Types of Number System Questions

MCQ Question 1

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Convert the 127 decimal number into binary.

1. 1100111
2. 1111111
3. 1111011
4. 111111

Answer (Detailed Solution Below)

Option 2 : 1111111

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Types of Number System MCQ Question 1 Detailed Solution

The correct answer is 'option 2'

Concept

Divide 127 by 2. Use the integer quotient obtained in this step as the dividend for the next step. Repeat the process until the quotient becomes 0.

Solution:

Divide	Remainder
127/2	1
63/2	1
31/2	1
15/2	1
7/2	1
3/2	1
1/2	1

Write the remainder from bottom to top i.e. in the reverse chronological order.

This will give the binary equivalent of 127.

Therefore, the binary equivalent of decimal number 127 is 1111111.

MCQ Question 2 View this Question Online >

The hexadecimal representation of 657_8 is

1. D78
2. 1AF
3. D71
4. 32F

Answer (Detailed Solution Below)

Option 2 : 1AF

Types of Number System MCQ Question 2 Detailed Solution

Concept:

Hexadecimal number: In this, value of the base is 16. Each digit is represented by 4-bit binary no.

Octal number: For octal number, value of base is 8. Each digit of an octal number is represented by 3-bit binary no.

Explanation:

Octal number = 657

Binary representation for this number (each digit of a octal number is converted into 3 binary bits)

So, 657 in binary is equivalent to 110 101 111

Now group this binary number into 4 bits starting from right to left.

i.e. 0001 1010 1111

Hexadecimal representation for this number is : 1AF

MCQ Question 3

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If $(110)_x = (132)_4$, then x =

1. 8
2. 5
3. 4
4. 9

Answer (Detailed Solution Below)

Option 2 : 5

Types of Number System MCQ Question 3 Detailed Solution

Concept:

Another number system to Decimal

In each and every representation of numbers with different bases, the maximum value in a number system with the base 'r' is r – 1. Since numbers vary from 0 to r – 1.

To convert any number which is in the different base to decimal number system we use **binary-weighted** representation.

Eg: let the number be $(abc\cdots\cdots yz)_r$

Now to convert the above number into the decimal number system

$a \times r^{n-1} + b \times r^{n-2} + \cdots \cdots + y \times r^{1} + z \times r^{0}$

If we convert all numbers into decimal then we can perform normal addition and subtraction etc.

Application:

Given:

$(110)_x = (132)_4$,

The decimal equivalent of this number will be:

$1 \times x^2 + 1 \times x^1 + 0 \times x^0 = 1 \times 4^2 + 3 \times 4 + 2 \times 4^0$

$x^2 + x + 0 = 16 + 12 + 2$

$x^2 + x - 30 = 0$

On solving this quadratic equation we'll get:

$x = 5, -6$

Base can't be a negative so;

$x = 5$

MCQ Question 4 View this Question Online >

The decimal equivalent of the binary number $(1101)_2$ is

1. 9
2. 11
3. 13
4. 15

Answer (Detailed Solution Below)

Option 3 : 13

Types of Number System MCQ Question 4 Detailed Solution

The correct answer is **13**.

- Step by step solution:
  - Step 1: Write down the binary number: 1101
  - Step 2: **Multiply each digit of the binary number by the corresponding power of two**: $1x2^3 + 1x2^2 + 0x2^1 + 1x2^0$
  - Step 3: Solve the powers: 1x8 + 1x4 + 0x2 + 1x1 = 8 + 4 + 0 + 1
  - Step 4: Add up the numbers written above: 8 + 4 + 0 + 1 = 13
    So, **$(1101)_2 = (13)_{10}$**

Key Points

- $(1101)_2 = (?)_8$ (Binary to octal conversation)
  - Step 1: Write down the binary number $(001101)_2$, **Group all the digits in sets of three starting from the LSB (far right). Add zeros to the left of the last digit if there aren't enough digits to make a set of three.** (001 101)
  - Step 2: Use the table below to convert each set of three into an octal digit. In this case, 001=1, 101=5.
    So, the number **1101 in binary is equivalent to 15 in octal**.
  - Table for binary to the octal conversation:

BINARY	OCTAL
000	0
001	1
010	2
011	3
100	4
101	5
110	6
111	7

MCQ Question 5

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Find the decimal equivalent of the 6-bit binary number $(101.101)_2$

1. 5.25_{10}
2. 5.125_{10}
3. 5.625_{10}
4. 6.625_{10}

Answer (Detailed Solution Below)

Option 3 : 5.625_{10}

Types of Number System MCQ Question 5 Detailed Solution

The decimal equivalent of the binary number 101.101 is,

$= 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3}$

$= 4 + 0 + 1 + 0.5 + 0 + 0.125$

$=$ **5.625**

MCQ Question 6

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State the octal equivalent of hexa decimal number $(B34)_{16}$.

1. $(6454)_8$
2. $(4564)_8$
3. $(5464)_8$
4. $(5645)_8$

Answer (Detailed Solution Below)

Option 3 : $(5464)_8$

Types of Number System MCQ Question 6 Detailed Solution

Concept:

A number system includes the number of independent digits used in the number system (the base), the place values of the different digits constituting the number, and the maximum numbers that can be written with the given number of digits.

Octal numbers: These numbers use digits from 0 to 7, total of 8 digits, and hence they are called octal number system. Octal numbers have base 8.

Hexadecimal numbers: The numbers which have base 16. It uses 16 different digits to represent the numbers. It is denoted as h_{16}, where h is a hexadecimal number. It may be a combination of alphabets and numbers. Thus, it includes numbers from 0 to 9 and alphabets A to F.

