Reg. No. : ....

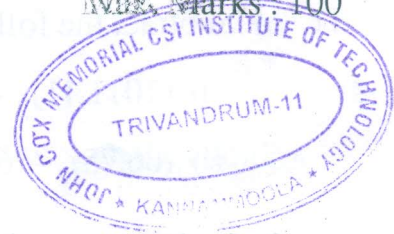Name : ....

Third Semester B.Tech. Degree Examination, November 2010
(2008 Scheme)
P 10.104/08.305 : DIGITAL SYSTEM DESIGN (RF)

Time : 3 Hours

Max. Marks : 100

PART – A

(Answer all questions)

1. Subtract the following decimal numbers using (r-1)'s complement method of addition.

   a) 1075.56–876.14   b) 34.375–1210.8

2. Obtain the weighted binary code for the base-12 digits using weights of 5421.

3. Convert the following numbers to decimal.

   a) $(ACF.0E)_{16}$ b) $(1354.012)_6$

   c) $(1231.120)_4$ d) $(8753.8130)_9$

4. List the six postulates of Boolean algebra.

5. Simplify the following expression and realize it using NAND gates
   $f = xy + x'z + yz$.

6. Obtain the simplified boolean function for the two outputs of a full subtractor.

7. Simplify the following function as product of sums form using k-map.
   $f(a, b, c, d) = \Sigma (1, 3, 5, 6, 7, 15)$

8. Differentiate between synchronous and asynchronous countries.

9. Explain the working of a JK flip flop.

10. Write notes on shift registers.

PART – B

(Answer **any one** full question from **each** Module)

Module – I

11. a) Subtract the following numbers using complement method of addition.

   i) $(1011.11)_2 - (101.110)_2$

   ii) $(ABCD.189)_{16} - (1798B.AC)_{16}$

   iii) $(66.75)_8 - (6754.431)_8$

   iv) $(9813.65)_{BCD} - (758.458)_{BCD}$ **12**

   b) Write notes on the following codes :

   i) Excess - 3 code

   ii) Gray code

   iii) ASCII

   iv) EBCDIC. **8**

OR

12. a) Perform the following operation without converting the numbers to decimal

   i) $(1212.10)_3 + (10012)_3$

   ii) $(5487)_9 + (81)_9$

   iii) $(453.06)_7 + (1026.1)_7$

   iv) $(145)_6 + (15.3)_6$ **8**

   b) If r is the base of a number system, explain how do you perform substraction using r's compliment addition. Give two examples. **12**

Module – II

13. a) Design an excess-3 to BCD code converter. **8**

   b) Express the following function in sum of min. terms and product of max. terms and also simplify the same using k-map.

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

   ii) $f(x, y, z) = (xy+z)(y+xz)$. **12**

OR

14. a) Implement the following boolean function.

$$f = xy + x'y' + y'z'$$

Using

   i) AND, OR and NOT gates

   ii) Only NOR gates

   iii) Only NAND gates.   8

  b) Show how a Full Adder can be converted to a Full Subtractor with the addition of one inverter circuit.   12

Module – III

15. a) Design a 4-bit Binary Ripple Counter.   15

  b) Write notes on Hardware Description Language.   5

OR

16. a) Explain the working of both D and T flipflops.   12

  b) Give the circuit diagram for a 4-bit synchronous Binary counter.   8