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Colour Code Practice.

Activity:

Convert Colours to their respective number. Perform the calculations then convert the answer back to its associated colour.

GREEN	YELLOW	BROWN	
ORANGE	RED	BLACK	+
<hr/>			
<hr/>			

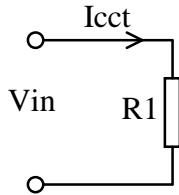
VIOLET	WHITE	GREEN	
BLUE	RED	GREY	+
<hr/>			
<hr/>			

GREEN	YELLOW	BROWN	
ORANGE	RED	BLACK	-
<hr/>			
<hr/>			

VIOLET	WHITE	GREEN	
BLUE	RED	GREY	-
<hr/>			
<hr/>			

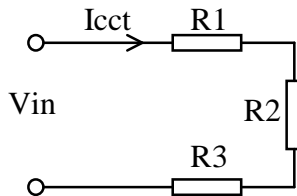
Voltage, Current & Resistance Practice.

Fill in the missing values.



<u>Vin</u>	<u>Ict</u>	<u>R1</u>
7V	7mA	
10V	2μA	
12V		3KΩ
	0.1A	2K7Ω
	500mA	100Ω
240V		600Ω

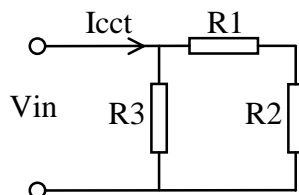
Fill in the missing values



<u>Vin</u>	<u>Ict</u>	<u>R1</u>	<u>R2</u>	<u>R3</u>
30V	30mA	240Ω		160Ω
	200mA	1000Ω	700Ω	800Ω
230V	27.7mA		S/C	2K7
50V	1000mA	10Ω	24Ω	
86V	259.8mA	56Ω		75Ω
2000V		1M	100K	120K

S/C = Short Circuit

Fill in the missing values

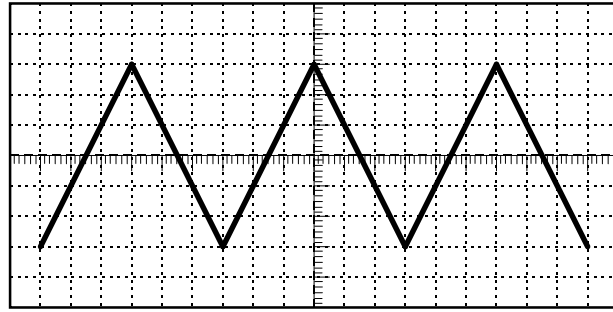


<u>Vin</u>	<u>Ict</u>	<u>R1</u>	<u>R2</u>	<u>R3</u>
5V	25mA	240Ω		400Ω
	5mA	1000Ω	800Ω	O/C
230V	1.15A		S/C	300Ω
64V	4A	16Ω	16Ω	
86V	860mA	S/C		200Ω
200V		750K	250K	1M

S/C = Short Circuit , O/C = Open Circuit

Using the Oscilloscope.

You have been presented with the Oscilloscope displays shown on the right hand side of the page. If the Oscilloscope settings are as shown in the tables as follows :-



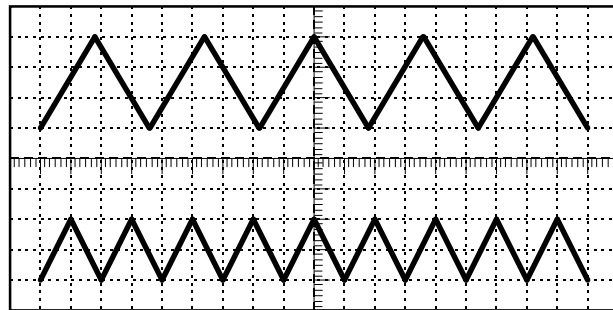
Fill in the missing values

<u>Channel 1</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
5V/cm	1s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
1mV/cm	5 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
0.1V/cm	10ms/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
20V/cm	0.1ms/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
50mV/cm	0.2s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
2V/cm	2 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
0.1mV/cm	0.1 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>

Channel 1 is the TOP trace

and

Channel 2 is the Lower trace



Fill in the missing values

<u>Channel 1</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
5V/cm	1s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
1mV/cm	5 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
0.1V/cm	2 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
20V/cm	0.1ms/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>

<u>Channel 2</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
50mV/cm	0.2s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
20mV/cm	5ms/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
2V/cm	10 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>
0.1mV/cm	0.1 μ s/cm	<input type="text"/>	<input type="text"/>	<input type="text"/>

Digital Arithmetic Exercises.

Fill in the missing values (Using Base 10 {in 6 columns})

<u>Value A</u>	<u>6 Columns</u>	<u><-- 10s Complement Process --></u>		<u>←10s Comp</u>
		<u>Inverse</u>	<u>Inverse +1</u>	
+4	000004	[]	999996	000004
+128	[]	[]	[]	[]

<u>Value A</u>	<u>Value B</u>	<u>←10s Comp B</u>	<u>A + (-B)</u>	<u>←10s Comp</u>
000335	000621	[]	[]	(-)
065437	094837	[]	[]	(-)
020576	074235	[]	[]	(-)
016903	098724	[]	[]	(-)

The symbol ← indicates “value to process is in the column to the left”.

Fill in the missing values

<u>Pattern A</u>	<u>Pattern B</u>	<u>A (and) B</u>	<u>A (or) B</u>	<u>A (xor) B</u>
00110011	11001100	[]	[]	[]
01010101	11110000	[]	[]	[]
11100111	01111000	[]	[]	[]
00011000	00111100	[]	[]	[]
00011111	00011110	[]	[]	[]
11111000	00001111	[]	[]	[]
00111100	00000111	[]	[]	[]

Fill in the missing values. (Limit all calculations to 8 columns)

<u>Pattern A</u>	<u>Pattern B</u>	<u>A (plus) B</u>	<u>Not B + 1</u>	<u>A (minus) B</u>
00110011	11001100	[]	[]	[]
01010101	11110000	[]	[]	[]
11100111	01111000	[]	[]	[]
00011000	00111100	[]	[]	[]
00011111	00011110	[]	[]	[]
11111000	00001111	[]	[]	[]
00111100	00000111	[]	[]	[]

You may show a single overflow digit if this help your calculation.

