I - ASSIGNMENT

(Start Writing From Here)

(1) Differentiate between Analog and Digital system. what are the advantages of digital system?

* Analog and Digital signals are used to transmit information usually through electric signals.
* Signals were translated as information in form of binary format ~~when~~ in Digital system where as in analog system signals were transmitted as electric pulses.
* Differences between Digital and analog system.

Digital System	Analog System
(i) Digital signals are discrete and generated by digital modulation	(i) Analog signals represents physical measurements
(ii) Square waves	(ii) Sine waves
(iii) Uses discrete values to represent information	(iii) Continous range of values to represent information.
(iv) More bandwidth to carry out the same information	(iv) less bandwidth
(v) Stored data in form of binary bit	(v) Stored data in form of wave signal
(vi) Consumes negligible power	(vi) Consumes large power
(vii) Computers, DVD's, CDs,	(vii) Human voice in air.

Advantages of analog system:

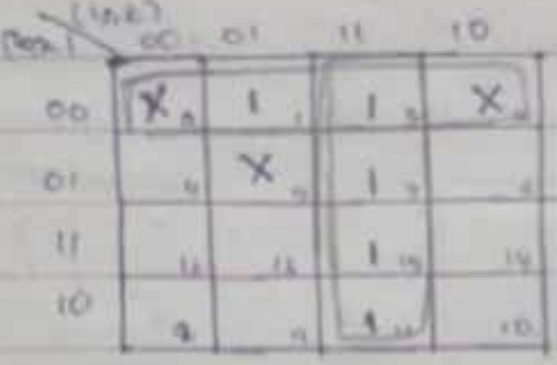
* It's economical and easy to design
* It has high noise immunity
* It's easy to duplicate similar circuits and complex digital ICs are manufactured with the advent of microelectronics technology.
* Adjustable precision and easily controllable by computer.
* etc

(2) Why don't care conditions are used? Simplify $F(w,x,y,z) = \Sigma(1,3,7,11,15)$ which has the don't care condition $d(w,x,y,z) = \Sigma(0,2,5)$

Ans
* The don't care conditions allows us to replace the empty cell of K-map to form a grouping of variables which results larger than that of forming groups without don't care.
* While grouping of cells, we can consider "don't care" cell as 1(or) 0 (or) we can ignore that cell. Therefore don't care condition will help us to form a large group of cells.
* A don't care cell is represented by a cross (X) in K-maps representing an invalid combination.
* It helps in simplifying the output expression using K-map.
* For example, in the excess-3 code system, 0000, 0001, 0010, 1101, 1110, and 1111 are invalid. These states are called don't cares

$F(w,x,y,z) = \Sigma(1,3,7,11,15) + d(0,2,5)$

K-map:



$\therefore F = \bar{w}\bar{x} + yz$

(3) Differentiate between combinational logic and sequential logic. List some application of sequential logic.

Combinational logic	Sequential logic
(1) Output depends on present input	(1) Output depends on present as well as past input
(2) Speed is fast	(2) Speed is slow
(3) It is designed easy	(3) It is designed tough
(4) No feedback between input and output	(4) Exists feedback path between input and output
(5) Time independent	(5) Time dependent
(6) used for Arithmetic as well as Boolean operation	(6) mainly used for storing data
(7) They don't have memory elements	(7) they have memory elements
(8) they don't have clock, they don't	(8) they are clock dependent

(1) They dont have capability to store any state.

Eg: Encoder, Decoder, multiplexer

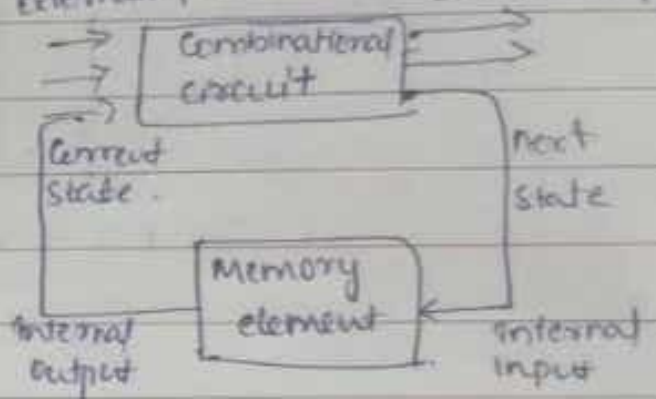
require triggering.

(2) They have capability to stored any state or retain earlierstate

Eg: Flip flops, clocks... etc

so they need triggering

Block diagram



Block diagram

(4) Describe BCD to excess-3 code conversion with truth table and block diagram.

Ans

BCD:

* Binary code decimal (BCD) is a straight assignment of binary equivalent. It is possible to assign weights to binary bits according to their positions
* The weights of BCD codes are 8,4,2,1.

Eg: 1001 → 8x1 + 4x0 + 2x0 + 1x1 = 8 + 1 = 9

* Convert $(123)_{10}$ into BCD

1 = 0001 , 3 = 0011

2 = 0010 , ∴ BCD code = 0001 0010 0011

Excess code-3:

* Excess-3 is a non-weighted code used to express decimal numbers. Each code is corresponding Binary code plus 0011 (3).

Conversion of BCD to excess-3:

* A BCD digit is converted into its corresponding excess-3 code by simply adding 3 to Binary code.

