CHAPTER 5
NUMBER SYSTEM

Q1. Explain the following: (a). Binary number system. (b). Octal number system
(c). Decimal number system. (d). Hexadecimal number system (e). ASCII codes (f). BCD

a). Binary number system:- (Base 2): This number system uses only two digits 0 and 1. So the base of this number system is 2. These digits are called Binary digIT (BIT). Binary number system is also a positional number system and each position has a weight that is a power of 2. For example $(101)_2 = 1x2^2+0x2^1+1x2^0 = (5)_{10}$

b). Octal number system:- (Base 8): This number system consist of eight digits like 0, 1, 2, 3, 4, 5, 6 and 7. The base of this number system is 8. Each Octal No. represents three binary digits. Some valid octal numbers are $(151)_8$, $(376)_8$ etc.

c). Decimal number system:- (Base 10): This number system consists of ten digits from 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. Therefore the base of this number system is 10. We use this number system in our daily routine life. $(98)_{10}$, $(59)_{10}$ are examples of Decimal no. system.

d). Hexadecimal number system: This number system consists of 16 digits from 0 to 9 and letters from A to F. Where A, B, C, D, E, F represents 10,11,12,13,14,15 respectively. Each Hexadecimal no. represents four binary digits. The base of this number system is 16. For example $(181)_{16}$, $(A5)_{16}$ etc.

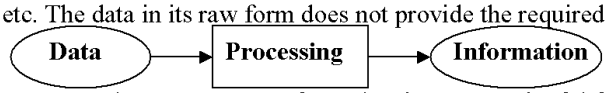
e). ASCII Codes:- ASCII (American Standard Code for Information Interchange) is a 7-bit code use to handle data. This coding scheme was published by ISO (International Standard Organization). This code allows manufacturers to standardize input/output devices.
ASCII-7 supports only 128 characters and ASCII-8 represents 2^8 = 256 different characters including graphics symbols. Most computers also use 8-bit ASCII codes.

f). BCD:- (Binary Coded Decimal): This coding scheme is used to represent numeric data. To represent decimal number we need a 4-bit BCD. For example

Number in decimal	2	4	7
BCD code	0010	0100	0111

Q2. Explain the following terms using examples. (a). DATA (b). INFORMATION

a). DATA:- The collection of raw facts and figures is called Data. Raw data may be names, roll numbers and marks etc. The data in its raw form does not provide the required information.



b). INFORMATION: The arrangement of raw data into a meaningful form is called information.

Q3. What are the main types of data used in different computer applications? Explain the uses of each of the data types and the operations performed on it.

There are e types of data.

a). Numeric Data, b). Alphabet data c). Alphanumeric Data.

a) Numeric Data:- The data which consist of only numbers as 123. It is used to represent different quantities like marks of students, sale reports etc. There are two types of numeric data.

(a). **Integers** (34, 60, 50) b). **Real Numbers** (5.5, 45.75)

b). Alphabetic Data:- This data consists of alphabetic characters as A, B, C,…Z. OR a, b, c, …z, and Names etc. No arithmetic operation can be carried out on this data type.

c). Alphanumeric Data:-The data consists of **the combination** of numbers and alphabets including special characters like %, $, # etc. For example F-16, House #. 20, PTV-2 etc

Q4. Explain the 1's complement method of representing signed numbers. How can you perform subtraction using this method?

To represent the negative numbers in 1's complement form we perform the following steps.

1. First determine the number of bits to represent the number. (8-bit or 16-bit or more)
2. Convert the given numbers into binary and perform complement operation.
3. Place 0 in MSB (Most Significant Bit) and binary conversion of the number in remaining bits.
4. Take 1's complement of the result.

Q5. Explain the 2's complement method of representing signed numbers. How can you perform subtraction using this method?

1. First determine the number of bits to represent the number. (8-bit or 16-bit or more)
2. Convert the given numbers into binary and perform complement operation.
3. Place 0 in MSB (Most Significant Bit) and binary conversion of the number in remaining bits.
4. Take 2's complement of the result.

Q20. What is the smallest and largest numbers that could be represented in 8 bits?

Smallest Number = –127 Largest Number =