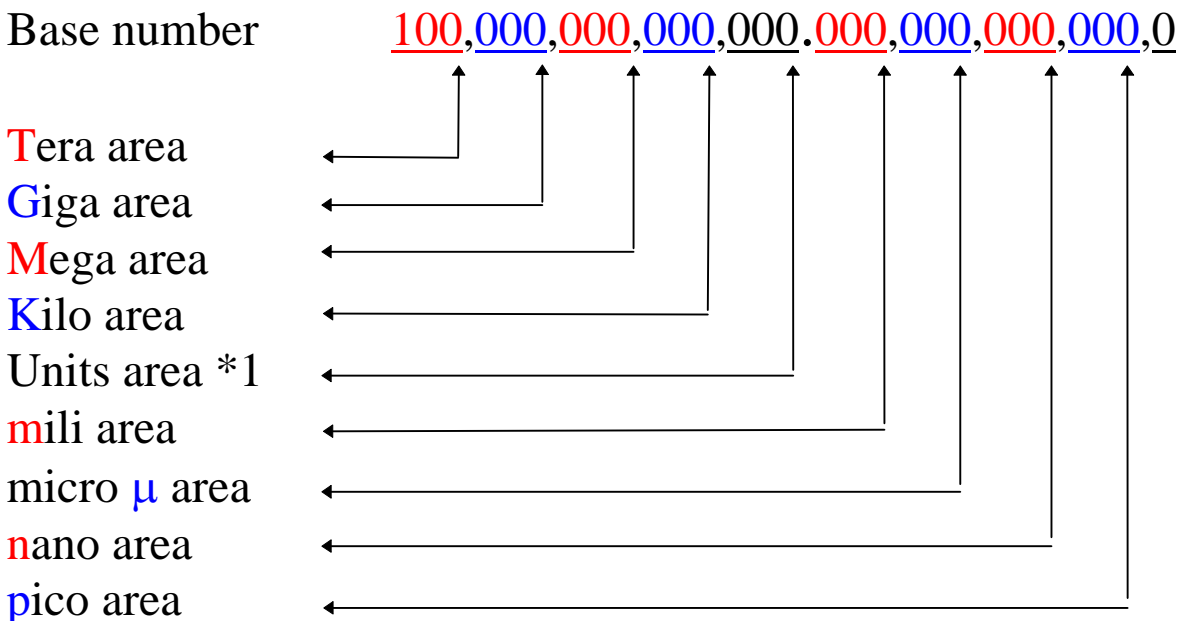
If you decide to show an overflow digit make sure it is obvious to the marker.

Metric Multiplier Conversion Practice.

Activity:

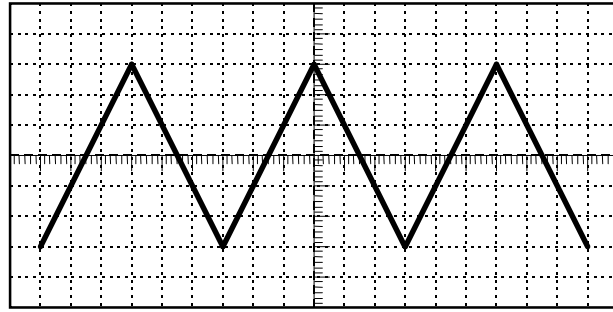
Convert the following numeric values to the cell value indicated with the Question mark in the appropriate box (?).

Decimal Value	Metric Multiplier Value
50,000	?
?	1K2
?	6M8
1,200,000,000	?
?	55T
?	12n
0.000,000,000,009,7	?
0.000,000,1	?
?	50m
0.000,220	?
0.000000001	?
?	1 μ



Using the Oscilloscope.

You have been presented with the Oscilloscope displays shown on the right hand side of the page. If the Oscilloscope settings are as shown in the tables as follows :-



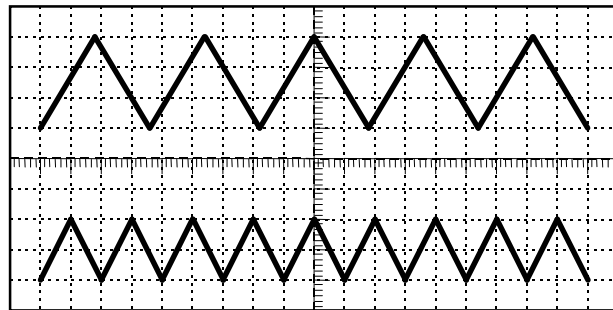
Fill in the missing values

<u>Channel 1</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
20V/cm	2s/cm			
5mV/cm	2 μ s/cm			
0.1V/cm	5ms/cm			
50V/cm	0.1ms/cm			
10mV/cm	0.2s/cm			
5V/cm	2 μ s/cm			
0.2mV/cm	0.5 μ s/cm			

Channel 1 is the TOP trace

and

Channel 2 is the Lower trace



Fill in the missing values

<u>Channel 1</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
2V/cm	5s/cm			
10mV/cm	2 μ s/cm			
0.5V/cm	1 μ s/cm			
50V/cm	0.2ms/cm			

<u>Channel 2</u>	<u>Timebase</u>	<u>Voltage P/P</u>	<u>Period</u>	<u>Frequency</u>
100mV/cm	0.2s/cm			
50mV/cm	1ms/cm			
1V/cm	10 μ s/cm			
0.2mV/cm	0.5 μ s/cm			

Capacitor Calculation Practice.

Fill in the missing values.

<u>Capacitance</u>	<u>Frequency</u>	<u>Reactance</u>
0.5nF	200Hz	
1mF	1KHz	
3nF		35.36mΩ
	33KHz	482.3Ω
	50Hz	12.7Ω
470pF		28.22KΩ

Fill in the missing values

<u>Width</u>	<u>Length</u>	<u>Distance</u>	<u>Voltage</u>	<u>Capacitance</u>	<u>Charge Q</u>
2cm	400mm	0.5mm	160V		
	1m	200μm		885nF	28.3μC
22mm	60cm		500mV	19.5 uF	
500μm	300μm	80μm	16V		
12cm	84cm	0.02cm			38.36mC
5m		20cm		3.98mF	99.56C

Assume $\epsilon = 8.85 * 10^{-7} \text{ F/m}^2$

Inductor Calculation Practice.

Fill in the missing values.

