→ Convert the given octal number $(2564.603)_8$ to hexadecimal number.

$(2564.603)_8$

010 101 110 100 . 110 000 011 000

$(574.C18)_{16}$

[April 2018 R16]

→ Given that $(81)_{10} = (100)_b$, find the value of b

$81 = 1 \times b^2 + 0 \times b^1 + 0 \times b^0$

$81 = b^2$

$\Rightarrow b = 9$

$(100)_9 = (81)_{10}$

[April 2018 R16]

→ Convert $(A0F9.0EB)_{16}$ $(A98.0DC)_{16}$ to decimal, binary, octal.

[May 2017 R13]

→ Convert the following to the required form

i) $(101001.001)_2 = (\_)_{10}$ ii) $(1264)_8 = (\_)_{10}$ [Oct/Nov 2016 R13]

i) $32+8+1+0.125 = (41.125)_{10}$ ii) $512+128+48+4 = (692)_{10}$

→ Perform the following arithmetic using 2's complement method

i) 101111 − 100110 ii) 111001 − 011010 [Oct/Nov 2016 R13]

i) 101111 + 011010 = 001001 (carry discarded)

ii) 111001 + 100110 = 011111 (carry discarded)

→ Convert $(A0F9.0EB)_{16}$, $(A98.0DC)_{16}$ to decimal, binary, octal.

[May 2017 R13]

$(A0F9.0EB)_{16}$

Decimal − 40960 + 240 + 9 + 0.0546 + 0.0026

$= (41209.0572)_{10}$

Binary − $(1010\ 0000\ 1111\ 1001.0000\ 1110\ 1011)_2$

Octal − $(120371.0352)_8$

8 | 41209		0.0572 × 8 = 0.4576
8 | 5151 − 1		0.4576 × 8 = 3.6608
8 | 643 − 7		0.6608 × 8 = 5.2864
8 | 80 − 3		0.2864 × 8 = 2.2912
8 | 10 − 0		
8 | 1 − 2		
0 − 1		

$(A98.0DC)_{16}$

Decimal - $2560+144+8+0.0507+0.0029$

$-(2712.0536)_{10}$

Binary - $(1010\ 1001\ 1000.\ 0000\ 1101\ 1100)_2$

Octal - $(5230.0333)_8$

$8|2712$ $\quad$ $0.0536\times8=0.4288$

$8|339-0$ $\quad$ $0.4288\times8=3.4304$

$8|42-3$ $\quad$ $0.4304\times8=3.4432$

$8|5-2$ $\quad$ $0.4432\times8=3.5456$

$0-5$

→ Convert the following numbers with indicated bases to decimal

i) $(101111)_2$ ii) $(A3B)_{16}$ [Nov/Dec 2015 R13]

i) $32+8+4+2+1=(47)_{10}$

ii) $2560+48+11=(2619)_{10}$

→ Add and subtract the following in binary

i) 1111 & 1010 ii) 100100 & 10110 [Nov/Dec 2015 R13]

i) $\begin{array}{r} 1111 \\ -1010 \\ \hline 0101 \end{array}$ ii) $\begin{array}{r} 100100 \\ 10110 \\ \hline 001110 \end{array}$

→ Given 2 binary numbers $X=(1010100)_2$ & $Y=(1000011)_2$

Perform i) X-Y ii) Y-X using 2's complement method.

[Nov/Dec 2015 R13]

→ Convert the number $(1222)_3$ into decimal & hexadecimal number system. [May 2015 R13]

Decimal - $27+18+6+2=(53)_{10}$

Hexadecimal - $(35)_{16}$

$16|53$

$16|3-5$

$0-3$

→ Convert the number $(4413)_5$ into decimal & hexadecimal number system [May 2015 R13]

Decimal - $500+100+5+3=(608)_{10}$

Hexadecimal - $(260)_{16}$

$16|608$

$16|38-0$

$16|2-6$

$0-2$

→ Find the 9's complement of the numbers 12345678, 87654321. [May 2015 R13]

```
 99999999        9999 9999
 12345678        8765 4321
--------        ---------
 87654321        1234 5678
```

→ Add -45.75 to +87.5 using the 12-bit 2's complement arithmetic.

```
+87.5          01010111.1000
-45.75       + 11010010.0100
-------      ---------------
+41.75       (*)00101001.1100
```

→ Add 25.125 to -79.625 using the 12-bit 2's complement arithmetic.

```
+27.125        00011011.0010
-79.625      + 10110000.0110
-------      ---------------
-52.500        11001011.1000
             = -00110100.1000
```

→ Subtract 27.50 from 68.75 using 12-bit 1's complement arithmetic.

```
+68.75         01000100.1100
-27.50       + 11100100.0111
-------      ---------------
+41.25       (1)00101001.0011
                  ------>1
             ---------------
               00101001.0100
```

→ Add -89.75 to +43.25 using 12-bit 1's complement method

```
+43.25         00101011.0100
-89.75       + 10100110.0011
-------      ---------------
-46.50         11010001.0111
             = -00101110.1000
```

→ Add $(27.5)_8$ & $(74.4)_8$

```
(27.5)8        (010 111.101)2
(74.4)8      + (111 100.100)2
---------    ----------------
(124.1)8     (1 010 100.001)2
```

→ Subtract (a) $(45)_8$ from $(66)_8$ & b) $(73)_8$ from $(25)_8$ using 8-bit representation & 2's complement method.

