PNS SCHOOL OF ENGINEERING & TECHNOLOGY

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QUESTION BANK
ON

DIGITAL ELECTRONICS

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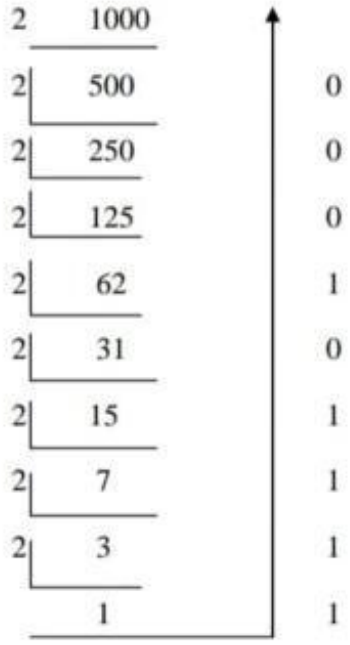
CHAPTER-1

Basics of Digital Electronics

Short questions

1.Convert the decimal no.$(1000)_{10}$ into binary.



Ans.($1111101000)_2$

2.Convert (10110101) from binary to gray code.

1 0 1 1 0 1 0 1 (binary)

↓

1 1 1 0 1 1 1 1 (gray)

3. Perform 2's complement substraction of 1000011-1010111.

$(67)_{10} - (87)_{10} = (-20)_{10}$

Convert substrate part into 2's complement

1010111 1's → 0101000 → 2's comp

+ 1

0101001

Then add both manuent and substrant

1000011

$$\begin{array}{r} + \quad 0101001 \\ \hline 1101100 \end{array}$$

Here there is no carry ,if there is no carry then substrate 1 from the result then recomplement it.

$$\begin{array}{r} 1101100 \\ - \quad 1 \\ \hline 1101011 \end{array}$$

Then recomplement of this $(0010100)_{10}$

4.What is the difference between weighted and non weighted binary code.

The weighted codes are those that obey the position weighting principle ,which states that the position of each number represent a specific weight .

The non-weighted codes are not positionally weighted .In other words codes that are not assigned with any weight to each digit position.

5.Convert the binary no.$(10110111.1101)_2$ to decimal.

$(10110111.1101)_2$

$1\times2^7+1\times2^5+1\times2^4+1\times2^2+1\times2^1+1\times2^0+1\times2^{-1}+1\times2^{-2}+1\times2^{-4}$

$128+32+16+4+2+1+1/2+1/4+1/16$

183.81

6.What are the application of gray code.

- Used as counter
- Used for asynchronous fifo's adress pointer
- Help to reduce the digital noise
- High speed decode circuit
- Also use in computers to address program memory .

7.What is parity bit.

It is an error detection scheme used to detect a change in the value of a bits (0 or 1) during transmission to detect error .

8.What is the base or radix of a number system.

The Radix of a number system is defined as the number of different digits which can occur in each position in the number system for example :Decimal number system has a base or radix of 10

9.Convert $(FADE)_{16}$ to binary and octal.

In the binary form

FADE is $(1111\ \ 1010\ \ 1101\ \ 1110)_2$

In octal form

001 111 101 011 011 110

1 7 5 3 3 6

Answer is $(175336)_8$

10.Convert $(7743)_d$ to binary and hexadecimal.

For binary

7 7 4 3

111 111 100 011

In the binary form the answer is $(111\ \ 111\ \ 100\ \ 011)_2$

For hexadecimal

First octal is converted to binary then to hexadecimal .

7 7 4 3

111 111 100 011

15 14 3

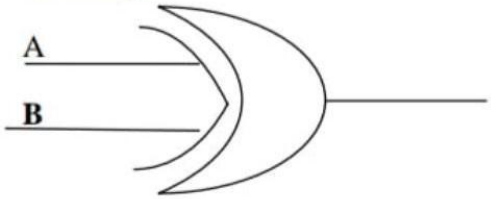
In the hexadecimal form the answer is $(FE3)_{16}$

11. Write down the truth table of 2 input ex-or gate.

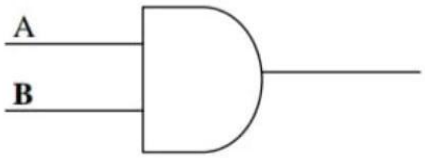
A	B	C=AB'+A'B
0	0	0
0	1	1
1	0	1
1	1	0

12.Draw the symbol ,truth table and expression for ex-or and AND gates.