<u>Inductance</u>	<u>Frequency</u>	<u>Reactance</u>
1H	10Hz	
1mH	2KHz	
22H		6911.5Ω
	33KHz	9.74Ω
	1MHz	427.26KΩ
3300μH		3.11KΩ

Fill in the missing values

<u>Turns</u>	<u>Length</u>	<u>XS Area</u>	<u>Inductance</u>	<u>Current</u>	<u>Energy</u>
50		3cm	5.65H	300mA	
	2.5cm	3μm	1.81H		2.3mJ
10,000	1.2m		125.66H	80mA	
700	20cm	80μm			59.1mJ
	84cm	20cm	97.75H		383.17J
85		0.02cm	10.9H	20A	

Assume $\mu_R = 3000$ & $\mu_0 = 4\pi * 10^{-7}$ Wb/Atm XS is Cross Sectional

Binary Arithmetic Exercise.

You have been issued with a calculation sheet.

1. Write your name at the top of the sheet calculation where indicated.
2. Complete all calculations on the test paper.
3. Get a colleague or friend to mark your paper and identify how many questions you have got correct.
4. Get the person who has marked your paper to both print and sign their name on your paper.
5. Once you have had your paper marked hand the completed document to your lecturer so the results can be recorded.
6. If you disagree with the markers verdict then indicate the question/s that give you concern so they can be rechecked.

All calculation limited to 8 Digits only.

Binary addition example	00001011 +	11
	00110010	50
	=====	
	00111101	61

Binary Subtraction example	10001011 -	139
	00110110	54
	=====	
	01010101	85

Or using twos complement method	10001011 +	139
	11001001	inverted
	00000001	+ one
	=====	
Most Significant digit lost	101010101	85

