Duration: 3hrs **Total Marks: 80**

Note: 1. Q. no. 1 is compulsory
2. Solve any three questions from the rest
3. Make suitable assumptions wherever applicable

Q. no. 1. Answer any four **(20)**

a. Draw the diagram of a three input AND gate and write the truth table and logic expression.
b. Convert $(247)_{10}$ in to octal and Hex equivalent.
c. Explain what DCTL logic family is?
d. Realize a half adder logic circuit using gates.
e. What is a latch? Explain.

Q. No. 2.

a. Perform the following subtraction using 2's complement method. **(10)**
   i. 01000-01001
   ii. 01100-00011
b. Write short note on characteristics of digital IC. **(10)**

Q.No.3

a. Explain the TTL logic with the help of TTL NAND gate realization. **(10)**
b. Minimize the four variable logic function using K map **(10)**
f(A,B,C,D)=$A\bar{B}\bar{C}D + \bar{A}BCD + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}\bar{D} + A\bar{C} + A\bar{B}C + \bar{B}$

Q. No. 4.

a. Minimize the following logic function and realize using NAND and NOR gate **(10)**
   f(A,B,C)=Σm(0,1,4,6,8)
b. Design a 6 bits binary to BCD converter using multiplexer. **(10)**

Q. No. 5

a. Write short note on J-K master slave Flip flop. **(10)**
b. Design a three bits asynchronous binary counter using flip flop. **(10)**

Q. No. 6 **(20)**

Write short not on **any 2**

i. A 3 bit R-2R D/A converter
ii. Dual slope A/D converter
iii. Classification of memory

****