R13

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015
DIGITAL LOGIC DESIGN
(Common to CSE & IT)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)

1   Answer the following: (10 x 02 = 20 Marks)
(a)   If $101_3 = X_2$, then X is _____.
(b)   A + AB + ABC + ABCD + BCD + CD + D = ?
(c)   What is the use of Quine-McCluskey method?
(d)   Implement an EX-OR gate using 2-input NAND gates.
(e)   Write the truth table of full subtractor.
(f)   Implement OR gate using only two input NAND gates.
(g)   Write the truth table of D-Flip flop.
(h)   What is the function of synchronous counter?
(i)   A PLA is similar to ROM in concept. Yes or No? How? Why?
(j)   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 toexcess-3 code converter using ROM.
(b)   Draw the basic circuit fo the DTL NAND gate. Explain the operation.

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