

Roll numbers 24K-0737

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Q#1) Decimal numbers to binary:-

(i) 256_{10}

Soln.

$$256 \div 2 = 128 \quad \text{Remainder } 0$$

$$128 \div 2 = 64 \quad \text{Remainder } 0$$

$$64 \div 2 = 32 \quad \text{Remainder } 0$$

$$32 \div 2 = 16 \quad \text{Remainder } 0$$

$$16 \div 2 = 8 \quad \text{Remainder } 0$$

$$8 \div 2 = 4 \quad \text{Remainder } 0$$

$$4 \div 2 = 2 \quad \text{Remainder } 0$$

$$2 \div 2 = 1 \quad \text{Remainder } 0$$

$$1 \div 2 = 0 \quad \text{Remainder } 1$$

$$\boxed{256_{10} = 100000000_2} \quad \text{Ans.}$$

(iii) $512_{10} = ?$ Ans.

Soln.

$$512 \div 2 = 256 \quad \text{Remainder } 0$$

$$256 \div 2 = 128 \quad \text{Remainder } 0$$

$$128 \div 2 = 64 \quad \text{Remainder } 0$$

$$64 \div 2 = 32 \quad \text{Remainder } 0$$

$$32 \div 2 = 16 \quad \text{Remainder } 0$$

$$16 \div 2 = 8 \quad \text{Remainder } 0$$

$$8 \div 2 = 4 \quad \text{Remainder } 0$$

$$4 \div 2 = 2 \quad \text{Remainder } 0$$

$2 \div 2 = 1 \quad \text{Remainder } 0$

(ii) 1024_{10}

$\frac{1024}{2} = 512$

$\frac{1024}{2} = 512$	RO
$\frac{512}{2} = 256$	RO
$\frac{256}{2} = 128$	RO
$\frac{128}{2} = 64$	RO
$\frac{64}{2} = 32$	RO
$\frac{32}{2} = 16$	RO
$\frac{16}{2} = 8$	RO
$\frac{8}{2} = 4$	RO
$\frac{4}{2} = 2$	RO
$\frac{2}{2} = 1$	RO
$1 / 0.5$	R1

$1024_{10} = 100000000000_2$ Ans

Q#2:- Decimal to Hexadecimal :-

(i) 345_{10}

sol

$$345 \div 16 = 21.5625 \quad R9$$

$$21 \div 16 = 1.3125 \quad R5$$

$$1 \div 16 = 0.0625 \quad R1$$

$$[345_{10} = 159_{16}] \text{ Ans.}$$

(ii) 789_{10}

sol:- ~~$789 - 96 = 693$~~ $789 - 96 = 78.625 \quad R$

$$789 \div 16 = 49.3125 \quad R5$$

$$49 \div 16 = 3.0625 \quad R1$$

$$3 \div 16 = 0.1875 \quad R3$$

$$[789_{10} = 315_{16}] \text{ Ans.}$$

(iii) 2048_{10}

sol

$$2048 \div 16 = 128 \quad R0$$

$$128 \div 16 = 8 \quad R0$$

$$8 \div 16 = 0.5 \quad R8$$

$$[2048_{10} = 800_{16}] \text{ Ans.}$$

Q#3. Decimal numbers to Octal number

(i) 512_{10}

$\frac{8}{2}$

$$512 \div 8 = 64 \text{ R } 0$$

$$64 \div 8 = 8 \text{ R } 0$$

$$8 \div 8 = 1 \text{ R } 0$$

$$1 \div 8 = 0 \text{ R } 1$$

$$\boxed{512_{10} = 1000_8} \text{ Ans}$$

(ii) 1234_{10}

$\frac{8}{2}$

$$1234 \div 8 = 154 \cdot 25 \text{ R } 2$$

$$154 \div 8 = 19 \cdot 25 \text{ R } 2$$

$$19 \div 8 = 2 \cdot 375 \text{ R } 3$$

$$2 \div 8 = 0 \cdot 25 \text{ R } 2$$

$$\boxed{1234_{10} = 2322_8} \text{ Ans}$$

(iii) 999

$\frac{8}{2}$, $999 \div 8 = 124 \cdot 875 \text{ R } 7$

$$124 \div 8 = 15 \cdot 5 \text{ R } 3$$

$$15 \div 8 = 1 \cdot 875 \text{ R } 7$$

$$1 \div 8 = 0 \cdot 125 \text{ R } 1$$

$$\boxed{999_{10} = 1747_8} \text{ Ans}$$

Q#4. Convert the binary number to decimal.

(i) 101101011

807

$$\begin{array}{r} 2^9 \ 2^8 \ 2^7 \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 101101011 \\ \hline 256 \ 128 \ 64 \ 32 \ 16 \ 8 \\ + 64 + 32 + 8 + 1 \\ \hline = 363 \end{array}$$

[$101101011 = 363_{10}$] Ans.

(ii) 1101001010

807

$$\begin{array}{r} 2^9 \ 2^8 \ 2^7 \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 1101001010 \\ \hline 512 \ 256 \ 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \end{array}$$

$$512 + 256 + 64 + 8 + 2 = 842.$$

[$1101001010 = 842_{10}$] Ans

(iii) 111110000 = 1008_{10} / Ans

807

$$\begin{array}{r} 2^9 \ 2^8 \ 2^7 \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \\ 111110000 \\ \hline 512 \ 256 \ 128 \ 64 \ 32 \ 16 \\ = 512 + 256 + 128 + 64 + 32 + 16 \\ = 1008 \end{array}$$

Q45:- Convert the following Hexadecimal number to decimal:

(i) 1A3

$$\begin{array}{r} 10 \\ \times 16^0 \\ \hline 16 \\ 16 \quad | \quad 16^0 \\ \hline 256 \quad | \quad 16^0 \quad 3 \\ \hline 256 + 16^0 + 3 \\ \hline 259 \end{array}$$