Calculation:

Hexadecimal to Octal Conversion:

Given, $B34_{16}$ is a hexadecimal number.

B → 1011, 3 → 0011, 4 → 0100

1011 0011 0100

Now group them from right to left, each having 3 digits.

101, 100, 110, 100

101 → 5, 100 → 4, 110 → 6, 100 → 4

Hence, $\mathbf{B34_{16} = 5464_8}$

Key Points

There is grouping of 3 from right to left since octal has base of 8, and 8 = 2^3, i.e. power 3.

MCQ Question 7 View this Question Online >

The decimal number $(57.375)_{10}$ when converted to binary number takes the form:

1. $(111001.011)_2$
2. $(100111.110)_2$
3. $(110011.101)_2$
4. $(111011.011)_2$

Answer (Detailed Solution Below)

Option 1 : $(111001.011)_2$

Types of Number System MCQ Question 7 Detailed Solution

Concept:

Decimal to binary:

- Take decimal number as dividend.
- Divide the number by 2.
- Get the integer quotient for the next iteration.
- Get the remainder (it will be either 0 or 1 because of divisor 2).
- Repeat the steps until the quotient is equal to 0
- Write the remainders in reverse order (which will be equivalent binary number of given decimal number).

Decimal to binary: (fractional part)

- Take decimal number as multiplicand.
- Multiple this number by 2 (2 is base of binary so multiplier here).
- Store the value of integer part of result in an array (it will be either 0 or 1 because of multiplier 2).
- Repeat the above two steps until the number became zero.
- Write these resultant integer part

Calculation:

Binary of 57:

Division	Remainder (R)
57 / 2 = 28	1
28 / 2 = 14	0
14 / 2 = 7	0
7 / 2 = 3	1
3 / 2 = 1	1
1 / 2 = 0	1

Now, write remainder from bottom to up (in reverse order), this will be 111001 which is equivalent binary number of decimal integer 57.

Convert decimal fractional number 0.375 into binary number.

Here, decimal fraction: 0.375

Multiplication	Resultant integer part (R)

0.375 x 2= 0.750	0
0.750 x 2 = 1.50	1
0.50 x 2= 1.00	1
0.00 x 2= 0	0

Now, write these resultant integer part, this will be 0.0110 which is equivalent binary fractional number of decimal fractional 0.375.

∴ 57.375 can be written as 111001.011 in binary

Hence, option (1) is correct.

MCQ Question 8 View this Question Online >

The number system with base 16 is called

1. Binary number system
2. Octal number system
3. Hexadecimal number system
4. Decimal number system

Answer (Detailed Solution Below)

Option 3 : Hexadecimal number system

Types of Number System MCQ Question 8 Detailed Solution

The correct answer is **Hexadecimal number system.**

Additional Information

- Hexadecimal numbers are used extensively in microprocessor work.
- The hexadecimal number system has a base of 16.
- After reaching 9 in the hexadecimal system, we continue as A, B, C, D, E, F.
- For converting a decimal number to a hexadecimal number, the number is successively divided by 16 with remainders occupying the successive positions from the right.

The procedure is exactly similar to the procedure for converting a decimal number to binary.

For example: $N = A_n B^n + A_{n-1} B^{n-1} + \ldots + A_1 B^1 + A_0 B^0 \ldots$

where, N = number, B = base, $A_n = (n + 1)^{th}$ digit in that base.

Converting hexadecimal to the decimal.

Let hexadecimal number =11

So, $N = 1*\mathbf{16}^1 + 1*\mathbf{16}^0 = 1*16 + 1*1 = 16 + 1 = \mathbf{17}$

The decimal number 11 is smaller than the hexadecimal number 11.

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

MCQ Question 9

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Decimal equivalent of Hexadecimal number $(C3B1)_{16}$ is

1. 12197
2. 32097
3. 52097
4. 50097

Answer (Detailed Solution Below)

Option 4 : 50097

Types of Number System MCQ Question 9 Detailed Solution

Conversion:

Hexadecimal number to decimal number

$(C3B1)_{16} = (C \times 16^3) + (3 \times 16^2) + (B \times 16) + (1 \times 16^0)$

$(C3B1)_{16} = (12 \times 16^3) + (3 \times 16^2) + (11 \times 16) + (1 \times 16^0)$

$\mathbf{(C3B1)_{16} = (50097)_{10}}$

Binary to Hexadecimal conversion table:

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

MCQ Question 10 View this Question Online >

When the value 37H is divided by 17H, the remainder is

1. C0H
2. 03H
3. 07H
4. 09H

Answer (Detailed Solution Below)

Option 4 : 09H

Types of Number System MCQ Question 10 Detailed Solution

Concept:

Hexa decimal division process:

Step 1: Convert the given hexadecimal numbers to decimal.

Step 2: perform division operation to the decimal numbers.

Step 3: Convert the result to requires number system.

Calculation:

Convert the given hexadecimal numbers to decimal and perform division operation and for the remainder obtained, convert that remainder into hexadecimal.

$\Rightarrow 37H = 3 \times 16^1 + 7 \times 16^0 = (55)_{10}$

$\Rightarrow 17H = 1 \times 16^1 + 7 \times 16^0 = (23)_{10}$

$\Rightarrow$ remainder of (55 / 23) = $(9)_{10}$

$(9)_{10}$ in hexa decimal form is represented as shown

$\Rightarrow (9)_{10} = 0 \times 16^1 + 9 \times 16^0 = 09H$

∴ **The remainder is 09H**

Note: From 0 - 9 vales of the both decimal and hexadecimal number systems are same.