QP Code : 30560

(3 Hours)   [Total Marks : 80]

N.B: (1) Question No. **1** is compulsory.
    (2) Attempt any **THREE** questions from remaining.
    (3) Figures to the right indicate full marks.
    (4) Assume suitable data if necessary.

1. Answer the following:-   [20]

   (a) State and prove De Morgan's theorems.
   (b) Implement 4:1 MUX using logic gates.
   (c) Explain the difference between combinational and sequential circuits.
   (d) Simplify the following expression using K Map.
     $F = \sum (0,2,5,7,8,10,13,15)$

2. (a) Convert :-   [10]

     i. $(1010.101)_2$ to Decimal.
     ii. $(1085)_{10}$ to Octal.
     iii. $(1011)_2$ to Gray.
     iv. $(34FB)_{16}$ to Binary.
     v. $(177.1)_8$ to Binary.

   (b) Perform: -   [05]
     i. Add $(9BDE)_{16}$ and $(ABCD)_{16}$
     ii Divide 110110 by 101
   (c) Compare demultiplexer and decoder.   [05]

3. (a) Prove the following using Boolean algebra and draw the logic circuit.   [10]
     i. $(A+B)(A+\bar{B}) = A$
     ii. $AB+\bar{A}C = AB+\bar{A}C+BC$

   (b) Convert JK flip-flop to T flip-flop and D flip-flop.   [10]

4. (a) Design 4 bit Binary to Gray code converter.   [10]
   (b) Implement full adder using logic gates.   [10]

5. (a) Design a MOD 5 synchronous counter using JK flip flops.   [10]
   (b) What is Shift register? Explain the working of 4 bit bidirectional shift register.   [10]

6. Write note on: - (any Four)   [20]

   (a) PAL and PLA, (b) ALU, (c) Priority Encoder, (d) ECL Family,

   (e) Basic dynamic RAM Cell.

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FW-Con. 9414-16.