Eg:(i) convert $(9)_{10}$ into excess code

$9 = 1001$

Now we add (0011) to the BCD of 9.

$$\begin{array}{r} 1001\ (9) \\ +\ 0011\ (3) \\ \hline 1100\ (12) \end{array}$$

∴ excess code of (9) is 1100.

(ii) Convert $(23)_{10}$ into Excess 3 code

$23 \Rightarrow \quad 2 = 0010$

$3 \Rightarrow 0011$

∴ BCD of (23) is 0010 0011

Now add 3 (0011) to each digit

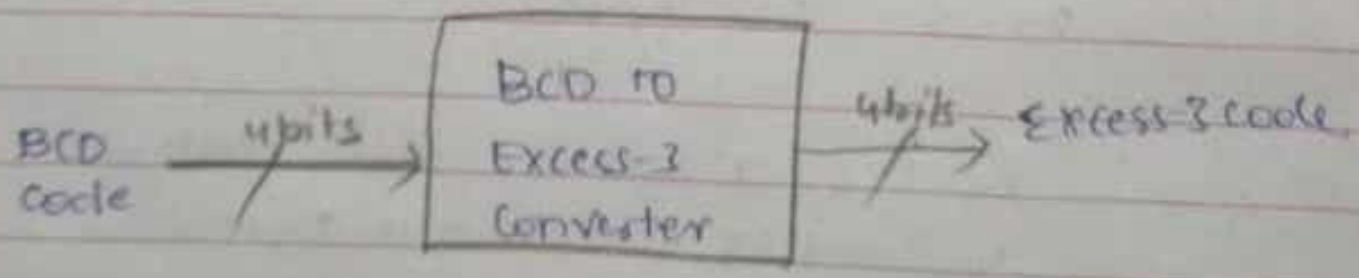
$$\begin{array}{rr} 0010(2) & 0011(3) \\ +\ 0011(3) & +\ 0011\ (3) \\ \hline 0101(5) & 0110\ (6) \end{array}$$

∴ Excess code of $(23)_{10}$ is 56

Truth table: (0-9)

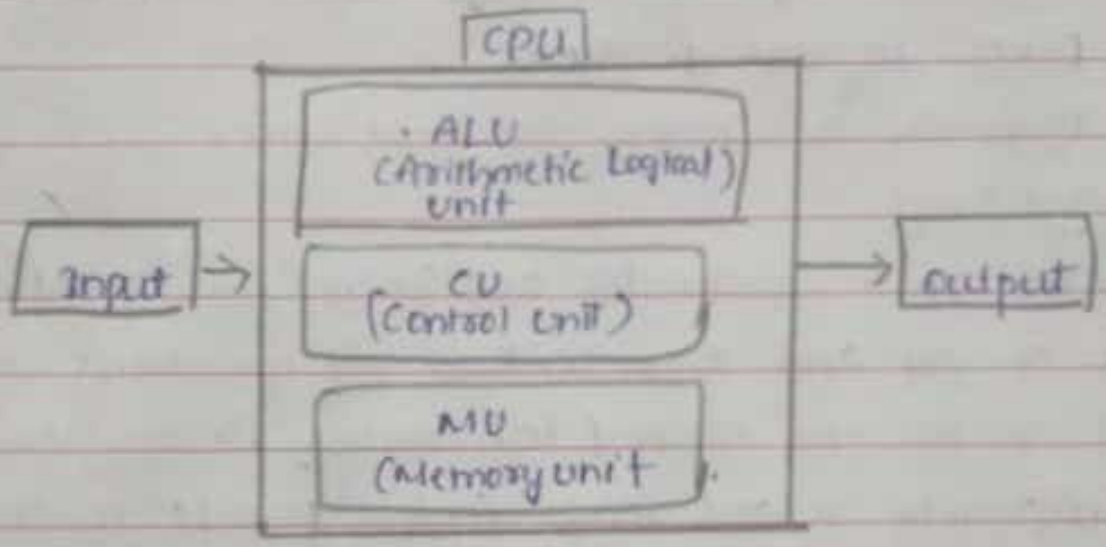
BCD(8421)				EXCESS-3			
A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0

Block diagram:



(5) Explain about functional units of basic computer.

Ans



Input Unit:

* Input unit consist of input devices that are attached to the computer. They take input and convert into binary language. Input devices are - key board, mouse, scanner...etc.

Central processing Unit (CPU):

* Once the information is entered, the processor processes it.
* CPU is called the brain of the computer. It is control centre of computer.
* It collects info from memory and then interpets them so as to know what it to be done.
* CPU has three main components which are responsible for different functions they are.
  (1) ALU
  (2) CU
  (3) MU

(1) Arithmetic and logic unit: mathematical

* This unit performs logic calculations and takes logical decisions
* Arithmetic calculations are done here.

(2) Control unit:

* Control unit coordinates and control flow of data in and out of cpu and also controls all operations of ALU.
* It decodes the fetched informations, instructions, interprets it and sends control signals to input (or) output devices.

(3) Memory unit:

* Memory unit stores the data which is directly used by the processor.
* memory can be of different sizes (16 bit, 32 bit, 64 bit... etc) and each has specific function.

Output Unit:

* The output unit consists of output devices that are attached with computer.
* It converts binary data coming from cpu to human understandable form.
* Output devices are monitor, printers... etc.