LAST MOMENT TUITIONS

# Digital Logic Design and Analysis

JUN 19

Computer Engineering (Semester 3)

**Total marks: 80**
**Total time: 3 Hours**

*INSTRUCTIONS*
*(1) Question 1 is compulsory.*
*(2) Attempt any **three** from the remaining questions.*
*(3) Draw neat diagrams wherever necessary.*

**1.a.** Convert $(451.43)_{10}$ into octal, binary and hexadecimal and base 7. (4 marks)

**1.b.** Subtract using 1's and 2's complement method $(73)_{10}$ - $(49)_{10}$. (4 marks)
**1.c** Perform $(52)_{10}$ -$(68)_{10}$ in BCD using 9's complement. (4 marks)
**1.d.** State De Morgan's theorem. Prove OR-AND configuration is equivalent to NOR-NOR configuration. (4 marks)
**1.e.** Encode the data bits 111010001 using Hamming code. (4 marks)
**1.f.** Explain SOP and POS and solve the following using K-Map
F(A,B,C,D)=πM(1,3,5,6,7,10,11)+d(2,4). (4 marks)
**1.g.** Explain lockout condition. How can it be avoided. (4 marks)

**2.a.** Reduce equation using Quine McCluskey method and realize circuit using basic gates.
F(A,B,C,D) = ∑m (1,5,6,12,13,14) + d(2,4) (10 marks)
**2.b.** Design 4-bit BCD subtractor using IC 7483. (10 marks)

**3.a.** Implement the following using only one 8:1 Mux.
F(A,B,C,D) = ∑m (0,2,4,6,8,10,12,14) (5 marks)
**3.b.** Design a Full Subtractor using only NAND gates. (5 marks)
**3.c.** Design a logic circuit to convert 4-bit gray code to its corresponding BCD code. (10 marks)

**4.a.** Compare different logic families with respect to fan in ,fan out, speed, Propagation delay and power dissipation. (5 marks)
**4.b.** Implement 3 bit binary to gray code converter using Decoder. (5 marks)
**4.c.** Explain 4 bitbidirectional shift register. (10 marks)

**5.a.** Design mod 13 synchronous counter using T flipflop. (10 marks)
**5.b.** Convert SR flipflop to JK flipflop and D flipflop. (10 marks)

**Write short note on (any four)**

**6.a.** ALU (5 marks)
**6.b.** 3 bit Up/Down Asynchronous Counter (5 marks)
**6.c.** Octal to Binary Encoder (5 marks)
**6.d.** 4-bit Universal shift register (5 marks)
**6.e.** VHDL (5 marks)