Date .....

Tutorial-4

1.

Binary	Octal	Decimal	Hexadecimal
11000010	302	194	C2
111 000100	704	452	1C4
100111	47	39	27
101116010	562	370	172
11001.01	31.2	25.25	19.4
11101.00001	35.02	29.03125	1D.08
10101101.0000111	255.034	173.0546875	AD.0E

2(a) $(58)_{10} - (43)_{10}$

$58 \rightarrow 111010$
$43 \leftarrow 101011$

```
  111010
+ 010100
--------
 1001110
```

as carry is generated in the result, the result is +ve, we add the carry bit in the result.

001111

2's complement of $101011 \rightarrow 010100 \rightarrow 010101$

Date .....

```
 111010
-010101
[1]001111
```

carry is generated hence result is +ve ! we ignore the carry.

001111

b) $(43)_{10} - (53)_{10}$

```
  101011
- 111010
  001111
```

← To verify.

Subtraction using 1's complement.

```
  101011
  000101
  110000
```

Result will be -ve

-001111

(ii) Subtraction using 2's complement method.

111010 → 000110

```
  101011
  000110
  110001
```

Carry is not generated result is -ve

-001111

Spiral

Date .....

3(a) $6742 - 2487$ using 10's complement approach.

10's complement ~~02487+1~~ = (9's complement) 97512+1

$$\begin{array}{r} 6742 \\ 97513 \\ \hline 154255 \end{array}$$

There is a carry, ignore it

4255

3(b) A2BC - B89 using 15's complent.

F - 0B89 → F476.

$$\begin{array}{r} A2BC \\ F476 \\ \hline 19732 \end{array}$$

1 is carry, we add it

9733

4.

Decimal	Binary	8 Bit Binary	1's complent	2's complent
+33	0100001	00100001	00100001	00100001
-33	1100001	10100001	11011110	11011111

5. $(110101)_2 \rightarrow (101111)_{Gray}$

6

	8	4	-2	-1
0	0	0	0	0
1	0	1	1	1
2	0	1	1	0
3	0	1	0	1
4	0	1	0	0
5	1	0	1	1
6	1	0	1	0
7	1	0	0	1
8	1	0	0	0
9	1	1	1	1

7. $95 - (-55)$

-55 in 8 bit signed 2's complement

11001001

-95 in 8 bit signed 2's complement

10100001

```
 11001001
 10100001
----------
101101010
```

no carry in to MSB, there is carry out from MSB there is an overflow condition

To resolve overflows, we increase the no of bits

```
 111001001
 110100001
-----------
 110110101
```

$\rightarrow (0100101101)$

-150