



B.Tech II Year I Semester Supplementary Examinations, July 2022  
DIGITAL LOGIC DESIGN

(CSE)

Maximum Marks: 70

Date: 27.07.2022

Duration: 3 hours

Part-A

(10x2M=20 Marks)

All the following questions carry equal marks

- 1 State and Prove De-Morgan theorem?
- 2 Write a table stating all the postulates and theorems of Boolean Algebra that are required for logic minimization?
- 3 Write the properties of EX-OR gate?
- 4 Summarize the rules and limitations of K-map simplification?
- 5 Define binary decoder?
- 6 Differentiate multiplexer and de- multiplexer?
- 7 Define bidirectional shift register?
- 8 Classify the basic types of counters?
- 9 Write the advantage of PLA over ROMs?
- 10 Write any three arithmetic micro operations?

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 (a) Solve arithmetic operation indicated below. Follow signed bit notation:  
i.  $001000 + 111010$  ii.  $101111 - 100110$ .  
(b) Explain the importance of gray code? [5+5]  
OR
- 12 Write the advantages of 2's complement and solve  $(3250 - 72532)_{10}$  using 10's complement? [10]
- 13 Summarize the Boolean function  $F(w, x, y, z) = \Sigma(1, 2, 3, 5, 6, 11, 15) + d(w, x, y, z) = \Sigma(0, 4)$  [10]  
OR
- 14 The following Boolean expressions using K-map and implement them using NOR gates:  
a)  $F(A, B, C, D) = AB'C' + AC + A'CD'$   
b)  $F(W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ$ . [5+5]
- 15 (a) Explain the working of carry look -ahead generator?  
(b) Explain carry propagation in parallel adder with neat diagram? [5+5]  
OR
- 16 (a) Explain the design procedure for code converter with the help of example?  
(b) Design and implement a full adder circuit using a 3:8 decoder? [5+5]
- 17 A sequential circuit has 3 flip-flops, A, B and C and one input ,X .it is described by the following flip flop input functions? [10]  
 $D_A = (BC^1 + B^1C)X + (BC + B^1C^1)X^1$

$$D_B = A$$

$$D_C = B$$

i) Derive the state table for circuit

ii) Draw two state diagrams: One for  $x=0$  and for  $x=1$

OR

18 a) Define T – Flip-flop with the help of a logic diagram and characteristic table?

b) Define Latch. Explain about Different types of Latches in detail? [5+5]

19 Design and implement 3-bit binary to gray code converter using PLA? [10]

OR

20 Explain about Register Transfer Language, Bus and Memory Transfer? [10]