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Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, September 2014

(2008 Scheme)

(Special Supplementary)

08.305 : DIGITAL SYSTEM DESIGN (RF)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Represent the decimal number 1875 in
   a) BCD code
   b) Excess-3 code
   c) As hexadecimal
   d) As octal.
2. Determine the radix 'r' :
   i) $(365)_r = (194)_{10}$
   ii) $(BEE)_r = (2699)_{10}$.
3. What are self complementing codes ? Give an example.
4. Show that :
   a) $a + a'b = a + b$
   b) $x'y'z + x'yz + xy' = x'z + xy'$
5. A circuit receives a 4-bit Excess-3 code. Design a minimal circuit to detect the decimal numbers 0, 1, 4, 6, 7 and 8.
6. Implement the following function
   $F = AB'CD' + A'BCD' + AB'C'D + A'BC'D$ with exclusive-OR and AND gates.
7. Differentiate between a decoder and a demultiplexer.

P.T.O.

8. What do you mean by race condition in a flip-flop ? How can it be eliminated ?

9. What is the difference between serial and parallel transfer ? What type of register is used in each case ?

10. Explain the principle of a shift register. **(10×4=40 Marks)**

PART – B

Answer **any one** from **each** Module.

Module – I

11. a) Convert the following as indicated :

i) $(2021.102)_3$ to base 9

ii) $(ADE.B)_{16}$ to base 4

iii) $(134.12)_5$ to base 7

iv) $(384.74)_{10}$ to binary

v) $(756.603)_8$ to hexadecimal. **15**

b) Differentiate between a weighted and an unweighted code. Give examples for each. **5**

OR

12. a) Perform the arithmetic operations :

a) $10111.101 + 110111.01$

b) $10001.01 - 1111.11$

c) 1101.11×101.1

d) $1011110 \div 1001$ **12**

b) Explain briefly on error detection and error correction codes. **8**

Module – II

13. a) Express the following functions in a sum of minterms and a product of maxterms :

i) $F(A, B, C, D) = D(A' + B) + B'D$

ii) $F(w, x, y, z) = y'z + wxy' + wxz' + w'x'z$. **8**

b) Reduce the function

$f(A,B,C,D) = \Sigma m(2, 3, 6, 7, 9, 12, 13, 14) + \Sigma d(4, 5)$ using tabulation method and realize using NAND gates. **12**

OR

14. a) Give the simplified expression for the following function where d represents don't care condition. Represent the simplified function using logic gates.

$f(A, B, C, D) = \Sigma m(0, 8, 11, 12, 15) + \Sigma d(1, 2, 4, 7, 10, 14)$ **10**

b) Design and implement a 4-bit gray code to binary converter. **10**

Module – III

15. Explain the working of a T flip-flop. Design a counter using T flip-flops that has a repeated binary sequence of states 0, 1, 3, 7, 6, 4. **20**

OR

16. a) With a neat diagram explain the working of master slave flip flop. **10**

b) Construct a 4-bit ring counter. Draw the timing diagram and explain its working. **10**