Binary AND example	10001011 &
	11110010
	=====
	10000010

Binary OR example	10001011 !
	11110010
	=====
	11111011

Student Name

Test Sheet 1

=====
Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10110100 10001000 =====	10110100 10001000 =====	10110100 10001000 =====	10110100 10001000 =====
-----	-----	-----	-----
10010100 01001010 =====	10010100 01001010 =====	10010100 01001010 =====	10010100 01001010 =====
-----	-----	-----	-----
01001101 11000110 =====	01001101 11000110 =====	01001101 11000110 =====	01001101 11000110 =====
-----	-----	-----	-----
00000011 11000010 =====	00000011 11000010 =====	00000011 11000010 =====	00000011 11000010 =====
-----	-----	-----	-----
11010000 10110101 =====	11010000 10110101 =====	11010000 10110101 =====	11010000 10110101 =====
-----	-----	-----	-----
00001011 01101001 =====	00001011 01101001 =====	00001011 01101001 =====	00001011 01101001 =====
-----	-----	-----	-----
11011100 11001010 =====	11011100 11001010 =====	11011100 11001010 =====	11011100 11001010 =====
-----	-----	-----	-----
01011111 11110110 =====	01011111 11110110 =====	01011111 11110110 =====	01011111 11110110 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
11011111 00001110 =====	11011111 00001110 =====	11011111 00001110 =====	11011111 00001110 =====
-----	-----	-----	-----
11110011 01011101 =====	11110011 01011101 =====	11110011 01011101 =====	11110011 01011101 =====
-----	-----	-----	-----
10000110 11000100 =====	10000110 11000100 =====	10000110 11000100 =====	10000110 11000100 =====
-----	-----	-----	-----
00001101 10010111 =====	00001101 10010111 =====	00001101 10010111 =====	00001101 10010111 =====
-----	-----	-----	-----
01110111 01001100 =====	01110111 01001100 =====	01110111 01001100 =====	01110111 01001100 =====
-----	-----	-----	-----
10011111 10100101 =====	10011111 10100101 =====	10011111 10100101 =====	10011111 10100101 =====
-----	-----	-----	-----
01000011 01000111 =====	01000011 01000111 =====	01000011 01000111 =====	01000011 01000111 =====
-----	-----	-----	-----
11010100 11010011 =====	11010100 11010011 =====	11010100 11010011 =====	11010100 11010011 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10010110 11111100 =====	10010110 11111100 =====	10010110 11111100 =====	10010110 11111100 =====
-----	-----	-----	-----
11101001 00111010 =====	11101001 00111010 =====	11101001 00111010 =====	11101001 00111010 =====
-----	-----	-----	-----
10110001 11111010 =====	10110001 11111010 =====	10110001 11111010 =====	10110001 11111010 =====
-----	-----	-----	-----
00111110 10001000 =====	00111110 10001000 =====	00111110 10001000 =====	00111110 10001000 =====
-----	-----	-----	-----
00011011 11111111 =====	00011011 11111111 =====	00011011 11111111 =====	00011011 11111111 =====
-----	-----	-----	-----
10101101 00000100 =====	10101101 00000100 =====	10101101 00000100 =====	10101101 00000100 =====
-----	-----	-----	-----
10010011 00011001 =====	10010011 00011001 =====	10010011 00011001 =====	10010011 00011001 =====
-----	-----	-----	-----
00011010 11001100 =====	00011010 11001100 =====	00011010 11001100 =====	00011010 11001100 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
01001000 00001011 =====	01001000 00001011 =====	01001000 00001011 =====	01001000 00001011 =====
-----	-----	-----	-----
01001011 01100001 =====	01001011 01100001 =====	01001011 01100001 =====	01001011 01100001 =====
-----	-----	-----	-----
01001101 11110010 =====	01001101 11110010 =====	01001101 11110010 =====	01001101 11110010 =====
-----	-----	-----	-----
11111010 01100110 =====	11111010 01100110 =====	11111010 01100110 =====	11111010 01100110 =====
-----	-----	-----	-----
01000111 00101001 =====	01000111 00101001 =====	01000111 00101001 =====	01000111 00101001 =====
-----	-----	-----	-----
00101001 10100101 =====	00101001 10100101 =====	00101001 10100101 =====	00101001 10100101 =====
-----	-----	-----	-----
01101000 01101001 =====	01101000 01101001 =====	01101000 01101001 =====	01101000 01101001 =====
-----	-----	-----	-----
10110110 01010011 =====	10110110 01010011 =====	10110110 01010011 =====	10110110 01010011 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10100010 00110101 =====	10100010 00110101 =====	10100010 00110101 =====	10100010 00110101 =====
-----	-----	-----	-----
00101111 10010101 =====	00101111 10010101 =====	00101111 10010101 =====	00101111 10010101 =====
-----	-----	-----	-----
00010100 01110101 =====	00010100 01110101 =====	00010100 01110101 =====	00010100 01110101 =====
-----	-----	-----	-----
11100111 01000010 =====	11100111 01000010 =====	11100111 01000010 =====	11100111 01000010 =====
-----	-----	-----	-----
11001001 01100000 =====	11001001 01100000 =====	11001001 01100000 =====	11001001 01100000 =====
-----	-----	-----	-----
01001010 11101011 =====	01001010 11101011 =====	01001010 11101011 =====	01001010 11101011 =====
-----	-----	-----	-----
10100001 10100000 =====	10100001 10100000 =====	10100001 10100000 =====	10100001 10100000 =====
-----	-----	-----	-----
01101101 00011001 =====	01101101 00011001 =====	01101101 00011001 =====	01101101 00011001 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10001111 10110001 =====	10001111 10110001 =====	10001111 10110001 =====	10001111 10110001 =====
-----	-----	-----	-----
11101001 11010101 =====	11101001 11010101 =====	11101001 11010101 =====	11101001 11010101 =====
-----	-----	-----	-----
00000101 10001011 =====	00000101 10001011 =====	00000101 10001011 =====	00000101 10001011 =====
-----	-----	-----	-----
11101010 01101110 =====	11101010 01101110 =====	11101010 01101110 =====	11101010 01101110 =====
-----	-----	-----	-----
10101101 10000000 =====	10101101 10000000 =====	10101101 10000000 =====	10101101 10000000 =====
-----	-----	-----	-----
10000011 01110110 =====	10000011 01110110 =====	10000011 01110110 =====	10000011 01110110 =====
-----	-----	-----	-----
01011010 01100111 =====	01011010 01100111 =====	01011010 01100111 =====	01011010 01100111 =====
-----	-----	-----	-----
01000101 00001110 =====	01000101 00001110 =====	01000101 00001110 =====	01000101 00001110 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
00111110 11111010 =====	00111110 11111010 =====	00111110 11111010 =====	00111110 11111010 =====
-----	-----	-----	-----
00001111 01100011 =====	00001111 01100011 =====	00001111 01100011 =====	00001111 01100011 =====
-----	-----	-----	-----
01011101 01111101 =====	01011101 01111101 =====	01011101 01111101 =====	01011101 01111101 =====
-----	-----	-----	-----
00100111 01111001 =====	00100111 01111001 =====	00100111 01111001 =====	00100111 01111001 =====
-----	-----	-----	-----
01000001 10100000 =====	01000001 10100000 =====	01000001 10100000 =====	01000001 10100000 =====
-----	-----	-----	-----
10001010 00101000 =====	10001010 00101000 =====	10001010 00101000 =====	10001010 00101000 =====
-----	-----	-----	-----
11110000 10100111 =====	11110000 10100111 =====	11110000 10100111 =====	11110000 10100111 =====
-----	-----	-----	-----
10000001 01100011 =====	10000001 01100011 =====	10000001 01100011 =====	10000001 01100011 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
00011011 11001000 =====	00011011 11001000 =====	00011011 11001000 =====	00011011 11001000 =====
-----	-----	-----	-----
01110101 11000000 =====	01110101 11000000 =====	01110101 11000000 =====	01110101 11000000 =====
-----	-----	-----	-----
10011000 11010101 =====	10011000 11010101 =====	10011000 11010101 =====	10011000 11010101 =====
-----	-----	-----	-----
00000100 00110101 =====	00000100 00110101 =====	00000100 00110101 =====	00000100 00110101 =====
-----	-----	-----	-----
00010010 00011010 =====	00010010 00011010 =====	00010010 00011010 =====	00010010 00011010 =====
-----	-----	-----	-----
01010100 00100000 =====	01010100 00100000 =====	01010100 00100000 =====	01010100 00100000 =====
-----	-----	-----	-----
00000000 10001001 =====	00000000 10001001 =====	00000000 10001001 =====	00000000 10001001 =====
-----	-----	-----	-----
10101000 10001011 =====	10101000 10001011 =====	10101000 10001011 =====	10101000 10001011 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
11010011 00010100 =====	11010011 00010100 =====	11010011 00010100 =====	11010011 00010100 =====
-----	-----	-----	-----
00110001 10101101 =====	00110001 10101101 =====	00110001 10101101 =====	00110001 10101101 =====
-----	-----	-----	-----
01110100 01011011 =====	01110100 01011011 =====	01110100 01011011 =====	01110100 01011011 =====
-----	-----	-----	-----
00100110 10110100 =====	00100110 10110100 =====	00100110 10110100 =====	00100110 10110100 =====
-----	-----	-----	-----
11101101 10000111 =====	11101101 10000111 =====	11101101 10000111 =====	11101101 10000111 =====
-----	-----	-----	-----
00010110 11000001 =====	00010110 11000001 =====	00010110 11000001 =====	00010110 11000001 =====
-----	-----	-----	-----
01100110 01110110 =====	01100110 01110110 =====	01100110 01110110 =====	01100110 01110110 =====
-----	-----	-----	-----
01111101 00110101 =====	01111101 00110101 =====	01111101 00110101 =====	01111101 00110101 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
01010100 00011000 =====	01010100 00011000 =====	01010100 00011000 =====	01010100 00011000 =====
-----	-----	-----	-----
10010110 00101011 =====	10010110 00101011 =====	10010110 00101011 =====	10010110 00101011 =====
-----	-----	-----	-----
11101101 00011001 =====	11101101 00011001 =====	11101101 00011001 =====	11101101 00011001 =====
-----	-----	-----	-----
