DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH - IT - Semester - III
SUBJECT: (IT 301) Design of Digital Circuits

Examination	**: Block-Regular**	**Seat No.**	**:**
Date	**: 21/10/2016**	**Day**	**: Friday**
Time	**: 3:00 to 04:15**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

(a) "The NAND and NOR operators are distributive" State T/F with justification. **[2]**

(b) Differentiate I^2L and RTL logic family. **[2]**

(c) What are the weights of the MSB of **[1]**
(i) 10-bit binary number and
(ii) 8-bit hex number?

(d) How does a priority encoder differ from an ordinary encoder? **[1]**

(e) What is the difference between serial and parallel transfer? What type of register is used in each case? **[2]**

(f) Construct a mod 07-counter using MSI circuit. Give two alternatives. **[2]**

(g) Find the complement of **F = x(y'z' + yz)** **[2]**

Q.2 Attempt following questions. **[12]**

(a) Design a combinational circuit with four input lines that represent a decimal digit in BCD and four output lines that generate 9's complement of the input digit. **[6]**

(b) Derive the state equations for the sequential circuit using state table given below. List the don't care terms. **[6]**

Present State	**Next State**		**Output**	
	x=0	**x=1**	**x=0**	**x=1**
ABC	ABC	ABC	Y	Y
001	001	010	0	0
010	011	100	0	0
011	001	100	0	0
100	101	100	0	1
101	001	100	0	1

Q.3 Attempt following questions **[12]**

(a) Differentiate PLA and ROM. **[2]**

(b) Design the sequential circuit described by the following state equations. Use JK flip-flops. **[4]**
$A(t+1) = A'Bx' + AB'x' + ABx' + ABx$
$B(t+1) = A'x + A'B + xB$

(c) Simplify the following Boolean function by means of Tabulation method. **[6]**
$F(w,x,y,z) = \Pi(0,1,2,3,4,10,11)$