

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B. TECH DEGREE EXAMINATION(S), MAY 2019**

**Course Code: EC361**

**Course Name: DIGITAL SYSTEM DESIGN**

Max. Marks: 100

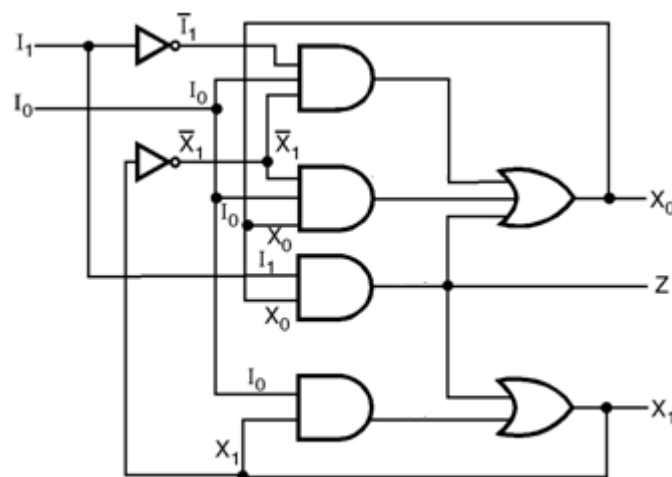
Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) Design a CSSN using T-FF having a single input line 'x' in which binary symbols 1 and 0 are applied. The network is to produce an output '1' coincident with the first 0 input symbol if it is preceded by exactly one or three 1 input symbols. All other times the output has to remain at 0. Write the proper sample sequence before starting the design. (8)
- b) Differentiate between state transition graph and ASM chart. Draw the ASM chart of a 3-bit up/down counter. How many ASM blocks are there in the ASM chart? (7)
- 2 a) There are two inputs  $x_1$  and  $x_2$  and single output  $z$ . The inputs  $x_1$  and  $x_2$  never change simultaneously. The output is to be 1 if  $x_1$  was the last input variable to change value. On the hand, the output is to be 0 if  $x_2$  was the last input variable to change value. Design a fundamental mode ASC based on the above behaviour. (8)
- b) Analyse the below given fundamental mode ASC (7)





(Note: ' indicates complement).

- 6 a) Describe the Fault Table method used for effective test set generation for the circuit whose logic equation is  $f = (a.b)' + b.d'$  (8)
- b) Explain different test pattern generation for BIST. (7)

### PART C

*Answer any two full questions, each carries 20 marks.*

- 7 a) Implement the following functions using PLA and obtain their compatibility matrix. (10)
- $$f1(a,b,c,d) = \sum(1,2,3,4,5,6,8,10,13,15)$$
- $$f2(a,b,c,d) = \sum(2,9,10,12,14,15)$$
- b) Explain different kinds of PLA folding (10)
- 8 a) What are FPGAs? What are the differences between CPLD and FPGA? What are the advantages of FPGA? (8)
- b) Explain the architecture of XC 4000 FPGA family. (12)
- 9 a) Using suitable illustrations explain the XC4000 programmable interconnect. (10)
- b) Obtain the compatibility matrix for implementing the following functions: (10)
- $$z1(x1,x2,x3) = x1$$
- $$z2(x1,x2,x3) = x1.x2' + x1'.x2$$
- $$z3(x1,x2,x3) = x2'.x3 + x2.x3'$$

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