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Beginner Assignment

PART A :-

1. 1) $(255.375)_{10} \rightarrow (?)_2$

→

2	255	1
2	127	1
2	63	1
2	31	1
2	15	1
2	7	1
2	3	1
2	1	1
	0	

$0.375 \times 2 = (0).750$
$0.75 \times 2 = (1).50$
$0.5 \times 2 = (1).00$
$0.00 \times 2 = (0).00$

$\therefore (255)_{10} \rightarrow (11111111)_2 \; ; \; (0.375)_{10} \rightarrow (0.011)_2$

$\therefore (255.375)_{10} \rightarrow (11111111.011)_2$

2) $(255.375)_{10} \rightarrow (?)_8$

8	255	7
8	31	7
8	3	3
	0	

$0.375 \times 8 = (3).00$
$0.00 \times 8 = (0).00$

$(0.375)_{10} \rightarrow (0.3)_8$

$\therefore (255.375)_{10} \rightarrow (377.3)_8$

$(255)_{10} \rightarrow (377)_8$

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3) $(255.375)_{10} \rightarrow (?)_{16}$

16	255	F
16	15	F
	0	

$0.375 \times 16 = 6.00$ ↓
$0.00 \times 16 = 0.00$

$\therefore (255)_{10} \rightarrow (FF)_{16}$

$\therefore (0.375)_{10} \rightarrow (0.6)_{16}$

$\therefore (255.375)_{10} \rightarrow (FF.6)_{16}$

2. $(110101.101)_2 \rightarrow (?)_{10}$

$\rightarrow 1\times2^5 + 1\times2^4 + 0\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0 + 1\times2^{-1} + 0\times2^{-2} + 1\times2^{-3}$

$\rightarrow 32 + 16 + 4 + 1 + 0.5 + 0.125 = (53.625)_{10}$

3. 3 in binary :- $(11)_2$ ∴ $(100111)_2 \div (11)_2 = ?$

$\rightarrow$

```
      1101
  11 | 100111
     - 11
       011
     - 11
       0011
     - 11
       00
```

Remainder is 0, hence $(100111)_2$ is divisible by 3, quotient is $(1101)_2 \rightarrow (13)_{10}$

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4. Data

5. F =

=

=

=

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4. Data representation using 2's complement: $-(+23)_{10} = (00010111)_2$ (in 8bit)

Take 2's complement $\rightarrow (-23)_{10} = (11101001)_2$

5. $F = (A+B)(A'+C)(B+C')$

$= ((A+B)A' + (A+B)C)(B+C')$ — (Using distributive law)

$= (AA' + BA' + AC + BC)(B+C')$ — (" " ")

$= (0 + BA' + AC + BC)(B+C')$ — (Using complement law)

$= (BA' + AC + BC)(B+C')$

$= BA'B + ACB + BCB + BA'C' + ACC' + BCC'$ — (" Distributive ")

$= BA' + ACB + BC + BA'C' + 0 + 0$ — (" complement ")

~~$= BA' + BC + B(AC +$~~

$= BA' + BA'C' + ACB + BC$

$= BA'(1+C') + BC(A+1)$ — (" Distributive ")

$= BA' + BC$ — (" " ")

$\boxed{F = B(A'+C)}$

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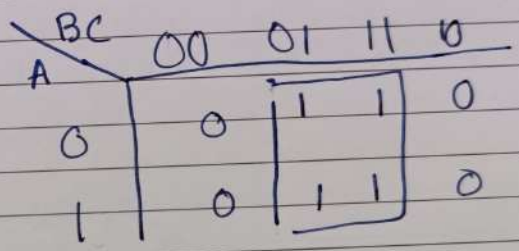
6. $m(1,3,5,7) = F(A,B,C)$

A	B	C	F	
0	0	0	0	m_0
0	0	1	1	m_1
0	1	0	0	m_2
0	1	1	1	m_3
1	0	0	0	m_4
1	0	1	1	m_5
1	1	0	0	m_6
1	1	1	1	m_7



$\therefore F = C$

In the group of 1's, only C remains constant, hence is the answer.

```
1 module top_module(
2     input a,
3     input b,
4     output out );
5 assign out = a&&b;
6 endmodule
7
```

```
1 module top_module(
2     input a,
3     input b,
4     output out );
5 assign out = a||b;
6 endmodule
7
```

```
module top_module(
    input a,
    input b,
    output out );
    assign out = (a && !b) || (!a && b);
endmodule

```

```
module top_module(
    input a,
    input b,
    input c,
    output out );
    assign out = (!a&&b&&c)||(a&&!b&&c)||(a&&b&&!c)||(a&&b&&c);
endmodule

```