01110001 01000101 =====	01110001 01000101 =====	01110001 01000101 =====	01110001 01000101 =====
-----	-----	-----	-----
11011111 11000000 =====	11011111 11000000 =====	11011111 11000000 =====	11011111 11000000 =====
-----	-----	-----	-----
01000101 10101100 =====	01000101 10101100 =====	01000101 10101100 =====	01000101 10101100 =====
-----	-----	-----	-----
01000001 00010111 =====	01000001 00010111 =====	01000001 00010111 =====	01000001 00010111 =====
-----	-----	-----	-----
00000111 01010010 =====	00000111 01010010 =====	00000111 01010010 =====	00000111 01010010 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
11001010 01001100 =====	11001010 01001100 =====	11001010 01001100 =====	11001010 01001100 =====
-----	-----	-----	-----
00111100 01111011 =====	00111100 01111011 =====	00111100 01111011 =====	00111100 01111011 =====
-----	-----	-----	-----
01000001 01010111 =====	01000001 01010111 =====	01000001 01010111 =====	01000001 01010111 =====
-----	-----	-----	-----
00001011 01111011 =====	00001011 01111011 =====	00001011 01111011 =====	00001011 01111011 =====
-----	-----	-----	-----
00110100 11011101 =====	00110100 11011101 =====	00110100 11011101 =====	00110100 11011101 =====
-----	-----	-----	-----
10010110 11000001 =====	10010110 11000001 =====	10010110 11000001 =====	10010110 11000001 =====
-----	-----	-----	-----
11101101 01010100 =====	11101101 01010100 =====	11101101 01010100 =====	11101101 01010100 =====
-----	-----	-----	-----
10001010 00010100 =====	10001010 00010100 =====	10001010 00010100 =====	10001010 00010100 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10100010 01101000 =====	10100010 01101000 =====	10100010 01101000 =====	10100010 01101000 =====
-----	-----	-----	-----
11110101 00011101 =====	11110101 00011101 =====	11110101 00011101 =====	11110101 00011101 =====
-----	-----	-----	-----
11101100 10011110 =====	11101100 10011110 =====	11101100 10011110 =====	11101100 10011110 =====
-----	-----	-----	-----
01011001 00100110 =====	01011001 00100110 =====	01011001 00100110 =====	01011001 00100110 =====
-----	-----	-----	-----
01111010 00111000 =====	01111010 00111000 =====	01111010 00111000 =====	01111010 00111000 =====
-----	-----	-----	-----
11111110 00100001 =====	11111110 00100001 =====	11111110 00100001 =====	11111110 00100001 =====
-----	-----	-----	-----
00000111 01011000 =====	00000111 01011000 =====	00000111 01011000 =====	00000111 01011000 =====
-----	-----	-----	-----
10001100 11101100 =====	10001100 11101100 =====	10001100 11101100 =====	10001100 11101100 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10001001 01101000 =====	10001001 01101000 =====	10001001 01101000 =====	10001001 01101000 =====
-----	-----	-----	-----
11011000 11010011 =====	11011000 11010011 =====	11011000 11010011 =====	11011000 11010011 =====
-----	-----	-----	-----
10101100 10111000 =====	10101100 10111000 =====	10101100 10111000 =====	10101100 10111000 =====
-----	-----	-----	-----
11111111 01010110 =====	11111111 01010110 =====	11111111 01010110 =====	11111111 01010110 =====
-----	-----	-----	-----
01111110 01101001 =====	01111110 01101001 =====	01111110 01101001 =====	01111110 01101001 =====
-----	-----	-----	-----
10110001 00101101 =====	10110001 00101101 =====	10110001 00101101 =====	10110001 00101101 =====
-----	-----	-----	-----
01101100 10001011 =====	01101100 10001011 =====	01101100 10001011 =====	01101100 10001011 =====
-----	-----	-----	-----
11010000 10001010 =====	11010000 10001010 =====	11010000 10001010 =====	11010000 10001010 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
01101101 10000010 =====	01101101 10000010 =====	01101101 10000010 =====	01101101 10000010 =====
-----	-----	-----	-----
00111010 10011110 =====	00111010 10011110 =====	00111010 10011110 =====	00111010 10011110 =====
-----	-----	-----	-----
01111101 10101110 =====	01111101 10101110 =====	01111101 10101110 =====	01111101 10101110 =====
-----	-----	-----	-----
11100010 01011110 =====	11100010 01011110 =====	11100010 01011110 =====	11100010 01011110 =====
-----	-----	-----	-----
01001101 01001010 =====	01001101 01001010 =====	01001101 01001010 =====	01001101 01001010 =====
-----	-----	-----	-----
00100110 10000111 =====	00100110 10000111 =====	00100110 10000111 =====	00100110 10000111 =====
-----	-----	-----	-----
00111001 10010101 =====	00111001 10010101 =====	00111001 10010101 =====	00111001 10010101 =====
-----	-----	-----	-----
01011101 11100000 =====	01011101 11100000 =====	01011101 11100000 =====	01011101 11100000 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
01111010 00110000 =====	01111010 00110000 =====	01111010 00110000 =====	01111010 00110000 =====
-----	-----	-----	-----
10101111 10111111 =====	10101111 10111111 =====	10101111 10111111 =====	10101111 10111111 =====
-----	-----	-----	-----
10011101 11001000 =====	10011101 11001000 =====	10011101 11001000 =====	10011101 11001000 =====
-----	-----	-----	-----
00101001 11001110 =====	00101001 11001110 =====	00101001 11001110 =====	00101001 11001110 =====
-----	-----	-----	-----
00110011 11110100 =====	00110011 11110100 =====	00110011 11110100 =====	00110011 11110100 =====
-----	-----	-----	-----
00010000 00001111 =====	00010000 00001111 =====	00010000 00001111 =====	00010000 00001111 =====
-----	-----	-----	-----
11001011 01100001 =====	11001011 01100001 =====	11001011 01100001 =====	11001011 01100001 =====
-----	-----	-----	-----
01110110 00011110 =====	01110110 00011110 =====	01110110 00011110 =====	01110110 00011110 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
00011101 00101100 =====	00011101 00101100 =====	00011101 00101100 =====	00011101 00101100 =====
-----	-----	-----	-----
00001100 10110110 =====	00001100 10110110 =====	00001100 10110110 =====	00001100 10110110 =====
-----	-----	-----	-----
10001000 10001111 =====	10001000 10001111 =====	10001000 10001111 =====	10001000 10001111 =====
-----	-----	-----	-----
00110111 01110111 =====	00110111 01110111 =====	00110111 01110111 =====	00110111 01110111 =====
-----	-----	-----	-----
10111111 11000000 =====	10111111 11000000 =====	10111111 11000000 =====	10111111 11000000 =====
-----	-----	-----	-----
01100110 11100111 =====	01100110 11100111 =====	01100110 11100111 =====	01100110 11100111 =====
-----	-----	-----	-----
10111110 00010110 =====	10111110 00010110 =====	10111110 00010110 =====	10111110 00010110 =====
-----	-----	-----	-----
10100010 10110110 =====	10100010 10110110 =====	10100010 10110110 =====	10100010 10110110 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
00000100 01101110 =====	00000100 01101110 =====	00000100 01101110 =====	00000100 01101110 =====
-----	-----	-----	-----
01100110 01000110 =====	01100110 01000110 =====	01100110 01000110 =====	01100110 01000110 =====
-----	-----	-----	-----
11111100 11001101 =====	11111100 11001101 =====	11111100 11001101 =====	11111100 11001101 =====
-----	-----	-----	-----
10110010 01101010 =====	10110010 01101010 =====	10110010 01101010 =====	10110010 01101010 =====
-----	-----	-----	-----
10111100 01000110 =====	10111100 01000110 =====	10111100 01000110 =====	10111100 01000110 =====
-----	-----	-----	-----
01011011 01101110 =====	01011011 01101110 =====	01011011 01101110 =====	01011011 01101110 =====
-----	-----	-----	-----
11110001 00011111 =====	11110001 00011111 =====	11110001 00011111 =====	11110001 00011111 =====
-----	-----	-----	-----
10100101 01011001 =====	10100101 01011001 =====	10100101 01011001 =====	10100101 01011001 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
00011010 00101111 =====	00011010 00101111 =====	00011010 00101111 =====	00011010 00101111 =====
-----	-----	-----	-----
00010011 01101110 =====	00010011 01101110 =====	00010011 01101110 =====	00010011 01101110 =====
-----	-----	-----	-----
11110101 10001010 =====	11110101 10001010 =====	11110101 10001010 =====	11110101 10001010 =====
-----	-----	-----	-----
01111110 11111001 =====	01111110 11111001 =====	01111110 11111001 =====	01111110 11111001 =====
-----	-----	-----	-----
00110111 01100001 =====	00110111 01100001 =====	00110111 01100001 =====	00110111 01100001 =====
-----	-----	-----	-----
01100101 01001000 =====	01100101 01001000 =====	01100101 01001000 =====	01100101 01001000 =====
-----	-----	-----	-----
10000000 00100011 =====	10000000 00100011 =====	10000000 00100011 =====	10000000 00100011 =====
-----	-----	-----	-----
10000100 11110111 =====	10000100 11110111 =====	10000100 11110111 =====	10000100 11110111 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
10001110 11101000 =====	10001110 11101000 =====	10001110 11101000 =====	10001110 11101000 =====
-----	-----	-----	-----
10101000 01110000 =====	10101000 01110000 =====	10101000 01110000 =====	10101000 01110000 =====
-----	-----	-----	-----
10110001 00010000 =====	10110001 00010000 =====	10110001 00010000 =====	10110001 00010000 =====
-----	-----	-----	-----
11000001 10110011 =====	11000001 10110011 =====	11000001 10110011 =====	11000001 10110011 =====
-----	-----	-----	-----
01111111 00100111 =====	01111111 00100111 =====	01111111 00100111 =====	01111111 00100111 =====
-----	-----	-----	-----
00111001 01010011 =====	00111001 01010011 =====	00111001 01010011 =====	00111001 01010011 =====
-----	-----	-----	-----
11001000 00001100 =====	11001000 00001100 =====	11001000 00001100 =====	11001000 00001100 =====
-----	-----	-----	-----
10000100 11000001 =====	10000100 11000001 =====	10000100 11000001 =====	10000100 11000001 =====
-----	-----	-----	-----

