MIDTERM EXAMINATION
Fall 2009
CS302- Digital Logic Design

Question No: 1 (Marks: 1) - Please choose one

According to Demorgan's theorem:

$\overline{A + B + C}$ = _____

- ► A.B.C
- ► $A + \overline{B.C}$
- ► $\overline{A}.\overline{B}.\overline{C}$ **Ans**
- ► $\overline{A.B} + C$

Question No: 2 (Marks: 1) - Please choose one

The Extended ASCII Code (American Standard Code for Information Interchange) is a _____ code

- ► 2-bit
- ► 7-bit
- ► **8-bit**
- ► 16-bit

Question No: 3 (Marks: 1) - Please choose one

The AND Gate performs a logical _____function

- ► Addition
- ► Subtraction
- ► **Multiplication**
- ► Division

Question No: 4 (Marks: 1) - Please choose one

NOR gate is formed by connecting _____

- ► **OR Gate and then NOT Gate**
- ► NOT Gate and then OR Gate
- ► AND Gate and then OR Gate
- ► OR Gate and then AND Gate

Question No: 5 (Marks: 1) - Please choose one

Generally, the Power dissipation of _____ devices remains constant throughout their operation.

► **TTL**
► CMOS 3.5 series
► CMOS 5 Series
► Power dissipation of all circuits increases with time.

Question No: 6 (Marks: 1) - Please choose one

Two 2-bit comparator circuits can be connected to form single 4-bit comparator

► **True**
► False

Question No: 7 (Marks: 1) - Please choose one

When the control line in tri-state buffer is high the buffer operates like a _____ gate

► AND
► OR
► NOT
► **XOR**

Question No: 8 (Marks: 1) - Please choose one

The GAL22V10 has ____ inputs

► 22
► **10**
► 44
► 20

Question No: 9 (Marks: 1) - Please choose one

The ABEL symbol for “OR” operation is

► !
► **&**
► #
► $

Question No: 10 (Marks: 1) - Please choose one

The OLMC of the GAL16V8 is _____ to the OLMC of the GAL22V10

► Similar
► Different
► **Similar with some enhancements**
► Depends on the type of PALs input size

Question No: 11 (Marks: 1) - Please choose one

All the ABEL equations must end with _____

► " . " (a dot)
► " $ " (a dollar symbol)
► **" ; " (a semicolon)**
► " endl " (keyword "endl")

Question No: 12 (Marks: 1) - Please choose one

The Quad Multiplexer has _____ outputs

► **4**
► 8
► 12
► 16

Question No: 13 (Marks: 1) - Please choose one

"Sum-of-Weights" method is used _____

► **to convert from one number system to other**
► to encode data
► to decode data
► to convert from serial to parralel data

Question No: 14 (Marks: 1) - Please choose one

Circuits having a bubble at their outputs are considered to have an active-low output.

► **True**
► False

Question No: 15 (Marks: 1) - Please choose one

$(A+B)(A+\overline{B}+C)(\overline{A}+C)$ is an example of _____

► **Product of sum form**
► Sum of product form
► Demorgans law
► Associative law

Question No: 16 (Marks: 1) - Please choose one

Which one is true:

► **Power consumption of TTL is higher than of CMOS**
► Power consumption of CMOS is higher than of TTL
► Both TTL and CMOS have same power consumption
► Power consumption of both CMOS and TTL depends on no. of gates in the

circuit.

Question No: 17 (Marks: 1)

Which device performs an operation which is the opposite of the Decoder function?

Ans:
Encoder function.

Question No: 18 (Marks: 1)

Name any two modes in which PALs are programmed.
Ans:

PAL devices are programmed by blowing the fuses permanently using over voltage.

Question No: 19 (Marks: 2)

Explain Combinational Function Devices?
Ans;
Xor,Xnor,NAND,NOR are combinational function devices.

Question No: 20 (Marks: 3)

Differentiate between hexadecimal and octal number system

octal - base 8
hexadecimal - base 16
Octal and hex are used to represent numbers instead of decimal because there is a very easy and direct way to convert from the "real" way that computers store numbers (binary) to something easier for humans to handle (fewer symbols). To translate a binary number to octal, simply group the binary digits three at a time and convert each group. For hex, group the binary digits four at a time.

Question No: 21 (Marks: 5)

Explain “Sum-of-Weights Method” for Hexadecimal to Decimal Conversion with at least one example ?

Ans:
The hexadecimal (Hex) numbering system provides even shorter notation than octal. Hexadecimal uses a base of 16. It employs 16 digits: number 0 through 9, and letters A through F, with A through F substituted for numbers 10 to 15, respectively,

Hexadecimal numbers can be expressed as their decimal equivalents by using the sum of weights method, as shown in the following example:

Weight	2	1	0	
Hex. Number	1	B	7	
			$7 \times 16^0 = 7 \times 1$	$= 7$
			$11 \times 16^1 = 11 \times 16$	$= 176$
			$1 \times 16^2 = 1 \times 256$	$= 256$
		Sum of products		439_{10}

Like octal numbers, hexadecimal numbers can easily be converted to binary or vise versa. Conversion is accomplished by writing the 4-bit binary equivalent of the hex digit for each position, as illustrated in the following example:

Hex. Number 1 B 7

0001 1011 0111 ← Binary number

Hexadecimal	Binary	Decimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
A	1010	10
B	1011	11
C	1100	12
D	1101	13
E	1110	14
F	1111	15

Question No: 22 (Marks: 10)

Draw the function table of two-bit comparator circuit, map it to K-Map and derive the
expression for (A > B)
Ans:

X_1	X_0	Y_1	Y_0	X<Y	X=Y	X>Y
0	0	0	0	0	1	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	0	1	0
1	0	1	1	1	0	0
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	0	0	1
1	1	1	1	0	1	0

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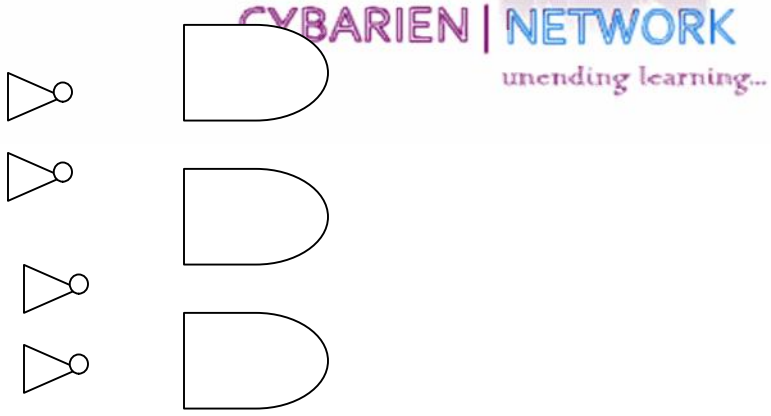

The circuit has inputs X_1X_0 and Y_1Y_0 and outputs X > Y,
the expression for > is $X_1\overline{Y_1} + X_0\overline{Y_1}\,\overline{Y_0} + X_1X_0\overline{Y_0}$
time is out……


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