

(1)

Name:

Saad Ahmad

Roll no:

20P-0051

Section:

BS(CS) - 2D

Question # 1

Decimal	BCD	Hexa	Octal
98	10011000	(63) <sub>16</sub>	(143) <sub>8</sub>
(98) <sub>10</sub>	10011000	(63) <sub>16</sub>	(143) <sub>8</sub>
(1467) <sub>10</sub>	0001010001100111	(5BB) <sub>16</sub>	2673
(43981) <sub>10</sub>	01000011100110000001	ABCD	(125715) <sub>8</sub>

Question # 2

01101010 by 11110001.

$$01101010 = 106$$

$$11110001 = -15.$$

$$00001111 = 15.$$

(2)

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$$\begin{array}{r}
 01101010 \\
 \times 00001111 \\
 \hline
 01101010 \\
 + 01101010X \\
 \hline
 0010011110 \\
 + 0011010101XX \\
 \hline
 089891100110 \\
 001101010XX \\
 \hline
 011000110110
 \end{array}$$

$$\begin{array}{r}
 106 \\
 \times -15 \\
 \hline
 530 \\
 106X \\
 \hline
 -1590
 \end{array}$$

$$(011000110110)_2 = 1590$$

As the answer should be negative, so we will take 2's complement.

$$011000110110 = (100111001010)_2 \text{ Ans.}$$

b) 219 by 15.

$$219 = 01101101$$

$$15 = 00001111$$

$$\begin{array}{r}
 01101101 \\
 \times 00001111 \\
 \hline
 00000000 \\
 000110110111 \\
 + 011011011X \\
 0010101010001 \\
 + 011011011XX \\
 00100101011101 \\
 + 011011011XX \\
 \hline
 0110011010101
 \end{array}
 \quad
 \begin{array}{r}
 15 \\
 \times 15 \\
 \hline
 1895 \\
 219X \\
 \hline
 3285
 \end{array}$$

(3)

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$$(0110011010101)_2 = 3285 \text{ Ans.}$$



This is for checking actual  
answer is  $(0110011010101)_2$ .

Question # 4:

$$a) (ABC)_{16} + (1A3)_{16}$$

$$(ABC)_{16} = (010101011100)_2$$

$$(1A3)_{16} = (0000110100011)_2$$

$$\begin{array}{r} 0000 \\ 010101011100 \\ + \underline{0000110100011} \\ 0110001011111 \end{array}$$

$$\begin{array}{r} 0 \\ \overline{0000} \quad \overline{1100} \quad \overline{0101} \quad \overline{1111} \\ C \qquad \qquad \qquad F \end{array}$$

$$OC5F \text{ or } CF C5F. \text{ Ans.}$$

(4)

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$$b) (F1)_{10} - (A6)_{10}$$

$$F1 = (011110001)_2$$

$$A6 = (010100110)_2$$

$$\begin{array}{r} 010100110 \leftarrow A6 \\ 2's \rightarrow 101011010 \end{array}$$

$$\begin{array}{r} 00000 \\ 011110001 \end{array}$$

$$+ \begin{array}{r} 101011010 \end{array}$$

$$\cancel{\begin{array}{r} 001001011 \end{array}}$$

Discard

$$\begin{array}{r} 00100' \underline{1011} \\ B \end{array}$$

4B Ans.

$$c) (110)_{10} - (84)_{10} = (?)_2$$

$$(110)_{10} = (0110110)_2$$

$$(84)_{10} = (01010100)_2$$

$$\begin{array}{r} 01010100 \leftarrow 84 \\ 2's \rightarrow 10101100 \end{array}$$

(5)

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Section: BSCS-2D.

$$\begin{array}{r}
 00\ 00 \\
 01101110 \\
 + 10101100 \\
 \hline
 \cancel{X} 00011010
 \end{array}$$

Discard

$$(00011010)_2 = (26)_{10}$$

 $(00011010)_2$  Ans.

Question #3

10001000 by 00100010.

$010001000 = 136.$

Quotient = 00000000

$00100010 = 34.$

$$\begin{array}{r}
 00 \\
 10001000 \\
 + 01101110 \\
 \hline
 \cancel{X} 01100110 \\
 + 11011110 \\
 \hline
 \cancel{X} 01000100 \\
 + 11011110 \\
 \hline
 \cancel{X} 00000000
 \end{array}$$

$$\begin{array}{r}
 4 \\
 34 \overline{)136} \\
 - 136 \\
 \hline
 X
 \end{array}$$

$$\begin{array}{r}
 00100010 = 34 \\
 2's \rightarrow 11011110
 \end{array}$$

6

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$$\text{quotient} = 00000100$$

= 0100 Ans.

$$\begin{array}{r}
 Q = 00000000 \\
 + \quad 1 \\
 \hline
 0000000\overset{0}{1} \\
 + \quad 1 \\
 \hline
 000000010 \\
 + \quad 1 \\
 \hline
 0000000\overset{0}{1}\overset{1}{1} \\
 + \quad 1 \\
 \hline
 00000100
 \end{array}$$

$$\text{b) } -145 \text{ by } 5.$$

$$-145 = 10010001$$

$$5 = 00000101$$

$$2^{\text{'s}} \text{ complement} \rightarrow 111111011 =$$

000 00  
10010001

$$\begin{array}{r} + 11111011 \\ \times 00001100 \\ \hline \end{array}$$

$$Q = \underline{00000000} + 1$$

A 0000000  
00000111

— 00000001

$$\begin{array}{r} + 11111011 \\ \hline 10000010 \end{array}$$

00000019

$$\begin{array}{r} 100000010 \\ + 1111011 \\ \hline 1000000001 \end{array}$$

1

$$\begin{array}{r} 1 & 1 & 1 & 1 & 1 & 1 \\ + & 1 & 1 & 1 & 1 & 0 & 1 \\ \hline 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 \end{array}$$

— 4 —

$$\begin{array}{r}
 & 01111000 \\
 + & 11111011 \\
 \hline
 & 00011000
 \end{array}$$

1

$$\begin{array}{r} 0111001 \\ + 11111011 \\ \hline 00000000 \end{array}$$

1

$$\begin{array}{r}
 8949049 \\
 + 14411011 \\
 \hline
 103900500
 \end{array}$$

~~000001~~

67

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Section: BS(CS) - 2D

(8)

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$$\begin{array}{r}
 0000 \\
 00101000 \\
 + 11111011 \\
 \hline
 X 00100011 \\
 + 11111011 \\
 \hline
 X 00010110 \\
 + 10011011 \\
 \hline
 X 00001100 \\
 + 11111011 \\
 \hline
 X 0000010100 \\
 + 11111011 \\
 \hline
 X 0000001010 \\
 + 11111011 \\
 \hline
 X 00000001010 \\
 + 11111011 \\
 \hline
 X 0000000000
 \end{array}$$

$$\begin{array}{r}
 00010100 \\
 + 1 \\
 \hline
 00010101 \\
 + 1 \\
 \hline
 00010110 \\
 + 1 \\
 \hline
 00010111 \\
 + 1 \\
 \hline
 00011000 \\
 + 1 \\
 \hline
 00011001 \\
 + 1 \\
 \hline
 00011010 \\
 + 1 \\
 \hline
 00011011 \\
 + 1 \\
 \hline
 00011100 \\
 + 1 \\
 \hline
 00011101
 \end{array}$$

Quotient = 00011101 Ans.