=====

Calculate all answers to 8 Bit accuracy.

Add Binary	Subtract	AND	OR
11001100 01010011 =====	11001100 01010011 =====	11001100 01010011 =====	11001100 01010011 =====
-----	-----	-----	-----
11111001 11001101 =====	11111001 11001101 =====	11111001 11001101 =====	11111001 11001101 =====
-----	-----	-----	-----
10101100 11100111 =====	10101100 11100111 =====	10101100 11100111 =====	10101100 11100111 =====
-----	-----	-----	-----
11100000 01101010 =====	11100000 01101010 =====	11100000 01101010 =====	11100000 01101010 =====
-----	-----	-----	-----
00011111 11110100 =====	00011111 11110100 =====	00011111 11110100 =====	00011111 11110100 =====
-----	-----	-----	-----
11001100 10110010 =====	11001100 10110010 =====	11001100 10110010 =====	11001100 10110010 =====
-----	-----	-----	-----
01100110 00000100 =====	01100110 00000100 =====	01100110 00000100 =====	01100110 00000100 =====
-----	-----	-----	-----
00101010 00101010 =====	00101010 00101010 =====	00101010 00101010 =====	00101010 00101010 =====
-----	-----	-----	-----

Resistor Calculation Practice.

Activity:

Calculate the numeric values that should be in the cells indicated with the Question mark from the given values in the table.

<u>Volts</u>	<u>Amps</u>	<u>Ohms</u>	<u>Watts</u>
39 Volts	6 Amps	<input data-bbox="867 541 1153 590" type="text" value="?"/>	<input data-bbox="1183 541 1421 590" type="text" value="?"/>
240 Volts	<input data-bbox="480 632 784 680" type="text" value="?"/>	<input data-bbox="867 632 1153 680" type="text" value="?"/>	60W
<input data-bbox="222 722 446 770" type="text" value="?"/>	<input data-bbox="480 722 784 770" type="text" value="?"/>	250K Ω	100 μ W
12 Volts	130 Amps	<input data-bbox="867 816 1153 865" type="text" value="?"/>	<input data-bbox="1183 816 1421 865" type="text" value="?"/>
<input data-bbox="222 907 446 955" type="text" value="?"/>	50 μ A	500M Ω	<input data-bbox="1183 907 1421 955" type="text" value="?"/>
1.2 Volts	<input data-bbox="480 997 784 1045" type="text" value="?"/>	<input data-bbox="867 997 1153 1045" type="text" value="?"/>	1440W
<input data-bbox="222 1087 446 1136" type="text" value="?"/>	10mA	500 Ω	<input data-bbox="1183 1087 1421 1136" type="text" value="?"/>
<input data-bbox="222 1178 446 1226" type="text" value="?"/>	<input data-bbox="480 1178 784 1226" type="text" value="?"/>	1M	36W

Number Conversion Practice.

