HIGHER SECONDARY FIRST YEAR

Unit – I Fundamentals of Computers :: Chapter – II Number Systems

Evaluation Questions

Part I

I. Choose the best answer

1. Which refers to the number of bits processed by a computer's CPU? **Word length**.
2. How many bytes does 1 KiloByte contain? **1024**
3. Expansion for ASCII. **American Standard Code for Information Interchange**
4. 2^50 is referred as. **Peta.**
5. How many characters can be handled in Binary Coded Decimal System? **64**
6. For 11012 what is the Hexadecimal equivalent? **D**
7. What is the 1's complement of 00100110? **11011001**
8. Which amongst this is not an Octal number? **876**

II. Very Short Answers

1. What is data?
   - The term data comes from the word datum, which means a raw fact.
   - The data is a fact about people, places or some objects.
   - Computer handles data in the form of '0'(Zero) and '1' (One).
2. Write the 1's complement procedure.

   Step 1: Convert given Decimal number into Binary.

   Step 2: Check if the binary number contains 8 bits , if less add 0 at the left most bit, to make it as 8 bits.

   Step 3: Invert all bits (i.e. Change 1 as 0 and 0 as 1)
3. Convert $(46)_{10}$ into Binary number.

2	46
2	23 - 0
2	11 - 1
2	5 - 1
2	2 - 1
	1 - 0

$46_{10} = 101110_2$

4. We cannot find 1's complement for $(28)_{10}$. State reason.

   We cannot find 1's complement for $(28)_{10}$. Because it is a positive number.
   1's complement apply only with negative number.
5. List the encoding systems for characters in memory.

Several encoding systems used for computer.

- BCD – Binary Coded Decimal
- EBCDIC – Extended Binary Coded Decimal Interchange Code
- ASCII – American Standard Code for Information Interchange
- Unicode
- ISCII - Indian Standard Code for Information Interchange

III. Short Answers

1. What is radix of a number system? Give example
   - A numbering system is a way of representing numbers.
   - The most commonly used numbering system in real life is Decimal number system, others Binary, Octal, Hexadecimal number system.
   - Each number system is uniquely identified by its base value or radix.
   - Radix or base is the count of number of digits in each number system.
     - Decimal Number System - Radix or base 10 – $(150)_{10}$
     - Binary Number System - Radix or base 2 – $(101110)_2$

- Octal Number System - Radix or base 8 – $(226)_8$
- Hexadecimal Number System - Radix or base 16 – $(7E)_{16}$.

2. Write note on binary number system.
   - There are only two digits in the Binary system, namely, 0 and 1.
   - The numbers in the binary system are represented to the base 2 and the positional multipliers are the powers of 2.
   - The left most bit in the binary number is called as the Most Significant Bit (MSB) and it has the largest positional weight.
   - The right most bit is the Least Significant Bit (LSB) and has the smallest positional weight.
   - Example 1101_2 .
3. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal

Decimal to Binary conversion

2	150
2	75 - 0
2	37 - 1
2	18 - 1
2	9 - 0
2	4 - 1
2	2 - 0
	1 - 0

$150_{10} = 10010110_2$

Binary to Octal conversion

Group 3 bit format 010 010 110

2 2 6

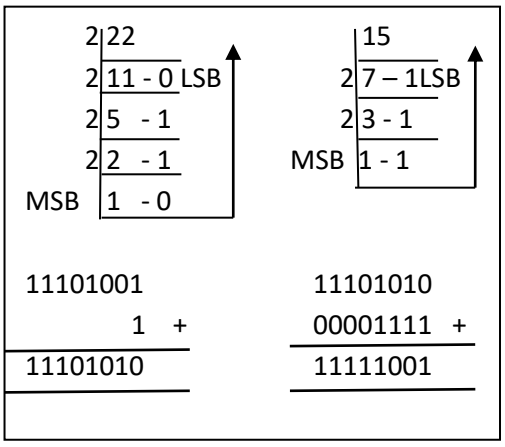
$010\ 010\ 110_2 = 226_8$

Octal	Binary Equivalent
0	000
1	001
2	**010**
3	011
4	100
5	101
6	**110**
7	111

4. Write short note on ISCII
   - Indian Standard Code for Information Interchange (ISCII) is the system of handling the character of Indian local languages.
   - This as a 8-bit coding system. Therefore it can handle 256 (28) characters.
   - This system is formulated by the department of Electronics in India in the year 1986-88 and recognized by Bureau of Indian Standards (BIS).
   - Now this coding system is integrated with Unicode.
5. Add a) $-22_{10}+15_{10}$ b) $20_{10}+25_{10}$

