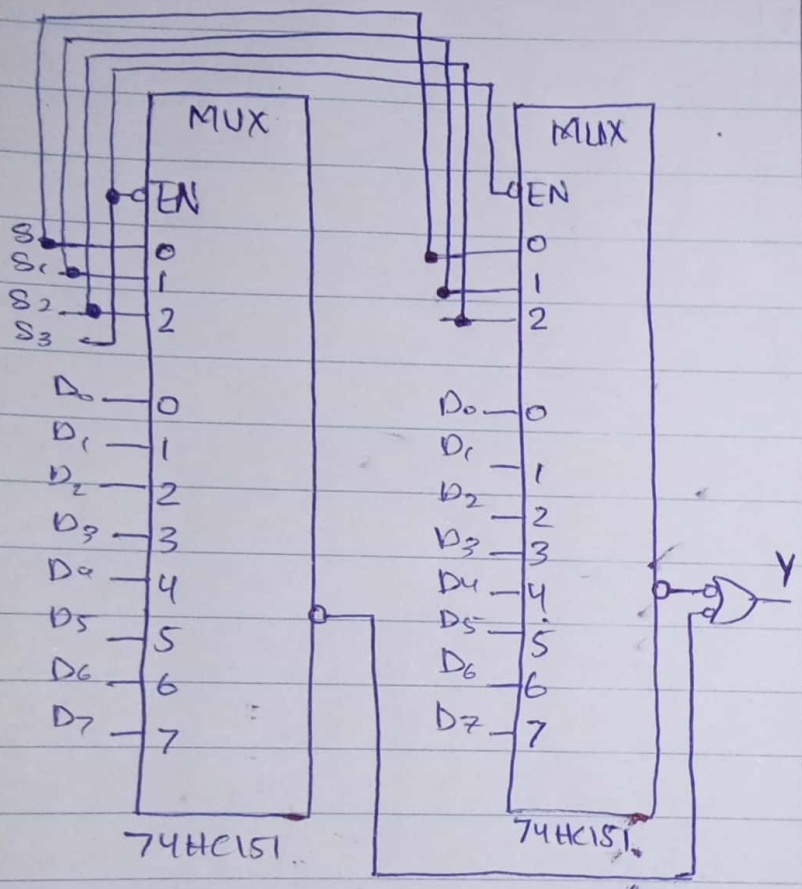
Foundation for Advancement of Science & Technology

(22K-4187) - SYED SAMROZE A

ASSIGNMENT #04

Example # 6-15



▲16-input multiplexer

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Example # 7-11

SOLUTIONS:-

Arbitarily select $R_{EXT} = 39\,K\Omega$ & calculate the necessary capacitance

$$t_W = 0.7 R_{EXT} C_{EXT}$$

$$C_{EXT} = \frac{t_W}{0.7 R_{EXT}}$$

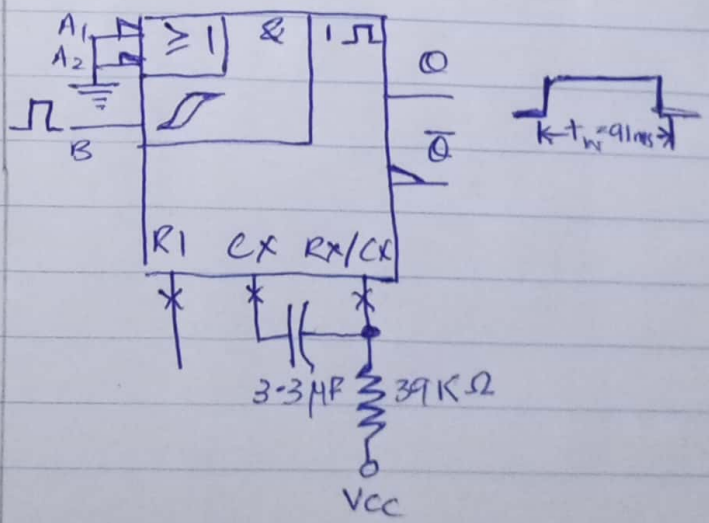
where C_{EXT} is in $\underline{PF}$, R_{EXT} is in $\underline{K\Omega}$ & t_W is in $\underline{ns}$

Since $700\,ms = 7 \times 10^8\,ms$

$$C_{EXT} = \frac{1 \times 10^8\,ms}{0.7\,(39K\Omega)}$$

$$= 3.66 \times 10^{-6}\,pF$$

$$\boxed{C_{EXT} = 3.66\,\mu F}$$



Example # 7-12

SOLUTION:-

Assume a value of $C_{EXT} = 560pF$ and than solve for R_{EXT}. The pulse width must be expressed in ns & C_{EXT} in pF & R_{EXT} in Ω.

$$t_W = 0.32 R_{EXT} C_{EXT} \left(1 + \frac{0.7}{R_{EXT}}\right)$$

$$t_W = 0.32 R_{EXT} C_{EXT} + 0.7 \left(\frac{0.32 R_{EXT} C_{EXT}}{R_{EXT}}\right)$$

$$t_W = 0.32 R_{EXT} C_{EXT} + 0.7(0.32) C_{EXT}$$

$$R_{EXT} = \frac{t_W - 0.7(0.32) C_{EXT}}{0.32 C_{EXT}}$$

$$= \frac{t_W}{0.32 C_{EXT}} - 0.7$$

$$= \frac{1000 ns}{0.32(560) pF} - 0.7$$

$$R_{EXT} = 4.88 K\Omega$$

Using standard value of 4.7 KΩ

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Example # 7-13

SOLUTION:

The pulse width is given by,

$$t_W = 1.1 R_1 C_1$$

$$= 1.1 (2.2 K\Omega)(0.01 pF)$$

$$t_W = 24.2 \mu s$$

CHECK-UP 8.4

—(ANS#01)—

→ There are total 16 states in an 8-bit Johnson Counter.

—(ANS#02)—

The sequence is

Initially → 000
CLK-1 → 100
CLK-2 → 110
CLK-3 → 111
CLK-4 → 011
CLK-5 → 001
CLK-6 → 001

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