

Question 2

Convert 110111101.1011 binary
multiplication method.

sol:

$$\begin{array}{cccccccccccc}
 2^8 & 2^7 & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 & 2^{-1} & 2^{-2} & 2^{-3} & 2^{-4} \\
 1 & 1 & 0 & 1 & 1 & 1 & 1 & 0 & 1 & . & 1 & 0 & 1 & 1
 \end{array}$$

$$254 + 128 + 32 + 16 + 8 + 4 + 1 + 0.5 + 0.0125 + 0.0625$$

$$445.6875$$

Question 3 ~~(a)~~

Convert 86235.876 decimal number
method

$$86325 = 65536 + 20699$$

$$65536 + 16384 + 4315$$

$$65536 + 16384 + 4096 + 219$$

$$65536 + 16384 + 4096 + 128 + 91$$

$$65536 + 16384 + 4096 + 128 + 64 + 27$$

$$65536 + 16384 + 4096 + 128 + 64 + 16 + 11$$

$$65536 + 16384 + 4096 + 128 + 64 + 8 + 2 + 1$$

$$10101000011011011$$

20P-0149

Day:

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Date:

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$$0.876 \times 2 \Rightarrow 1$$

$$1.752 \times 2 \Rightarrow 1$$

$$1.008 \times 2 \Rightarrow 0$$

$$0.016 \times 2 \Rightarrow 0$$

$$0.032 \times 2 \Rightarrow 0$$

$$0.064 \times 2 \Rightarrow 0$$

$$0.128 \times 2 \Rightarrow 0$$

$$0.256 \times 2 \Rightarrow 0$$

$$0.512 \times 2 \Rightarrow 1$$

$$1.024 \times 2 \Rightarrow 0$$

$$0.048 \times 2 \Rightarrow 0$$

$$0.096 \times 2 \Rightarrow 0$$

$$0.192 \times 2 \Rightarrow 0$$

$$0.384 \times 2 \Rightarrow 0$$

$$0.768 \times 2 \Rightarrow 1$$

$$1.536 \times 2 \Rightarrow 1$$

$$1.072 \times 2 \Rightarrow 0$$

$$0.144 \times 2 \Rightarrow 0$$

$$0.288 \times 2 \Rightarrow 0$$

$$0.576 \times 2 \Rightarrow 0$$

$$1.152 \times 2 \Rightarrow 0$$

It will repeat.

Question 4

Convert the decimal number -412.390625... number-

$$-412.390625$$

Change to binary first

$$412 = 256 + 156$$

$$256 + 128 + 28$$

$$256 + 128 + 16 + 12$$

$$256 + 128 + 16 + 8 + 4$$

$$\boxed{110011100}$$

Now:-

$$0.390625 \times 2 \Rightarrow 0$$

$$0.781250 \times 2 \Rightarrow 1$$

$$1.56250 \times 2 \Rightarrow 1$$

$$1.1250 \times 2 \Rightarrow 0$$

$$0.250 \times 2 \Rightarrow 0$$

$$0.50 \times 2 \Rightarrow 1$$

$$1.0$$

$$\boxed{110011100.011001}$$

Now:

$$1.10011100011001 \times 28$$

$$127 + 8 = 145 = 128 + 17$$

$$= 128 + 16 + 1$$

$$\Rightarrow \boxed{10010001}$$

S	exponent	mantissa
1	10010001	100111000110010000000000

Question 5

Determine the binary
number

11011011011000101100111010110111

sol:

$$\begin{aligned}
 &+ 2^{30} + 2^{28} + 2^{27} + 2^{25} + 2^{24} + 2^{22} + 2^{21} + 2^{17} + 2^{15} + 2^{14} \\
 &+ 2^{11} + 2^{10} + 2^9 + 2^7 + 2^5 + 2^4 + 2^2 + 2^1 + 2^0
 \end{aligned}$$

$$\begin{aligned}
 \Rightarrow & 2147483648 + 1073741824 + \\
 & 268435456 + 134217928 + \\
 & 33554432 + 16777216 + \\
 & 4194304 + 2097152 + 131072 + \\
 & 32768 + 16384 + 2048 + 1024 + \\
 & 512 + 128 + 32 + 16 + 4 + 2 + 1 \\
 & 3680685751
 \end{aligned}$$