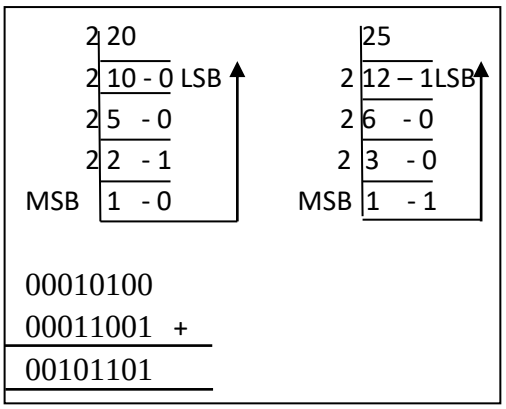
a) $-22_{10}+15_{10}$

Binary equivalent of 22	10110
8 bit format	00010110
1's Complement	11101001
Add 1 to LSB	1
2's Complement	**11101010**
Binary equivalent of 15	1111
8 bit format	**00001111**
Binary addition of -22 and 15	11101010
	00001111
	11111001



b) $20_{10}+25_{10}$

Binary equivalent of 20	10100
8 bit format	**00010100**
Binary equivalent of 25	11001
8 bit format	**00011001**
Binary addition of 20 and 25	00010100
	00011001
	00101101



IV. Short Answers

1. A) Write the procedure to convert fractional Decimal to Binary.

The method of repeated multiplication by 2 has to be used to convert such kind of decimal fractions.

The steps involved in the method of repeated multiplication by 2.

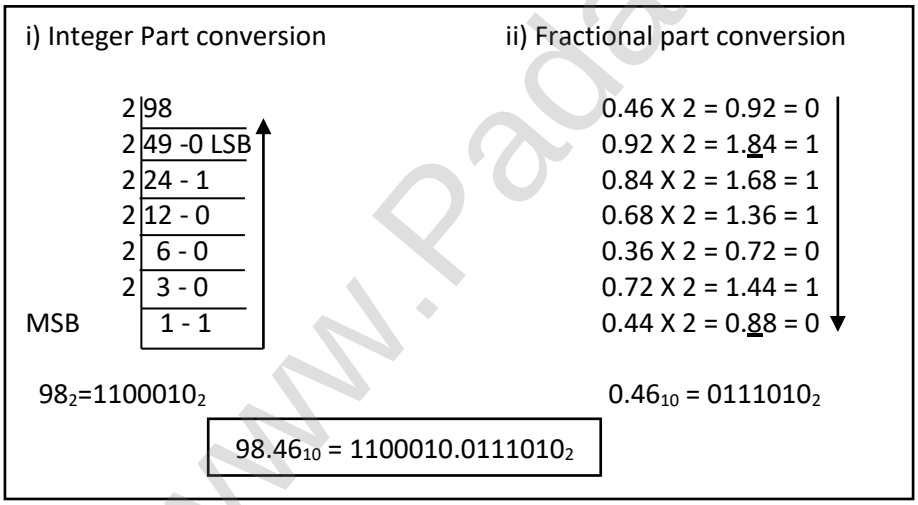
Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

B) Convert $(98.46)_{10}$ to Binary.

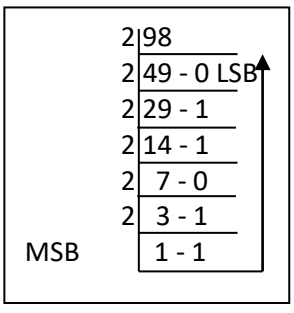


2. Find 1's Complement and 2's Complement for the following Decimal number

A) -98 B) -135

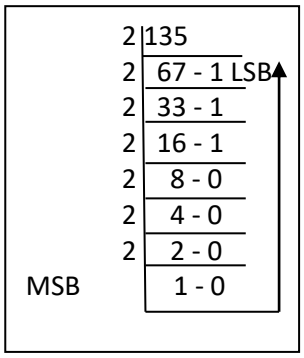
A) -98

Binary equivalent of 98	1110110
8 bit format	01110110
1's Complement	**10001001**
Add 1 to LSB	1
2's Complement	**10001010**



B) -135

Binary equivalent of 135	10000111
1's Complement	**01111000**
Add 1 to LSB	1
2's Complement	**01111001**



3) A) Add $1101010_2 + 101101_2$ B) Subtract $1101011_2 - 111010_2$

A)
$$\begin{array}{r} 1101010 \\ +\ 101101 \\ \hline 10110111 \end{array}$$

$1101010_2 + 101101_2 = 10110111_2$

B)
$$\begin{array}{r} 1101011 \\ -\ 111010 \\ \hline 100001 \end{array}$$

$1101011_2 - 111010_2 = 100001_2$

0+1=1
1+0=1
1+1=10
1+1+1=11

1-0=0
1-1=0
10-1=1