

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA ENGINEERING – SEMESTER – I • EXAMINATION – WINTER- 2016

Subject Code:3310702**Date: 31-12 -2016****Subject Name: Fundamentals of Digital Electronics****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of programmable & Communication aids are strictly prohibited.
5. Use of only simple calculator is permitted in Mathematics.
6. English version is authentic.

Q.1

Answer any seven out of ten. દશમાંથી કોઇપણ સાતના જવાબ આપો.

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1. Draw Logic Circuit of EX-OR.
૧. EX-OR માટે Logic Circuit દોરો.
2. Perform 10's Complement :4069
૨. 10's Complement કરો: 4069
3. $(101011101)_2 = (\quad)_8$
૩. $(101011101)_2 = (\quad)_8$
4. Write Truth Table of OR gate.
૪. OR ગેટ માટે નું Truth Table લખો.
5. $(101010000110)_{Ex-3} = (\quad)_{10}$
૫. $(101010000110)_{Ex-3} = (\quad)_{10}$
6. Calculate : $10011.011 + 1111.111$
૬. શોધો: $10011.011 + 1111.111$
7. What is POS?
૭. POS એટલે શું?
8. Draw block diagram of 3 to 8 decoder.
૮. 3 to 8 decoder દોરો.
9. Draw logic circuit for : $X = A + B + (CD)'$
૯. $X = A + B + (CD)'$ માટે Logic Circuit દોરો.
10. Differentiate Min term and Max term.
૧૦. Min term અને Max term વચ્ચેનો તફાવત લખો.

Q.2

- (a) Explain Excess-3 code With Example. **03**
- પ્રશ્ન. ૨ (અ) Excess-3 code ઉદાહરણ આપી સમજાવો. **03**

OR

- (a) Give 2's Complements of (i) $(111011)_2$ and (ii) $(101010)_2$ **03**
- (અ) (i) $(111011)_2$ અને (ii) $(101010)_2$ નું 2's Complements શોધો. **03**
- (b) Explain EX-NOR gate With Truth table. **03**
- (બ) EX-NOR ગેટ માટે નું Truth Table લખો અને સમજાવો. **03**

		OR	
	(b)	Simplify Boolean Expression $Z = (X+Y) (X+ Y') (X'+Y)$.	03
	(બ)	$Z = (X+Y) (X+ Y') (X'+Y)$ નું સાદુરૂપ આપો.	03
	(c)	Prove : (i) $(A+B)' = A' * B'$ (ii) $(A * B)' = A' + B'$	04
	(ક)	સાબિત કરો : (i) $(A+B)' = A' * B'$ (ii) $(A * B)' = A' + B'$	0૪
		OR	
	(c)	List Out Properties of Boolean algebra. Explain Commutative and Associative Properties.	04
	(ક)	Boolean algebra ની Properties ની યાદી બનાવો. Commutative અને Associative Properties સમજાવો.	0૪
	(d)	Simplify Boolean function using K-Map.and implement using logic gates. $f(A,B,C) = \Sigma_m (0,3,4,7)$.	04
	(ડ)	K-Map નો ઉપયોગ કરી $f(A,B,C) = \Sigma_m (0,3,4,7)$. નું સાદુરૂપ આપો. અને logic gates ની મદદથી તેને implement કરો.	0૪
		OR	
	(d)	Draw K-Map of following Boolean Expression. $f(A,B,C) = AC + B$	04
	(ડ)	Boolean Expression $f(A,B,C) = AC + B$ માટે K-Map દોરો.	0૪
Q.3	(a)	Explain Half adder With Block diagram.	03
પ્રશ્ન. 3	(અ)	Half adder આકૃતિ સહિત સમજાવો.	03
		OR	
	(a)	Explain Full adder With Block diagram.	03
	(અ)	Full adder આકૃતિ સહિત સમજાવો.	03
	(b)	Explain Half subtractor With Block diagram.	03
	(બ)	Half subtractor આકૃતિ સહિત સમજાવો.	03
		OR	
	(b)	Explain Full subtractor With Block diagram.	03
	(બ)	Full subtractor આકૃતિ સહિત સમજાવો.	03
	(c)	Explain 4-bit parallel binary adder with block diagram.	04
	(ક)	4-bit parallel binary adder આકૃતિ સહિત સમજાવો.	0૪
		OR	
	(c)	Explain 4-bit parallel binary subtractor with block diagram.	04
	(ક)	4-bit parallel binary subtractor આકૃતિ સહિત સમજાવો.	0૪
	(d)	Differentiate Combinational Logic Circuit and Sequential Logic Circuit.	04
	(ડ)	Combinational અને Sequential Logic Circuit વચ્ચેનો તફાવત લખો.	0૪
		OR	
	(d)	Differentiate POS and SOP.	04
	(ડ)	POS અને SOP વચ્ચેનો તફાવત લખો.	0૪
Q.4	(a)	What is K-Map? Explain Don't care Condition in K-Map.	03
પ્રશ્ન. ૪	(અ)	K-Map એટલે શું? K-Map માં Don't care Condition સમજાવો.	03
		OR	
	(a)	Define Universal Gate and Explain any one with truth table.	03
	(અ)	Universal Gate ની વ્યાખ્યા આપી કોઈ એક truth table સાથે સમજાવો.	03

- (b) Draw logic circuit of following Boolean Expression. **04**
 (i) $Y = AB + AC' + A'BC$
 (ii) $Y = (A' + B + C)(A + B' + C)$
- (બ) નીચેના Boolean Expression માટે logic circuit દોરો. **0૪**
 (i) $Y = AB + AC' + A'BC$
 (ii) $Y = (A' + B + C)(A + B' + C)$

OR

- (b) Draw Half adder circuit using NAND and NOR gates. **04**
 (બ) NAND અને NOR gate નો ઉપયોગ કરી Half adder circuit દોરો. **0૪**
 (c) List out Universal Gate and realize AND gate and EX-NOR gate using NOR gate. **07**
 (ક) Universal Gate ની યાદિ બનાવો. NOR gate નો ઉપયોગ કરી ને AND gate અને EX-NOR gate બનાવો. **0૭**

Q.5 (a) Explain 8 to 3 Encoder with Truth table and logic circuit. **04**

- પ્રશ્ન. ૫** (અ) 8 to 3 Encoder Truth table અને logic circuit સાથે સમજાવો. **0૪**
 (b) Explain 1 to 4 Demultiplexer with truth table and logic circuit. **04**
 (બ) 1 to 4 Demultiplexer Truth table અને logic circuit સાથે સમજાવો. **0૪**
 (c) Explain 1-bit Magnitude comparator with truth table and logic circuit. **03**
 (ક) 1-bit Magnitude comparator Truth table અને logic circuit સાથે સમજાવો. **03**
 (d) (i) $(3764.670)_8 = ()_{16}$ **03**
 (ii) $(7542)_8 = ()_{16}$
 (સ) (i) $(3764.670)_8 = ()_{16}$ **03**
 (ii) $(7542)_8 = ()_{16}$
