



B.Tech II Year I Semester Supplementary Examinations, March/April 2023
DIGITAL LOGIC DESIGN

(CSE)

Maximum Marks: 70

Date:04.04.2023 Duration: 3 hours

- Note: 1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 State 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 Write the K-map simplification?
- 5 Define binary decoder.
- 6 Differentiate multiplexer and demultiplexer?
- 7 Define bidirectional shift register.
- 8 Classify the basic types of counters.
- 9 Write the advantage of PLA over ROMs.
- 10 Write any five 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: [5]
i. $001110 + 110010$ ii. $101011 - 100110$.
(b) Explain the importance of gray code? [5]
OR
- 12 Solve $(3250 - 72532)_{10}$ using 10's complement? [10]
- 13 Summarize the Boolean function $F(w, x, y, z) = \Sigma(1, 3, 7, 11, 15) + d(w, x, y, z) = \Sigma(0, 2, 5)$ [10]
OR
- 14 The following Boolean expressions using K-map and implement them using NOR gates:
 $F(A, B, C, D) = AB'C' + AC + A'CD'$ [10]
- 15 Explain carry propagation in parallel adder with neat diagram? [10]
OR
- 16 Design and implement a full adder circuit using a 3:8 decoder? [10]
- 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 Define T – Flip-flop with the help of a logic diagram and characteristic table? [10]

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]