Duration: 01:30   Full Marks: 25

1 *Answer All*

a   Convert $(0.00011110101101)_2$ to hexadecimal equivalent   1

b   What is the largest binary number that can be expressed with 12 bits? What is its decimal equivalent?   1

c   Define the Duality Theorem.   1

d   Write the minterms and maxterms obtained from the expression: F(A,B,C)= A'BC'+ AB'C'+AB'C+ +ABC   1

e   Write one property of Gray code. Convert the gray code 1001 to binary.   1

f   Reduce the given Boolean expression: 1
     X=(A'B)(AB)+AB

2 *Answer All*

a   (i) Do the following subtraction using 2's complement method.   3
     11011- 11001
     (ii) Do the following subtraction using 1's complement method.
     110100-10101

b   Express the following function as (i) the sum of minterms and (ii) the product of maxterms.   3
     F= (A' + B). (B' + C)

c   Simplify the following Boolean function F, along with the don't care conditions d.   3
     F(A,B,C,D)=Σ(0,6,8,13,14)
     d(A,B,C,D)=Σ(2,4,10)

3 *Answer any One*

a   Implement the following function using (i) NAND gates and (ii) NOR gates.   5
     F= (AB'+A'B).(C+D')

b   Simplify the following expression to the minimum number of literals.   5
     (i) (x'y'+z)'+z+xy+wz
     (ii) AB +(AC)'+AB'C (AB+C)

4 *Answer any One*

a   Implement a full adder with 4X1 multiplexers.   5

b   Design a combinational circuit to convert 3-bit binary numbers to 3-bit Gray code numbers.   5