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B.Tech.(Automation & Robotics) (DE-I 2011 & Onward) B.Tech.(ECE/ ETE) (E-I 2011 Onwards) (Sem.-6) DIGITAL SYSTEM DESIGN Subject Code : BTEC-904 M.Code : 71233

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. Answer briefly :

- a) Define the race around condition. How can it be avoided?
- b) Covert the JK flip flop into D flip-flop.
- c) What is an ASM chart? What are its basic elements?
- d) What are the problems associated with a ripple counter?
- e) Realize NAND and OR gates using 2:1 MUX.
- f) What is a flip flop and how is it different from a latch?
- g) Define a Mealy machine.
- h) If three mod 16 counters are used in cascade, What will the maximum counting range?
- i) What is the role of a delay element in an asynchronous sequential circuit?
- j) What is a transition table and how is it different from a flow table?



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SECTION-B

- 2. Design a 4 bit BCD adder.
- 3. Derive the characteristic equations and the excitation tables for SR, JK, T and D type flip flops.
- 4. Differentiate between PROM, PLA and PAL.
- 5. What are the differences between synchronous and asynchronous sequential circuits?
- 6. A combinational logic is defined by the function :

 $F_1(A,B,C) = \Sigma m(3,5,6,7)$

 $F_2(A,B,C) = \Sigma m(0,2,4,7)$

Implement the circuit with PLA having three inputs, four product terms and two outputs.

SECTION-C

- 7. Design a counter that goes through the states 0, 3, 5, 6, 0,.... using T flip flops (only). Show how the lock out condition is taken care of.
- 8. What are static and dynamic hazards? Implement the circuit for the following function after removing various hazards.

 $F(A,B,C) = \Sigma m (0,1,3,4,6,7)$

9. Design a sequence generator using JK flip flop for the sequence : 1001001.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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