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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?

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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) $(479)_{10} = (?)_{BCD}$
 - (iii) $(10110111)_2 = (?)_{16}$
 - (iv) $(724)_8 = (?)_2$
 - (v) $(6254)_{10} = (?)_8$
- 5. Simplify the following using K-maps :

 $F(A,B,C,D) = \Sigma (0,1,2,5,8,9,10)$

- 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 $F(A,B,C,D) = \Sigma (0,2,3,6,7,12,13,14) + d(l,4,11,15)$, 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 D/A converter.

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