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**Presidency University**

**Bengaluru**

 **SCHOOL OF ENGINEERING**

**MIDTERM EXAMINATION - MAY 2023**

**Semester** : Semester II - 2022

**Course Code** : ECE2007

**Course Name** : Sem II - ECE2007 - Digital Design

**Program** : All Program

**Date** : 19-MAY-2023

**Time** : 10.30am – 12.00pm

**Max Marks** : 50

**Weightage** : 25 %

 **Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculators are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**Part A**

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

1. Find the 9’s complement and 10’s complement of the decimal number 8392.

(CO1) [Knowledge]

1. Express -78 in 8-bit 2’s complement form.

(CO1) [Knowledge]

1. Convert the decimal number 0.485 to binary number.

(CO1) [Knowledge]

1. Simplify the expression $\overbar{\overbar{A}B+A\overbar{B}}$

(CO1) [Knowledge]

1. Convert $(\overbar{A}+\overbar{B})(A+B+C)$ to standard form.

 (CO2) [Comprehension]

**Part B**

**ANSWER ALL THE QUESTIONS (4 x 5 = 20M)**

1. Draw the logic diagram and write the truth table of a half-adder circuit. Also, implement the half-adder using NAND gates only.

(CO2) [Comprehension]

1. Draw the logic diagram and write the truth table of a full-subtractor circuit.

(CO2) [Comprehension]

1. Implement NOT, OR, AND gates using NAND gates only.

(CO2) [Comprehension]

1. Draw the logic diagram and write the truth table for the expression $Y=\overbar{\overbar{AB}C\overbar{A+B}}$

(CO2) [Comprehension]

**Part C**

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

1. Simplify the expression **f(X,Y,Z) = Ʃm (0,3,4,7)** using a K-Map. Also, draw the logic diagram of the simplified expression.

(CO1) [Knowledge]

1. Simplify the expression **F(P,Q,R,S) = πM (3,5,7,8,10,11,12,13)** using a K-Map. Also, draw the logic diagram of the simplified expression.

(CO1) [Knowledge]