Assignment-9

1. Convert the following numbers into the number system indicated
   (a) $(1010.011)_2$ to decimal
   (b) $(FA)_{16}$ to decimal
   (c) $(101110101101)_2$ into hexadecimal
   (d) $(FA)_{16}$ to binary

2. Convert the decimal number 27.25 into a binary number.

3. What is the largest decimal number that you can represent using 8bits? How many bits are required to represent decimal numbers less than or equal to 10^6?

4. Determine the number system in which the following arithmetic operations have been carried out. Give justifications for your answer.
   (a) 24+17=40
   (b) 22 x 5 = 132

5. Obtain 1's and 2's complement of the following binary numbers:
   (a) 10000000
   (b) 10101010
   (c) 01110101
   (d) 10011100

6. (a) What is the minimum number of bits required to represent -32 in 2's complement form?
   (b) 11011111 is a number in 2's complement. Is it positive or negative? What is its magnitude?

7. Carry out the following four operations using 8bit 2's complement representation: Verify that operations have been properly carried out. (i) 32 + 24, (ii) -32 + 24, (iii) 32-24, (iv) -32-24

8. Show that the Boolean expression $x + \bar{x}.y$ is equivalent to $x + y$ using basic postulates and theorems of Boolean algebra.

9. Reduce the following expressions to a minimum number of literals:
   (a) $f = (x + y).(\bar{y} + \bar{x})$
   (b) $f = ABCD + \bar{A}BD + AB\bar{C}D$

10. Obtain the truth table for the following function: (x.y+z)(y+x.z) and write it as sum of products (SOP) and product of sums (POS).