

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 $F_1 = AB + AC + \bar{A}\bar{B}\bar{C}$ 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)
