Q.P. Code : 534603

(3 Hours)

[Total Marks : 80]

N.B.
1. Question No. 1 is compulsory.
2. Attempt any three out of remaining five questions.
3. Figures to right indicate full marks.

1. Solve any **Four** :   20
   a. Explain weighted codes.
   b. Design a half subtractor using only NAND gates.
   c. Why Excess-3 is called a self complementing code?
   d. State and prove De-Morgan's theorems.
   e. Explain with respect to Flip-Flop:-
      i. Level triggering
      ii. Edge triggering

2. a. Design a binary ($B_3 B_2 B_1 B_0$) to gray ($G_3 G_2 G_1 G_0$) code converter.   10
   b. What is shaft position encoding?   05
   c. Derive characteristic equation of J-K Flip-Flop.   05

3. a. Design a 3-bit MOD-5 asynchronous counter using Flip Flops.   10
   b. What are the different logic families? & explain salient features of the TTL logic family.   10

4. a. Design the following gates:-   10
      i. NOR using NAND
      ii. NAND using NOR
   b. Explain bidirectional shift register.   05
   c. Explain 5 & 6 variable K-Maps.   05

5. a. Explain operation of 1:8 demultiplexer   05
   b. Show that :   05
      $$A\overline{B}C + B + B\overline{D} + AB\overline{D} + \overline{A}C = B + C$$
   c. Draw BCD subtractor using 7483   05
   d. What are the hazards in combinational circuits?   05

6. Write short notes on any **Four** :   20
   a. Hamming code
   b. 3 bit odd parity generator
   c. Standard and nonstandard SOP & POS forms.
   d. Counter ICs
   e. Quine McClusky's technique.

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