1. Perform following conversions:
    a. $(25.625)_{10} = (?)_2$
    b. $(112)_{10} = (?)_8$
    c. $(254)_{10} = (?)_{16}$
    d. $(57.4)_8 = (?)_{10}$
    e. $(BAD)_{16} = (?)_{10}$
    f. $(22.07)_8 = (?)_2$
    g. $(10110.11)_2 = (?)_8$
    h. $(259A)_{16} = (?)_2$
    i. $(10011)_2 = (?)_{10}, (?)_8, (?)_{16}$
2. Obtain 1’s and 2’s complement of : 1010101,0111000,0000001,10101110
3. Obtain 9’s and 10’s complement of : 13597,09900,90090,10000
4. Subtract the following using r’s and (r-1)’s complement:
    a. 5250-321
    b. 20-100
    c. 11010-1101
    d. 100-110000
5. Perform the following;
    a. $(1101)_{gray} = (?)_2$
    b. $(110101)_{gray} = (?)_2$
    c. $(101111)_2 = (?)_{gray}$
    d. $(1011)_{excess3} = (?)_{84\text{-}2\text{-}1}$
    e. $(1010)_{84\text{-}2\text{-}1} = (?)_{excess3}$
6. Write (-53) in all types of representation.
7. Find the value of negative number 11001110 in signed magnitude, 1’s and 2’s complement form.
8. Differentiate between Analog and Digital Systems. List the advantages of Digital system over its Analog counterpart.
9. What is Parity? Write even and odd parity for 4-bit message.
10. Perform the subtraction using BCD(using 10’s complement):
    a) $(817)_{10}-(213)_{10}$
11. Perform $(275)_{10}+(484)_{10}$ using BCD.
12. “Excess-3 code is also known as self-complementing code.” Explain with an example.
13. State and verify De Morgan’s Theorem for three variables.
14. If F = x’+yz’ ; Find F’. Also prove that F.F’ = 0 and F+F=1.
15. Define literal, minterm and maxterm. Write all the minterms and maxterms for 4 variables.
16. Simplify :
    a. xyz+x’y+xyz’
    b. x+yz+x’(y’+z’)

c. (x+y)(x’+z)(y+z’)
d. (BC’A’D)+(AB’+CD’)
e. ABC’D’+A’BC’D+BC’D

17. Prove:
a. (A+B)(A+C) = A+BC
b. (A+B)(A+B’)(A+C’) = AC
c. ABC+AB’C+ABC’ = A(B+C)

18. Simplify the following Boolean functions using K-map.
a. $F(x,y) = \sum(0,1,2,3)$
b. $F(x,y) = \sum(0,1,2)$
c. $F(a,b) = \sum(0,1)$
d. $F(y_1,y_2) = \sum(0,3)$
e. $F(x_1,y_1) = \sum(1)$
f. $F(a,b) = \sum(1,2)$

19. Simplify the following Boolean functions using K-map.
a. $F(x,y,z) = \sum(3,4,6,7)$
b. $F(a,b,c) = \sum(3,5,6,7)$
c. $F(x,y,z) = \sum(1,2,3,7)$
d. $F(x,y,z) = \sum(0,2,4,6)$
e. $F(x,y,z) = \sum(0,1,2,4,6)$
f. $F(x_1,x_2,x_3) = \sum(1,2,4,6)$
g. $F(a,b,c) = \sum(0,1,2,3,4,5,6,7)$

20. Simplify the following Boolean functions using K-map.
a. $F(w,x,y,z) = \sum(2,3,12,13,14,15)$
b. $F(a,b,c,d) = \sum(3,7,11,13,14)$
c. $F(w,x,y,z) = \sum(2,3,10,11,12,13,14,15)$
d. $F(a,b,c,d) = \sum(0,2,4,5,6,7,8,10,13,15)$
e. $F(a,b,c,d) = \sum(0,1,2,4,5,7,11,15)$
f. $F(w,x,y,z) = \sum(0,1,2,4,5,6,8,9,12,13,14)$

21. Simplify the Boolean function using K-map.
$F(w,x,y,z) = \sum(0,2,4,5,6,7,8,10,13,15)$; Represent in both SOP & POS form.

22. Simplify the following Boolean functions using K-map and represent it in POS.
a. $F(w,x,y,z) = \sum(1,5,9,10,11,13,14,15)$
b. $F(w,x,y,z) = \sum(8,9,10,11,12,13,14,15)$
c. $F(w,x,y,z) = \sum(0,2,3,4,5,6,7,8,10,11,13,15)$
d. $F(w,x,y,z) = \sum(0,2,5,7,8,10,13,15)$
e. $F(w,x,y,z) = \sum(0,1,2,3,6,8,9,10,11,12)$
f. $F(w,x,y,z) = \sum(3,6,8,9,11,12,13,14)$

23. Reduce the following Boolean function using K-map:
a. F(C,A,B) = CAB + C'AB + CA'B + C'A'B
b. F(A,B,C,D) = A’B’C’D’ + A’B’CD’ + AB’C’D’ +AB’CD’