BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II Computer Science & Engineering AI & ML : SUMMER : 2025
SUBJECT: DIGITAL ELECTRONICS

Day : Wednesday
Date : 28/05/2025

S-27702-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat labeled diagrams **WHEREVER** necessary.

Q.1 .Perform the following operation. **(10)**

a) Add 10111 and 1001
b) Subtract 1000 from 1110
c) Multiply 11101 by 101
d) Divide 11110 by 101
e) Subtract 1011 from 1111

OR

Q.1 Why are NAND and NOR gates called Universal gates? Derive AND and OR gates using NAND and NOR gates. **(10)**

Q.2 Simplify the following expression using Quine Mc Clusky method and realize it using basic gates. **(10)**
$F(A,B,C,D) = \sum m\,(0,1,3,7,8,9,11,15)$

OR

Q.2 a) Expand $A(\overline{A}+B)(\overline{A}+B+\overline{C})$ TO Maxterms. **(05)**

b) Expand $A+B\overline{C}+AB\overline{D}+ABCD$ to minterms. **(05)**

Q.3 a) Draw a logic diagram, block diagram, and write a truth table for: **(10)**
a) Half Adder
b) Half Subtractor

OR

Q.3 Describe the function of parity bit generators and checkers for even and odd with the help of logic diagram. **(10)**

Q.4 Describe the working of T-flip flop and SR-flip flop with the help of truth table. **(10)**

OR

Q.4 Design and explain 4-bit PISO shift register in detail. **(10)**

Q.5 Draw a state diagram of S-R, J-K, T and D flip flop. List the rules for state assignment. **(10)**

OR

Q.5 Explain the following state machines in detail with the help of diagram. **(10)**
a) Moore state machine
b) Mealy state machine

Q.6 Describe EEPROM and ROM with its advantages and disadvantages. **(10)**

OR

Q.6 Give the logic implementation of **(10)**
a) 32 X 4-bit ROM using a decoder of suitable size.
b) 8 X 4-bit ROM using a decoder of suitable size.

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