Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   **Total No. of Pages : 2**

Total No. of Questions : 09

B.Tech.(CSE/IT) (Sem.–3)
# DIGITAL CIRCUITS AND LOGIC DESIGN
Subject Code : BTCS-303 (2011 Batch)
Paper ID : [A1125]

Time : 3 Hrs.   **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

l. Write briefly :

   (a) Represent the function $(x,y,z) = y$ using K-Map.

   (b) What is the advantage of R-2R ladder?

   (c) Explain clearly how a Flip-Flop is used as a memory unit

   (d) Rewrite the following expression in a form that requires as few inversions as possible

   $b'c + acd' + a'c + c(a + c)(a' + d')$

   (e) Given that $(79)_{10} = (142)_b$ determine the value of b.

   (f) What is edge-triggering?

   (g) What is the major advantage of D-flip flop over S-R?

   (h) What is the purpose of a shift register?

   (i) What are De-Morgan's laws?

   (j) What is DAC?

SECTION-B

2. What is the difference between 1's and 2's complement? Which is better of the two for the representation of the negative numbers and why?

3. Using 2's complement notation perform the following arithmetic operations using 8 bit register(s):

   (i) 25 + (–12)
   (ii) 17–6
   (iii) –18 – 16
   (iv) –8 + (18)
   (v) 12–(–19)

4. What is Ring Counter? Explain the working of a 4-bit ring counter.

5. Mention all the Boolean laws and explain any two of them.

6. Explain the structure of a typical RAM cell.

SECTION-C

7. (a) Explain the following terms used in a DAC:

   (i) Resolution
   (ii) Accuracy
   (iii) Settling time
   (iv) Môn tonicity

   (b) How are R-2R ladder used in DACs?

8. Given the function $T(w,x,y,z) = \Sigma (1,3,4,5,7,8,9,11,14,15)$

   a) Use the K - map to determine the set of all prime implicants. Indicate specifically the essential ones. Find three distinct minimal expressions for T.

   b) Assume that only unprimed variables are available. Construct a circuit which realizes T

9. Design a decade counter using J-K flip-flops.

[N-12]