Activity:

Convert the following numeric values to the cell value indicated with the Question mark in the appropriate box (?). Show examples of your working on this or another page to indicate that you have not used a calculator to obtain the results.

Decimal	Binary	Octal	Hex
67	<input type="text" value="?"/> 01110011		<input type="text" value="?"/>
	<input type="text" value="?"/>	132	
236	<input type="text" value="?"/>		<input type="text" value="?"/> DE BA
<input type="text" value="?"/>		<input type="text" value="?"/> 777	
	11010110	<input type="text" value="?"/>	
<input type="text" value="?"/>	11001100		
250		<input type="text" value="?"/> 645	
<input type="text" value="?"/>			<input type="text" value="?"/> 5A

Frequency / Period Conversion Practice.

Activity:

Convert the following numeric values to the cell value indicated with the Question mark in the appropriate box (?).

Frequency	Period
<input type="text" value="?"/>	20ms
2MHz	<input type="text" value="?"/>
150Hz	<input type="text" value="?"/>
<input type="text" value="?"/>	1ms
22KHz	<input type="text" value="?"/>
<input type="text" value="?"/>	4 μ s
1M5Hz	<input type="text" value="?"/>
4KHz	<input type="text" value="?"/>
<input type="text" value="?"/>	1.25ms
<input type="text" value="?"/>	5s

Example

80Hz

12.5ms

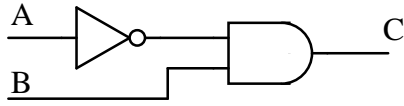
$$\text{Frequency} = \frac{1}{\text{Period}}$$

or

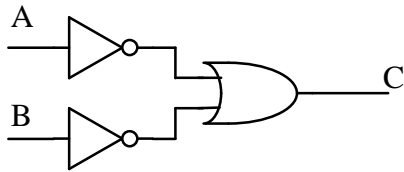
$$\text{Period} = \frac{1}{\text{Frequency}}$$

Logic Circuits Practice.

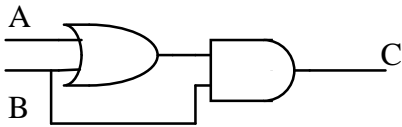
Complete the Truth tables for the following circuits.



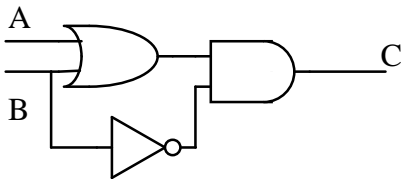
A	B			C
0	0			
0	1			
1	0			
1	1			



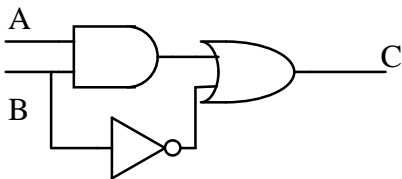
A	B			C
0	0			
0	1			
1	0			
1	1			



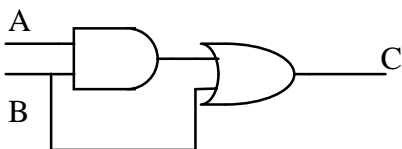
A	B			C
0	0			
0	1			
1	0			
1	1			



A	B			C
0	0			
0	1			
1	0			
1	1			



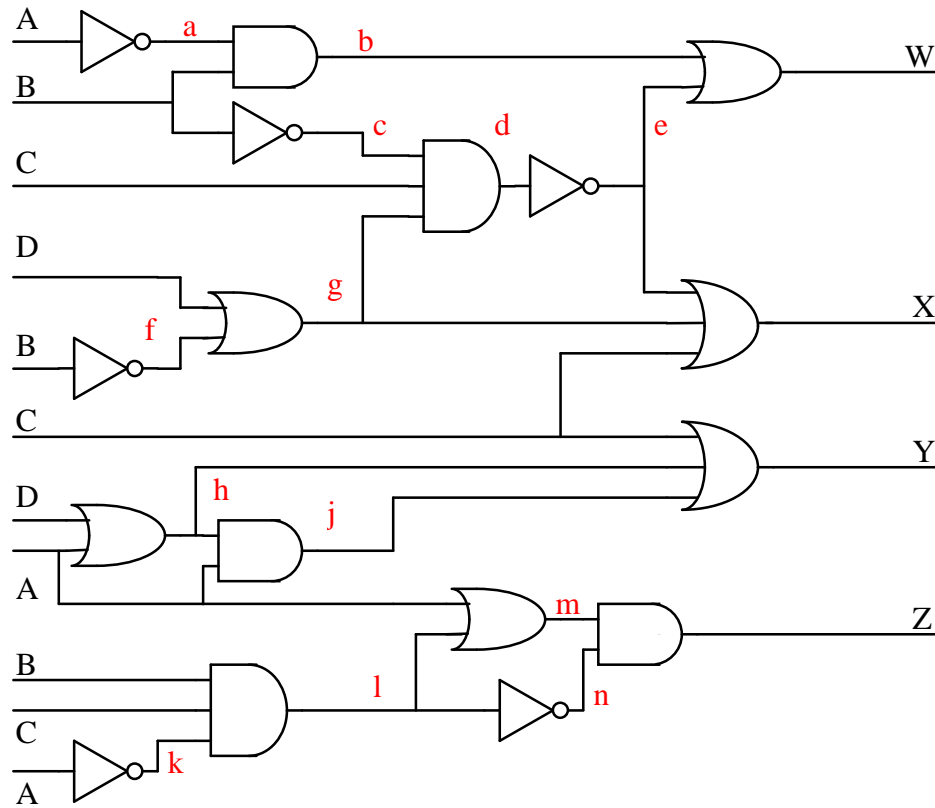
A	B			C
0	0			
0	1			
1	0			
1	1			



A	B			C
0	0			
0	1			
1	0			
1	1			

Logic Circuits Practice.

Create the Truth tables for the following circuit (W , X, Y, Z).



A	B	C	D					W	X	Y	Z
0	0	0	0								
0	0	0	1								
0	0	1	0								
0	0	1	1								
0	1	0	0								
0	1	0	1								
0	1	1	0								
0	1	1	1								
1	0	0	0								
1	0	0	1								
1	0	1	0								
1	0	1	1								
1	1	0	0								
1	1	0	1								
1	1	1	0								
1	1	1	1								

Logic Circuits Practice.