EX-OR gate



AND gate



Truth table

A	B	Y=AB'+A'B
0	0	0
0	1	1
1	0	1
1	1	0

Truth table

A	B	Y=AB
0	0	0
0	1	0
1	0	0
1	1	1

13.Define demorgan's law.

This law states that the complement of any expression can be obtained by replacing each variable and element with its complement and changing OR operators with AND operators and AND operators to OR operators .These can be expressed

A) $\overline{X + Y} = \overline{X} \cdot \overline{Y}$

B) $\overline{X \cdot Y} = \overline{X} + \overline{Y}$

LONG QUESTION :

1. Explain the difference between weighted binary code and non-weighted binary code with suitable example.
2. Draw the logic symbol, truthtable of 3 input XOR and NAND gate ?
3. State and proof Demorgan's Theorem.
4. Simplify F(A, B, C, D) = m (0, 2, 5, 7, 8, 10, 13, 15).
5. Simplify F(P, Q, R, S) = m (1, 3, 4, 6, 8, 9, 11, 13, 15) + d (0, 2, 14)

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QUESTION BANK ON UNIT-2(COMBINATIONAL LOGIC CIRCUIT)
Prepared by : Er. Aditya Narayan Jena, Lecturer in ETC Dept.

CHAPTER-2
COMBINATIONAL LOGIC CIRCUIT

2 Marks

1. What is CLC ?

Ans It is a logic circuit whose output depends on present input only.
For Example : Adder, Mux

2. What is encoder ?

Ans. It is a CLC, whose inputs are decimal digits and outputs are coded of input.

3. What is half adder ?

Ans. It is a CLC which performs addition of two binary bits.

4. What is full substractor ?

Ans. It is a CLC which performs substraction of only three binary bits.

5. Define MUX ?

Ans. It is a CLC which takes several inputs and gives only one output.

6. Give the application of DMUX ?

Ans. It is used in computer, any time information from one source to several places.

7. List the application of MUX ?

Ans. (i) Data routing
(ii) Control sequence.
(iii) Function generator.
(iv) Parallel to serial converter.

8. List the application of Decoder ?

Ans. (i) Counter System
(ii) Analog to digital converter.
(iii) Display system.

LONG QUESTION :

1. Explain the working principle of full substractor with logic diagram and truth table.
2. Explain the working of 2-bit magnitude comparator.
3. Explain the working of 1 x 4 DMUX & 4 x 1 MUX.
4. Explain the working principle of 3 to 8 decoder and 8 to 3 encoder ?
5. Explain the working principle of full adder with logic diagram and truth table.

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QUESTION BANK ON
UNIT-3 (Sequential Logic Circuit)

1. *What do you mean by Sequential Circuits ?*

Ans. *The digital cicuits in which present output depends on the present input, past input and past output are called Sequential Ciruits.*

2. *What is Flip Flop ? Mention its types.*

Ans. *FF is a 1-bit memory element used in SLC.*

Types :
- *(i) SR - FF*
- *(ii) D-FF*
- *(iii) JK - FF*
- *(iv) T-FF*

3. *Define Counter ?*

Ans. *Counter is a Sequential Logic Circuit use to court binary numbers.*

4. *Define Shift Register.*

Ans. *Shift register is a sequential logic circuit used to store the binary data as well as shift the binary data.*

5. *Differentiate between Synchronous and Asynchronous Counters.*

Ans. *Synchronous Counter :- A common clock pulse triggers all the Flip-Flops simultaneously.*
Eg; 2-bit Synchronous Counter
Asyrchronous Counter : - First FF is triggered by a clock pulse and remaining FFs are triggered by output of previous FF.
Eg; 4-bit Ripple Counter.

6. *Draw the Truth Table of JK FF ?*

Ans.

