

**DIGITAL LOGIC DESIGN**

(Common to CSE &amp; IT)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

- 1 Answer the following: (10 x 02 = 20 Marks)
- If  $101_3 = X_2$ , then X is \_\_\_\_\_.
  - $A + AB + ABC + ABCD + BCD + CD + D = ?$
  - What is the use of Quine-McCluskey method?
  - Implement an EX-OR gate using 2-input NAND gates.
  - Write the truth table of full subtractor.
  - Implement OR gate using only two input NAND gates.
  - Write the truth table of D-Flip flop.
  - What is the function of synchronous counter?
  - A PLA is similar to ROM in concept. Yes or No? How? Why?
  - Mention few applications of PLA.

**PART – B**

(Answer all five units, 5 x 10 = 50 Marks)

**UNIT - I**

- 2 (a) Implement the Boolean function  $F = xy + x'y' + y'z$  with only AND and NOT gates.  
 (b) Add and multiply the following numbers in the given base without converting to decimal:  
 (i)  $123_4$  and  $321_4$  (ii)  $567_8$  and  $234_8$ .

**OR**

- 3 (a) Implement the Boolean function  $F = xy + x'y' + y'z$  with only OR and NOT gates.  
 (b) Convert the decimal number 246.8 to base 3, base 5 and base 7.

**UNIT - II**

- 4 Give three possible ways to expression function  $F = A'B'D' + AB'CD' + A'BD + ABC'D$  with eight or less literals.

**OR**

- 5 Boolean expression  $BE + B'DE'$  is a simplified version of the  $A'BE + BCDE + BC'D'E + A'B'DE' + B'C'DE'$ . Are there any don't care conditions? If so what are they.

**UNIT - III**

- 6 (a) What is the function of Half adder? Draw and explain various implementations.  
 (b) Explain about Half subtractor.

**OR**

- 7 (a) What is the function of binary multiplier? Explain.  
 (b) Design a combinational circuit that accepts a three bit number and generates an output binary number equal to the square of the input number.

**UNIT - IV**

- 8 (a) Draw the basic flip flop circuit with NAND gates. Explain its operation.  
 (b) What is state reduction? Explain with a suitable example.

**OR**

- 9 (a) Explain the working of clocked RS flip flop with the help of truth table.  
 (b) Design a BCD counter with JK flip flops.

**UNIT - V**

- 10 (a) Explain about ROM and PROM.  
 (b) Draw the basic circuit of the RTL NOR gate. Explain the operation.

**OR**

- 11 (a) Design a BCD to excess-3 code converter using ROM.  
 (b) Draw the basic circuit for the DTL NAND gate. Explain the operation.

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