(30) Question 1. Let \( t_1 \) be the E clock period with stretching. \( t_{DW} \) is 100ns.

WDA = (106, \( t_1 + 20 \))

the rise of CS1 occurs at \( t_1 + [0,10] \), so

WDR = (\( t_1 + [0,10]-100, t_1 + [0,10] \))

To make it WDA overlap WDR, we need

\[ 106 = t_1 + [0,10]-100 \]

or

\[ 206 = t_1 \]

which is 1 stretch (makes \( t_1 = 250\text{ns} \)).

(15) Question 2.

\*(short *) 0x0910 = *(short *) 0xFFEE;

(25) Question 3.

(10) Part a) Start with

\[ y(n) = \frac{(12x(n) + 92x(n-3) - 60y(n-2))}{100} \]

then simplify to

\[ y(n) = \frac{(3x(n) + 23x(n-3) - 15y(n-2))}{25} \]

(5) Part b) \[ 3*511 + 23*511 - 15*-512 = 1533+11753+7680 = 20966 \]

short because it is less than 32767

(10) Part c) Convert all terms to constants

\[ y = \frac{(3x + 23x - 15y)}{25} \]

Solve for y/x

\[ 25y = 3x + 23x - 15y \]

\[ 40y = 26x \]

\[ y/x = 26/40 = 0.65 \]

(30) Question 4. Match input range of 0.5 to 1.0 into output range of 0 to 5.0.

(10) Part a) \( V_{out} = 10*(V_{in}-0.5) \) or \( V_{out} = 10*V_{in}-5 \)

(20) Part b)

Add \( V_{ref} = 2.5\text{V} \)

\[ V_{out} = 10*V_{in}-2*V_{ref} \]

Add \( V_g = 0\text{V} \), to make sum of gains equal to 1

\[ V_{out} = 10*V_{in}-2*V_{ref}-7*V_g \]

Chose \( R_f = 140\text{ k} \Omega \), as the least common multiple of 10, 2, 7

Build

\[ \text{transducer} \]

\[ \text{REF03} \]

\[ \text{ADin} \]

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