

(3 Hours)

80 Marks



- N.B.: (1) Question No. 1 is compulsory.  
(2) Solve any **three** questions from the **remaining five**  
(3) Figures to the right indicate full marks  
(4) Assume suitable data if necessary and mention the same in answer sheet.

- Q.1 a) If  $F(A, B, C) = \sum m(0, 3, 5, 7)$  with its truth table and express F in SOP and POS form [20]  
b) Compare TTL and CMOS Logic families  
c) Perform the following operation using 2's compliment  
i)  $(7)_{10} - (15)_{10}$   
ii)  $(50)_{10} - (2A)_{16}$   
Comment on results of (i) and (ii)  
d) Compare SRAM with DRAM
- Q.2 a) Implement following Boolean function using 8:1 multiplexer [10]  
 $F(A, B, C, D) = \bar{A} B \bar{D} + A C D + \bar{B} C D + \bar{A} \bar{C} D$   
b) Design 3 bit Binary to Gray code Converter [10]
- Q.3 a) What are shift registers? How are they classified? Explain working of any one type of shift register. [10]  
b) Write VHDL code for 3 bit up counter. [10]
- Q.4 a) Explain Master slave JK Flip flop [5]  
b) Convert T flip flop to D flip flop. [5]  
c) Minimize the following expression using Quine McClusky Technique [10]  
 $F(A, B, C, D) = \sum m(1, 3, 7, 9, 10, 11, 13, 15)$
- Q.5 a) State and prove Demorgan's theorem [5]  
b) Convert  $(532.125)_8$  into decimal, binary and hexadecimal. [5]  
c) Explain Full Adder circuit using PLA having three inputs, 8 product terms and two outputs. [10]
- Q.6 a) Prove that NAND and NOR gates are universal gates [10]  
b) Draw and explain 3 bit asynchronous binary counter using positive edge triggered JK flip flop. Draw the waveforms. [10]

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