J	K	Qn	Qn+1	State
0	0	0	0	Qn(No Change)
0	0	1	1	
0	1	0	0	Reset
0	1	1	0	
1	0	0	1	Set
1	0	1	1	
1	1	0	1	Toggle
1	1	1	0	

7. *What is Race around condition ? How it can be avoided ?*

Ans. *In JK-FF, when J = 1, K-1 ; Toggle state occurs. So when Qn = 1, Qn+1 = 0 and when Qn = 0, Qn+1 = 1.*
So, output will oscillate between 0 and 1. This is called Race around condition.
It can be avoided by using; Master - Salve JK-FF and when $t_p < \Delta t$; where t_p = width of CLK Pulse and Δt = Propagation delay.

8. *State the types of Sequential Circuits ?*

Ans. *2 types. (i) Synchronous SLC*
(ii) Asynchronous SLC

9. *Define Modulus of a counter ?*

Ans. *The number of states a counter can count is called Modulus of a Counter.*

10. *What is Ripple Counter ?*

Ans. *In Ripple counter first FF is triggered by a clock pulse and remaining FFs are triggered by clock pulse of previous FF.*

11. *What are application of shift register ?*

Ans. *(i) Time delay.*
(ii) Serial to parrel converten
(iii) Parallel to serial converter
(iv) Shift Register.

12. *State application of D-FF.*

Ans. *(i) Used as Temporary Memory Device.*
(ii) Used as storage registers.

LONG QUESTIONS :

1. *Differentiate between combinational logic circuit and sequential logic circuit ?*
2. *State the working principle of clocked SR-FF with logic diagram and truth table.*
3. *Explain the working principle of JK-FF with Truth Table.*
4. *Explain working of Master-Slave JK-FF.*
5. *Explain working of 4-bit Ripple counter with Truth Table and Timing Diagram.*
6. *Explain different types of shift registers (SISO, SIPO, PIPO, PISO).*

Unit: 4 – Register's, Memories & PLD

Short questions:

(1) Classify the memory?

Ans- Memory are of 4 types

(i) Primary memory
(ii) Secondary memory
(iii) Register memory
(iv) Cache memory

(2) Differentiate between SRAM and DRAM?

Ans- SRAM

- It is stands for Static RAM
- It consume Less Power
- It is faster

DRAM

- It stands for Dynamic Ram
- It consume High power
- It is slower

(3) Define PLD. State its applications?

Ans- Programmable Logic device (PLD) is an integrated circuit which is user configurable and capable of implementing Logic function.

Applications

→ Used in counters.
→ Used in Decoders.

Long questions:

(1) Discuss Various types memories, in brief?
(2) Write down the working, advantages and applications of PLD?

Unit-5: A/D and D/A Converters

Short questions:

(1) Define Resolution of DAC?

Ans- The resolution of DAC is defined as the smallest change, that can occur in an analog output, as a result of a change in the Digital input.

(2) What are the applications of DAC?

Ans- DAC used as;

→ Transistor Characteristics.
→ Graphic display on CRT.

(3) Which ADC is mostly used and fastest type?

Ans-

- The Successive- Approximation ADC is most widely used ADC.
- The Flash type ADC is fastest type ADC.

(4) What are type of ADC?

Ans-

(i) Counter- Ramp type ADC
(ii) Successive- approximation type ADC
(iii) Flash type ADC
(iv) Dual slop type ADC

Long questions:

(1) Explain R-2R Ladder D/A conversion network?
(2) Explain Successive approximation method A/D conversion?

Unit-6: Logic families

Short questions:

(1) Define Fan-in?

Ans- It is the maximum number of gates that can be connected to input lines of the gate.

(2) Define Fan-out?

Ans- It is the maximum no of gates that can be connected to the output lines of the gate.

(3) What are the types of Logic families?

Ans- 2 types

(i) Bipolar Logic Families.
(ii) Unipolar Logic Families.

(4) Write down any 4 Characteristics of Logic Families?

Ans-

(i) Speed
(ii) Propagation delay
(iii) Noise margin
(iv) Fan-in
(v) Fan-out

Long questions:

(1) Explain the different Characteristics of Logic families?
(2) Explain the circuit operation of TTL NAND gate?