Roll No. $\square$ Total No. of Pages: 02
Total No. of Questions : 09
B.Tech.(CSE/IT) (2011 Onwards) (Sem.-3)

DIGITAL CIRCUITS AND LOGIC DESIGN
Subject Code : BTCS-303
Paper ID: [A1125]
Time : 3 Hrs.
Max. Marks : 60

## INSTRUCTIONS 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 have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. Write briefly :
(a) Why a flip-flop is called latch?
(b) Why NAND gates is called universal gate?
(c) What is the advantage of D flip-flop over S-R?
(d) Name various logic families.
(e) What is a ring counter?
(f) What is edge triggering? How is it different from level clocking?
(g) What is the difference between BCD and Binary numbers?
(h) Which Gate is a single input gate and why?
(i) What is difference between serial and parallel adder?
(j) What are Don't care conditions? What is their importance and role in a circuit?

## SECTION-B

2. Explain the concepts of :
(i) fan-out
(ii) propagation delay
(iii) power dissipation
(iv) noise margin that are used in the comparison of the logic families.
3. Explain the design and working of a 4-bit up-down counter.
4. Perform the following number conversions :
(i) $(135)_{10}=(?)_{2}$
(ii) $(479)_{10}=(?)_{\mathrm{BCD}}$
(iii) $(10110111)_{2}=(?)_{16}$
(iv) $(724)_{8}=(?)_{2}$
(v) $\quad(6254)_{10}=(?)_{8}$
5. Simplify the following using K-maps :
$\mathrm{F}(\mathrm{A}, \mathrm{B}, \mathrm{C}, \mathrm{D})=\Sigma(0,1,2,5,8,9,10)$
6. Explain the following :
(i) What is the expression relating the output and inputs of DAC?
(ii) Define step size of DAC.
(iii) Define full scale.
(iv) Define percentage resolution.
(v) Accuracy

## SECTION-C

7. Compare the characteristics of CMOS and TTL families.
8. Given $F(A, B, C, D)=\Sigma(0,2,3,6,7,12,13,14)+d(1,4,11,15)$, where $d$ denotes the don't care condition. Find simplified expression
(i) In SOP form
(ii) In POS form.

Also realize the simplified expression using gates.
9. Explain the working of successive approximation $\mathrm{D} / \mathrm{A}$ converter.

