

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**THIRD SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017**

Course Code: **IT201**

Course Name: **DIGITAL SYSTEM DESIGN (IT)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two questions.*

1. a. Simplify  $F(W,X,Y,Z) = \sum m(1,2,3,5,9,12,14,15) + \sum d(4,8,11)$  using tabulation method. (6)
- b. Find the dual of  $F = \bar{x}y\bar{z} + \bar{x}\bar{y}z$ . (2)
- c. Determine the radix  $r$ ,  $(191)_{10} = (362)_r$ . (3)
- d. Express (-51) in sign magnitude form, 1's complement form and 2's complement form. (4)
2. a. Using K-map, minimize the given Boolean function  $F(A,B,C) = \bar{A}C + \bar{A}B + A\bar{B}C + BC$ . (5)
- b. Perform  $(305.5)_{BCD} - (168.8)_{BCD}$  using  $r$ 's complement. (4)
- c. Convert the following: (6)
  - i.  $(7346)_8$  to hexadecimal
  - ii.  $(36.54)_{10}$  to binary
  - iii.  $(2AC5.D)_{16}$  to decimal
3. a. Find the reduced POS and SOP form of the function  $F(A,B,C,D) = \sum(1,3,7,11,15) + \sum d(0,2,5)$  and draw the logic diagram of the reduced expressions. (6)
- b. Perform  $(5427.65)_8 - (236.43)_8$  using  $(r-1)$ 's complement. (3)
- c. List the postulates of Boolean algebra. (2)
- d. Write a note on character coding scheme. (4)

**PART B**

*Answer any two questions.*

4. a. Design a binary to BCD code converter. (7)
- b. Differentiate between combinational circuit and sequential circuit. (4)
- c. Explain the basic flip-flop circuit. (4)

5. a. With neat diagram, explain the working of carry-look-ahead adder. (8)
- b. Explain the working of master-slave JK flip-flop. (7)
6. a. Design a full adder using two half adders. (6)
- b. Using a 8:1 MUX, realize the function  $F = \sum(0,1,5,6,7)$  (3)
- c. Explain the terms state equation, state table and state diagram. (6)

**PART C**

*Answer any two questions.*

7. a. Design a 4-bit bidirectional shift register with parallel load. (10)
- b. Write a note on PLA. (3)
- c. Realize the function  $F_1 = A\bar{B} + AC + \bar{A}B\bar{C}$  and  $F_2 = \overline{(AC + BC)}$  using PLA. (7)
8. a. Design a synchronous 3-bit up-down counter using JK-flip-flop. (10)
- b. Write a note on error detection and correction. (10)
9. a. Design a combinational circuit using a ROM. The circuit accepts a 3-bit number and generates an output binary number equal to the square of the input number. (10)
- b. Differentiate between asynchronous counter and synchronous counter. (3)
- c. Design a Mod-10 Asynchronous counter using T flip-flop. (7)

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