(ii) 3F8

$$\begin{array}{r} 256 \\ \times 3 \\ \hline 8 \\ 3 \quad | \quad 15 \\ \hline 16 \quad | \quad 16^0 \\ \hline 768 \end{array}$$

$$\begin{array}{r} 768 \\ \rightarrow 40 + 8 \\ 1016 \end{array}$$

(iii) C9B

$$\begin{array}{r} 12 \\ \rightarrow \\ C \quad | \quad 9 \quad | \quad B \\ \hline 16^2 \quad | \quad 16^1 \quad | \quad 16^0 \\ \hline \end{array}$$

$$= 256 \times 12 + 9 \times 16 + 11$$

$$= 3072 + 144 + 11$$

$$= 3227$$

Q#6: Convert the Octal to decimal:-

(i) 457

8D

$$\begin{array}{r} 4 \quad 5 \quad 7 \\ \hline 8^2 \quad 8^1 \quad 8^0 \end{array}$$

$$= 64 \times 4 + 5 \times 8 + 7 \times 1$$

$$= 256 + 40 + 7$$

$$\begin{array}{r} 303 \\ \hline 457_8 \rightarrow 303_{10} \end{array} / \text{Ans}$$

(ii) 1052

8DB

$$\begin{array}{r} 1 \quad 0 \quad 5 \quad 2 \\ \hline 8^3 \quad 8^2 \quad 8^1 \quad 8^0 \end{array}$$

$$= 512 + 64 + 40 + 2$$

$$= 618$$

$$\begin{array}{r} 618 \\ \hline 1052_8 \rightarrow 618_{10} \end{array} / \text{Ans}$$

(iii) 764

8DH

$$\begin{array}{r} 7 \quad 6 \quad 4 \\ \hline 16^2 \quad 16^1 \quad 16^0 \end{array}$$

$$= 256 \times 7 + 6 \times 16 + 4$$

$$= 1792 + 96 + 4$$

$$\begin{array}{r} 1892 \\ \hline 764_8 \rightarrow 1892_{10} \end{array} / \text{Ans}$$

QH7:- Convert the binary to hexadecimal

(i) 10011001101
807

10011001101

0100	1100	1101
8421	8421	8421
↓	↓	↓
4	12	13

s. $(4C0)_{16}$ Ans.

(ii) 1101011011

807

0011	10101	11011
8421	8421	8421
↓	↓	→
3	5	B

s. $(35B)_{16}$ Ans.

(iii) 1010101010
8D₁₆
=

1010101010

0010	[1010]	[1010]
8421	8421	8421

2 10 10
• (2AA)₁₆ Ans.

Q8) Convert the hexadecimal to binary:-

(i) 2B5

8021

$\begin{array}{r} 2 \\ 8421 \end{array}$ $\begin{array}{r} 11 \\ 8421 \end{array}$ $\begin{array}{r} 5 \\ 8421 \end{array}$
0000 1011 0101

$(2B5)_{16} \rightarrow (000010110101)_2$ Ans

(ii) 7D3

8021

$\begin{array}{r} 7 \\ 8421 \end{array}$ $\begin{array}{r} D = 13 \\ 8421 \end{array}$ $\begin{array}{r} 3 \\ 8421 \end{array}$
0111 1101 0011

$(7D3)_{16} \rightarrow (01111010011)_2$ Ans

(iii) FA4

8021

$\begin{array}{r} F_A4 \\ 8421 \end{array}$ $\begin{array}{r} A = 10 \\ 8421 \end{array}$ $\begin{array}{r} 4 \\ 8421 \end{array}$
1111 1010 0100

$(FA4)_{16} \rightarrow (111110100100)_2$ Ans

Q#9. Convert octal number to binary:

(i) $(726)_8$

$\frac{802}{2} \rightarrow$

7	2	6
$4_2/1$	$4_2/1$	$4_2/1$
111	010	110

$[(726)_8 \rightarrow (111010110)_2]$ Ans.

(ii) $(453)_8$

$\frac{802}{2} \rightarrow$

4	5	3
$4_2/1$	$4_2/1$	$4_2/1$
100	101	011

$[(453)_8 \rightarrow (100101011)_2]$ Ans

(iii) 1075

1	0	7	5
$4_2/1$	$4_2/1$	$4_2/1$	$4_2/1$
1	000	111	101

$[(1075)_8 = (1000111101)_2]$ Ans.

Q16:- Convert the binary numbers to octal.

(i) 111000110

sol:

$\boxed{111000110}$
 $\begin{matrix} \cancel{1} & \cancel{1} & \cancel{1} \\ \cancel{2} & \cancel{2} & \cancel{2} \\ \downarrow & \downarrow & \downarrow \\ 4 & 0 & 6 \end{matrix}$
 76

$[(111000110)_2 \rightarrow (76)_8]$ Ans

(ii) 1001100110

sol:

$\boxed{10011001100110}$
 $\begin{matrix} \cancel{1} & \cancel{0} & \cancel{1} & \cancel{1} & \cancel{0} & \cancel{0} \\ \cancel{2} & \cancel{2} & \cancel{1} & \cancel{2} & \cancel{1} & \cancel{2} \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 4 & 4 & 1 & 4 & 1 & 4 \end{matrix}$

$[(146)_8 = (1001100110)_2]$ Ans

(iii) 1011010111

sol:

$\begin{matrix} 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 \\ \cancel{2} & \cancel{2} & \cancel{1} & \cancel{2} & \cancel{1} & \cancel{2} & \cancel{1} \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 1 & 3 & 2 & 7 \end{matrix}$

$[(1011010111)_2 = (1327)_8]$ Ans