



VIT
Vellore Institute of Technology
(Chartered as an Institute under section 3 of the UCI Act, 1984)

Final Assessment Test – May 2024

Course: BITE202L - Digital Logic and Microprocessors

Class NBR(s): 3034/3037/3043

Time: Three Hours

Slot: D2+TD2

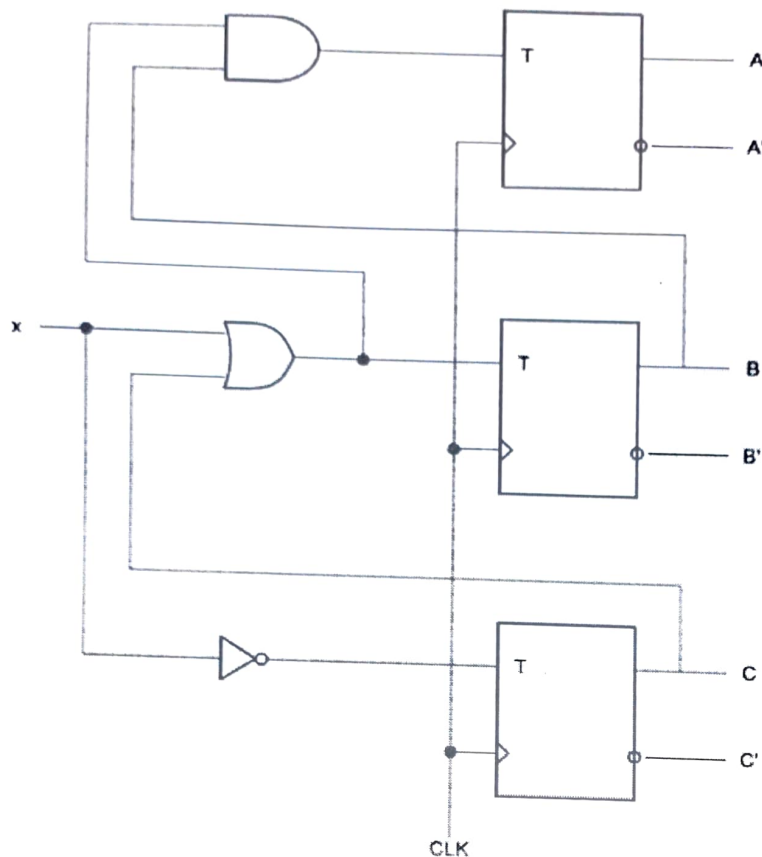
Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer any TEN Questions
(10 X 10 = 100 Marks)

1. a) Convert the binary 1011.101 to decimal.
b) Convert the octal 26.28 to hexadecimal.
c) Convert the decimal 431 to binary.
d) Reduce the following Boolean expressions $xyz + x'z + xyz'$ to three literals.
2. Implement the following Boolean function F , together with the don't-care conditions d , using no more than two NOR gates: $F(A,B,C,D) = \sum(2, 4, 10, 12, 14)$
 $d(A,B,C,D) = \sum(0, 1, 5, 8)$. Assume that both the normal and complement inputs are available.
3. Implement the following Boolean function with a 4 X 1 multiplexer and external gates. $F(A,B,C,D) = \sum(1,3,4,11,12,13,14,15)$ Choose the inputs A and B as selection lines and the input requirements for the four data lines will be a function of remaining variables C and D.
4. A sequential circuit has two JK flip-flops A and B, two inputs x and y, and one output z. The flip-flop input equations and circuit output equation are
 $J_A = Bx + B'y' \quad K_A = B'xy'$
 $J_B = A'x \quad K_B = A + xy'$
 $z = Ax'y' + Bx'y'$
 - a) Draw the logic diagram of the circuit.
 - b) Tabulate the state table.
 - c) Derive the state equations for A and B.

5. Derive the state table and state diagram for the given sequential circuit.



6. The content of a four-bit register is initially 10101. The register is shifted six times to the right with the input being 1011100. Demonstrate it using the various type of register.
7. Discuss in detail the pipelined architecture of 8086 microprocessor supported with internal block diagram. Briefly explain the physical memory organization of 1Mbytes of memory and physical address formation 8086.
8. a) Write the name of the addressing mode for the following:
- i) MOV BX, CL
 - ii) MOV AL, [BX]
 - iii) MOV AX, 055FH
 - iv) MOV AL, [2000H]
 - v) MOV DX, [BX + SI + 0AH]
- b) Explain the usage of the following assembler directives with suitable example.
EQU, SEGMENT, ASSUME

9. ✕ Write a 8086 program to find the largest and smallest in the given array.
10. ✕ What is 8254? Discuss its various operating modes and areas of applications?
11. ✕ Design an 8421 BCD to excess 3 code convertor using minimum number of NAND gates. ???
12. ✕ Design a sequential circuit with three flip-flops and one input x. When $x = 1$, count 0, 7, 2, 4, 1 and repeat. When $x = 0$, count 7, 4, 1, 2, 0 and repeat. Your answer should include a state diagram and a state table. It should also include Karnaugh-maps and Boolean expressions for each D flip-flop.

⇔⇔⇔ K/E/TX ⇔⇔⇔