(a) $(66)_8$ $(00\ 110\ 110)_2$

$-(45)_8$ $+(11\ 011\ 011)_2$

$(21)_8$ $(00\ 010\ 001)_2$

(b) $(25)_8$ $(00\ 010\ 101)_2$

$-(73)_8$ $+(11\ 000\ 101)_2$

$(11\ 011\ 010)_2$

$(-00\ 100\ 110)_2$

→ (a) Add $(GE)_{16}$ & $(C5)_{16}$ (b) Subtract $(7B)_{16}$ from $(C4)_{16}$ & (c) Subtract $(5D)_{16}$ from $(3A)_{16}$

(a) GE_{16} $0110\ 1110_2$

$C5_{16}$ $+1100\ 0101_2$

133_{16} $10011\ 0011_2$

(b) $C4_{16}$ $1100\ 0100_2$

$-7B_{16}$ $+1000\ 0101_2$

49_{16} 0100.1001_2

(c) $3A_{16}$ $0011\ 1010_2$

$-5D_{16}$ $+1010\ 0011_2$

-23_{16} $1101\ 1101_2$

$-0010\ 0011_2$

→ Add 679.6 & 536.8 in 8421 code

679.6 0110 0111 1001 · 0110

536.8 +0101 0011 0110 · 1000

1216.4 1011 1010 1111 · 1110

+0110 +0110 +0110 +0110

1 0010 0001 0110 · 0100

1 2 1 6 · 4

→ Perform the following subtractions in 8421 code using the 10's complement method.

a) 342.7 − 108.9

b) 206.4 − 507.6

a)
342.7 − 108.9 = 233.8

342.7 + 891.1 = 1233.8 (X)

b)
206.4 − 507.6

206.4 + 492.4 = 698.8

1000.0 − 698.8 = 301.2 (−)

0011 0100 0010 . 0111
+ 1000 1001 0001 . 0001
1011 1101 0011 . 1000
+0110 +0110
(X) 0010 0011 0011 . 1000

0010 0000 0110 . 0100
+ 0100 1001 0010 . 0100
0110 1001 1000 . 1000

1001 1001 1001 . 1010
− 0110 1001 1000 . 1000
(−) 0011 0000 0001 . 0010

→ Perform the following decimal subtractions in BCD by 9's complement method.

a) 305.5 − 168.8

b) 679.6 − 885.9

a)
305.5 − 168.8 = 136.7

305.5 + 831.1 = (1) 136.6
→ +1
136.7

0011 0000 0101 . 0101
+ 1000 0011 0001 . 0001
1011 0011 0110 . 0110
+0110
(1) 0001 0011 0110 . 0110
→ +1
0001 0011 0110 0111

b)
679.6 − 885.9 = −206.3

679.6 + 114.0 = 793.6

999.9 − 793.6 = 206.3 (−)

0110 0111 1001 . 0110
+ 0001 0001 0100 . 0000
0111 1000 1101 . 0110
+0110
0111 1001 0011 . 0110

1001 1001 1001 . 1001
− 0111 1001 0011 . 0110
(−) 0010 0000 0110 . 0011

→ Perform the following additions in XS-3 code

a) 37 + 28

b) 247.6 + 359.4

a)
37 + 28 = 65

0110 1010
+ 0101 1011
1100 0101
−0011 +0011
1001 1000

b)
247.6 + 359.4 = 607.0

0101 0111 1010 . 1001
+ 0110 1000 1100 . 0111
1100 0000 0111 . 0000
−0011 +0011 +0011 +0011
1001 0011 1010 . 0011

→ Perform the following subtractions in XS-3 code using the 9's complement method.

a) 687 - 348

b) 246 - 592

a) 687 − 348 = 339

687 + 651 = 1338 → 1 + 338 = 339

b) 246 − 592 = −346

246 + 407 = 653

999 − 653 = 346 → −346

→ Perform the following subtraction in XS-3 code using the 10's complement method.

a) 597 - 239

b) 354 - 672

a) 597 − 239 = 358

597 + 761 = 1358 → 358

b) 354 − 672 = −318

354 + 328 = 682

1000 − 682 = 318 → −318