Textual exercises

A) Choose the correct answer.

1) Computer recognize only two discrete states, i.e……
   a) Yes and No b) Right and Wrong c) **On and Off**
2) The On and Off states are represented by ……..
   a) **0 and 1** b) 1 and 2 c) 2 and 1
3) The base 8 number system is ……
   a) Hexadecimal b) Binary c) Octal
4) The digit 'zero' represents the electronic state ……..
   a) On b) **off** c) None
5) The number system used internally by all modern computers is ……..
   a) Hexadecimal b) Binary c) Octal
6) The digits used in Octal number system are from ……..
   a) 0 to 9 b) 0 and 1 c) **0 to 7**

B) Write True / False of the following statements.

1) Every character in a computer has an assigned numeric code, called its ASCII code. [T]
2) The decimal number system has just two unique digits, 0 and 1. [F]
3) A byte is used to represent a single character in the computer. [F]
4) A group of 8 bits is called kilobyte. [F]
5) A nibble is a collection of 5 bits. [F]

C) Fill in the blanks.

1) In computers, characters have to be represented in the form of **0s and 1s.**
2) In a positional number system, there are only a few symbols called **digits**.
3) The **Binary** Number System represents numeric values using two symbols, i.e., 0 and 1.
4) The Decimal Number System has **10** as its base.
5) The Octal Number System has **8** as its base.
6) The Hexadecimal Number System includes the symbols **0 to 9** and **A to F**.

D) Define the following.

1. Bit: The smallest unit in computer processing is called Bit. It is a unit of data that can be either of the two conditions, 0 or 1.
2. Byte: A group of 8 bits is called a Byte.
3. Nibble: Half a byte is called Nibble. A nibble is a collection of bits on a 4-bit boundary.

E. Differentiate between the following.

1. Positional Number System: The positional system depends on where the numbers are placed in the sequence of numbers.

   Non-positional Number System: The non-positional system does not depend on the position of the number and symbols are used to represent the number.

2. Binary number system: Binary is a base 2 number system (bi means two), and the symbols it uses are 0 and 1. In binary, the place values, moving from right to left, are successive powers of two (2^0, 2^1, 2^2, 2^3 or 1, 2, 4, 8)

   Decimal number system: The decimal number system is a base 10 number system (deci means ten). The base of a number system indicates how many symbols it uses. The decimal number system uses 10 symbols: 0 to 9. Each of the symbol in the number system has a value associated with it.

3. Octal number system: In an octal number system, the base is 8. Hence, there are only eight symbols or digits: 0, 1, 2, 3, 4, 5, 6, and 7 (8 and 9 do not exist in this system).

   Hexadecimal number system: The hexadecimal number system uses 16 digits including 6 letters of alphabet (hex means six). These include the symbols 0 to 9 and A to F.

F) Answer in one word:-

1) A group of 8 bits is called what?

A) Byte

2) How many types of number systems are there? Which are they?

A) Two, 1) non-positional number system 2) positional number system

3) What is a collection of bits on a 4 bits boundary?

A) A nibble

4) The smallest unit in computer processing is called what?

A) **Bit**

5) Which number system depends on the position where the numbers are placed in the sequence of numbers?

A) Non-positional number system

6) Which number system does not depend on the position of the number, and symbols are used to represent the number?

a) Positional system

Activity Section

Convert the following.

1. Decimal to Binary

i. 345

2	345	
2	172	1
2	86	0
2	43	0
2	21	1
2	10	1
2	5	0
2	2	1
	1	0

Ans $(101011001)_2$

ii. 113

2	113	
2	56	1
2	28	0
2	14	0
2	7	0
2	3	1
	1	1

Ans $(1110001)_2$

iii. 145

2	145	
2	72	1
2	36	0
2	18	0
2	9	0
2	4	1
2	2	0
	1	0

Ans $(10010001)_2$

iv. 287

2	287	
2	143	1
2	71	1
2	35	1
2	17	1
2	8	2
2	4	0
2	2	0
	1	0

Ans $(100011111)_2$

2. Binary to Decimal

i. $(111)_2$ = $(1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)$

$(1 \times 4) + (1 \times 2) + (1 \times 1)$

$4 + 2 + 1 = (7)_{10}$

ii. $(1101)_2$ = $(1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$

$(1 \times 8) + (1 \times 4) + (0 \times 2) + (1 \times 1)$

$8 + 4 + 0 + 1 = (13)_{10}$

iii. $(1001)_2$ = $(1 \times 2^3) + (0 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$

$(1 \times 8) + (0 \times 4) + (0 \times 2) + (1 \times 1)$

$8 + 0 + 0 + 1 = (9)_{10}$

iv. $(1011)_2$ = $(1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)$

$(1 \times 8) + (0 \times 4) + (1 \times 2) + (1 \times 1)$

$8 + 0 + 2 + 1 = (11)_{10}$

3. Decimal to Octal

i. 45

8	45	
8	5	5
	0	5

Ans $(55)_8$

ii. 70

8	70	
8	8	6
8	1	0
	0	1

Ans $(106)_8$

4. Decimal to Hexadecimal

i. 22

16	22	
16	1	6
	0	1

Ans $(16)_{16}$

ii. 330

16	330	
16	20	10
16	1	4
	0	1

Ans $(14A)_{16}$

(because A = 10)