3hrs **Total Marks: 80**

N.B: 1. Question no. 1 is compulsory.
   2. Attempt any three questions out of remaining five questions
   3. Assume suitable data wherever applicable

Q1. Attempt any 4 [20]

   A. Why and which code is used for labeling the cells of K-Map
   B. Realize 1-bit comparator using logic gates
   C. Compare PAL and PLA
   D. Convert $(352.7)_{10}$ into binary, octal and hexadecimal.
   E. What is race around condition in JK flipflop and how to overcome it.

Q2. A. Prove that NAND and NOR are universal gates [10]
Q2. B. Perform the following operation using 2's complement
   i) $(35)_{10} - (45)_{10}$ ii) $(45)_{10} - (35)_{10}$ [10]

Q3. A. Implement the 3 bit binary to gray code converter [10]
Q3. B. Using Boolean Algebra prove the following [10]
   i) $AB + BC + \bar{A}C = AB + \bar{A}C$
   ii) $[(C + \bar{C}D)(C + \bar{C}\bar{D})])[(AB + \bar{A}B)(\bar{A}B + A B)] = C$

Q4. A. Design a asynchronous decade counter. [10]
Q4. B. Convert the following [10]
   i) SR flipflop to T flipflop
   ii) T flipflop to D flipflop

Q5. A Explain the 3 bit R-2R D/A converter [10]
Q5. B. Explain the classification of memory. [10]

Q6. Write in brief any two [20]
   a. Compare the TTL and CMOS logic families
   b. Full adder using PLA
   c. Implement 16:1 MUX using 4:1 MUX

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