Roll No											

PRESIDENCY UNIVERSITY
BENGALURU SET B

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - DEC 2023

Semester : Semester III - 2022
Course Code : ECE2007
Course Name : Sem III - ECE2007 - Digital Design
Program : B.TECH

Date : 11-DEC-2023
Time : 02:30 PM - 4:00 PM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. NAND gate is an universal Gate to implement any digital logic .Draw the XOR logic using only NAND logic

(CO1) [Knowledge]

2.

Each term in canonical form contains all possible literals .Convert the Boolean Expression
Y= BCD' + ABC' + ACD into Canonical forms

(CO1) [Knowledge]

3. The Logic gates are classified into three different categories . AND,OR , NOT gates belongs to _____ category .

(CO1) [Knowledge]

4. A Full Adder which adds three inputs and produces two outputs.The first two inputs are A and B and the third input is an input carry as C_in .The output carry is designed as C_out and output sum which is SUM.
i) Draw the Truth table and Implement the full adder using Logical gates.
ii) implement FULL ADDER using NAND logic.

(CO2) [Knowledge]

5. A Subtractor is combinational logic circuit which helps in implementing subtraction of digital numbers. Write an expression for borrow and difference in a full subtractor

(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 10 = 20M)**

6. K map is simplication technique used to simplify the logical expressions.Simplify the expression F(A,B,C,D)=*m(*1, 3, 4, 5, 6, 7, 9, 11, 13, 15) using a K-map ,Also draw the logic diagram of the simplified expression using Logic gates and NAND gates

(CO1) [Comprehension]

7. Design a logic circuit to check a given input 4 bit binary number is divisible by 4. Draw a truth table for this situation and obtain a Boolean expression for it. Minimize this expression and draw a logic diagram using basic gates

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

8. A digital system is to be designed in which the week of the month is given as input in three bit form. The day Monday is represented as '000', Tuesday as '001' and so on. The output of the system should be '1' corresponding to the input of the day containing “t” letter or otherwise it is '0'. If don’t care exist then consider the excess numbers in the input as don't care conditions for system of three variables (x,y,z). Implement the simplified logic using a) basic gates and b) NAND gates only.

(CO2) [Application]