b)} + \overline{a}(a + b) = a\overline{a}\overline{b} + \overline{a}a + \overline{a}b = \overline{a}b$$

$$(a + b)\overline{b} = a\overline{b} + b\overline{b} = a\overline{b}$$

$$(a \oplus (a + b)) + (a + b)\overline{b} = \overline{a}b + a\overline{b} = a \oplus b$$