Additional Workspace for Truth Tables.

A	B	C	D						
0	0	0	0						
0	0	0	1						
0	0	1	0						
0	0	1	1						
0	1	0	0						
0	1	0	1						
0	1	1	0						
0	1	1	1						
1	0	0	0						
1	0	0	1						
1	0	1	0						
1	0	1	1						
1	1	0	0						
1	1	0	1						
1	1	1	0						
1	1	1	1						

A	B	C	D						
0	0	0	0						
0	0	0	1						
0	0	1	0						
0	0	1	1						
0	1	0	0						
0	1	0	1						
0	1	1	0						
0	1	1	1						
1	0	0	0						
1	0	0	1						
1	0	1	0						
1	0	1	1						
1	1	0	0						
1	1	0	1						
1	1	1	0						
1	1	1	1						

Metric Multiplier Conversion Practice 2.

Activity:

Convert the following numeric values to the cell value indicated with the Question mark in the appropriate box (?).

Decimal Value	Metric Multiplier Value
470,000.00	?
?	10n
?	25M
1800000000.000	?
?	125T
?	1200n
4p5	?
0.000,000,1	?
?	50m
0.33m	?
0.0000000020	?
?	0.000001000

Base number

100,000,000,000,000.000,000,000,000,0

Tera area

Giga area

Mega area

Kilo area

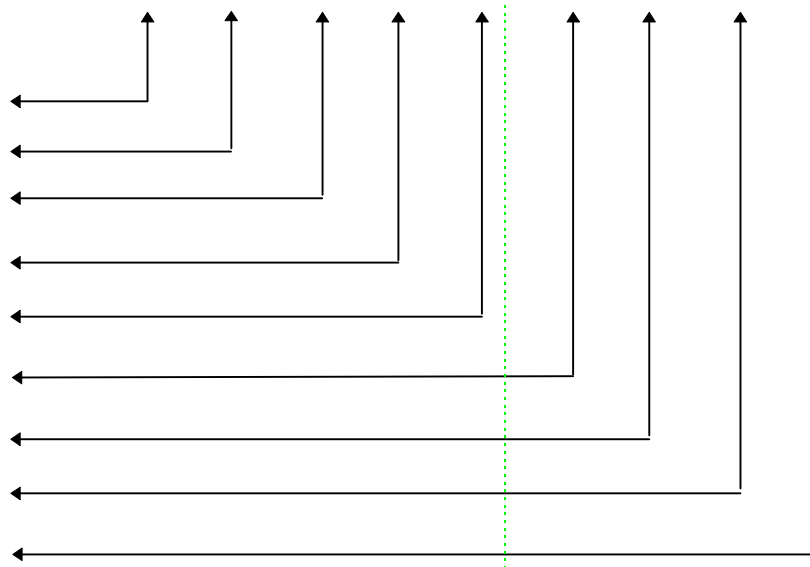
Units area *1

mili area

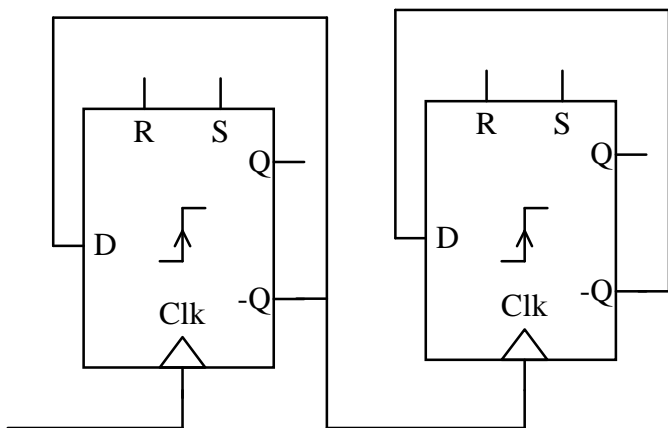
micro μ area

nano area

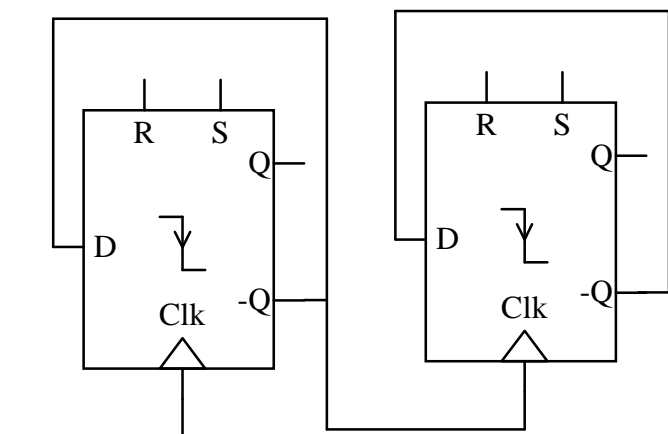
pico area



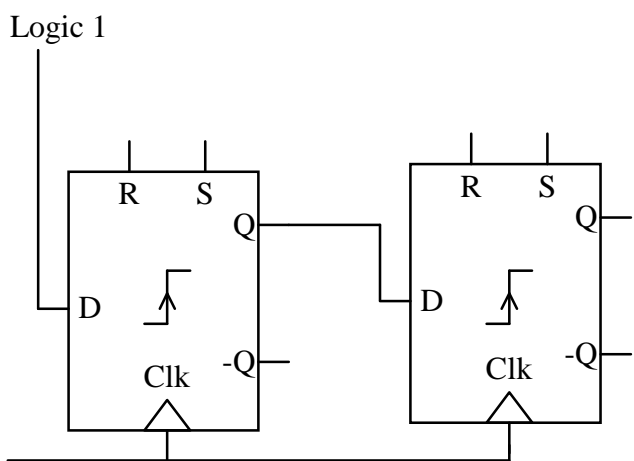
Counters and Shift Registers



D1																			
Q1																			
-Q1																			
D2																			
Q2																			
-Q2																			
Clk1																			
Clk2																			



D1																			
Q1																			
-Q1																			
D2																			
Q2																			
-Q2																			
Clk1																			
Clk2																			



D1																			
Q1																			
-Q1																			
D2																			
Q2																			
-Q2																			
Clk1																			
Clk2																			

Assume at start all Q outputs = 0 and -Q outputs = 1
 Draw truth tables of above circuits on reverse of this sheet.