

Vivekanand College, Kolhapur (Autonomous)
Department of Electronics
Notice

Date: 06.04.2023

All the students of B.Sc. III Electronics are hereby informed that their internal examination for Semester VI will be conducted in offline mode as per attached schedule.

Paper	Section	Section title	Marks	Date	Time
DSE 1005F1	I	PLC Programming	10	10-04-2023	02:00pm-02.30pm
DSE 1005F1	II	Advanced Microcontroller	10	11-04-2023	02:00pm-02.30pm
DSE 1005F2	I	Power Electronics	10	12-04-2023	02:00pm-02.30pm
DSE 1005F2	II	FPGA & VHDL Programming	10	13-04-2023	02:00pm-02.30pm




(Dr. C. B. Patil)

Head
Department of Electronics
Vivekanand College, Kolhapur.

B.Sc. Part- III (Electronics) (Sem-VI) Internal Examination: April -2023
Course Code: DSE - 1005F1

Section - I: Industrial process control and PLC programming

Day: Monday

Time: 2.00 pm to 02.30 am

Date: 10/04/2023

Marks : 10

Q. 1. A]Select correct alternative

[4]

1. -----control system requires time to time calibration.
A. Closed-loop B. Feed forward C. Adaptive D. Open-loop
2. In Open-loop control systems are----- stable.
A. More B. Less C. Moderate D. none of these
3. Sprinkler is an example of ----- system.
A. Closed-loop B. Open-loop C. Adaptive D. Feed forward
4. Feedback loop system is also called as -----system.
A. Closed-loop B. Open-loop C. Adaptive D. Feed forward

Q.2. Attempt any Two

[6]

1. Write a note on feed forward control system.
2. Discuss open loop control system and closed loop control system.
3. Write a note on multi-position control system.

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Sakshi Tushara Bhopale.

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Suppliment No. :

Roll No. : 8358

Class : BSc TY Sem VI

Subject : Electronics

Test / Tutorial No. : Internal Exam

Div. :

Q.1]

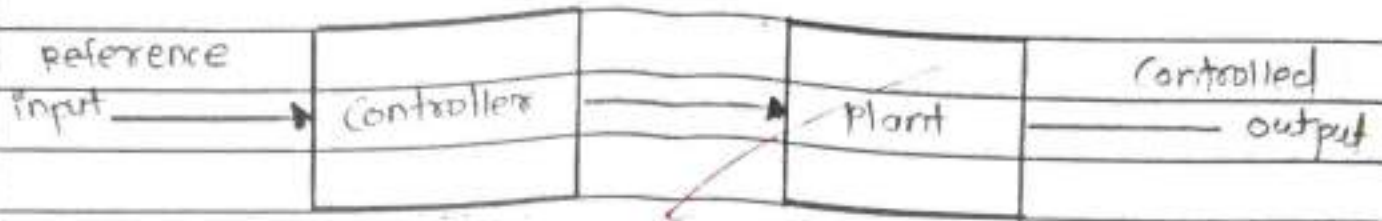
A]

- 1) open loop control system requires time to time calibration.
- 2) In open loop control systems are less stable.
- 3) Spinkler is an example of open-loop system.
- 4) Feedback loop system is also ~~as~~ called as closed loop system.

oh

Q.2]

2) Open Loop control system



In open loop control system, the input is process to produce a specified output.

It is very simple and basic system.

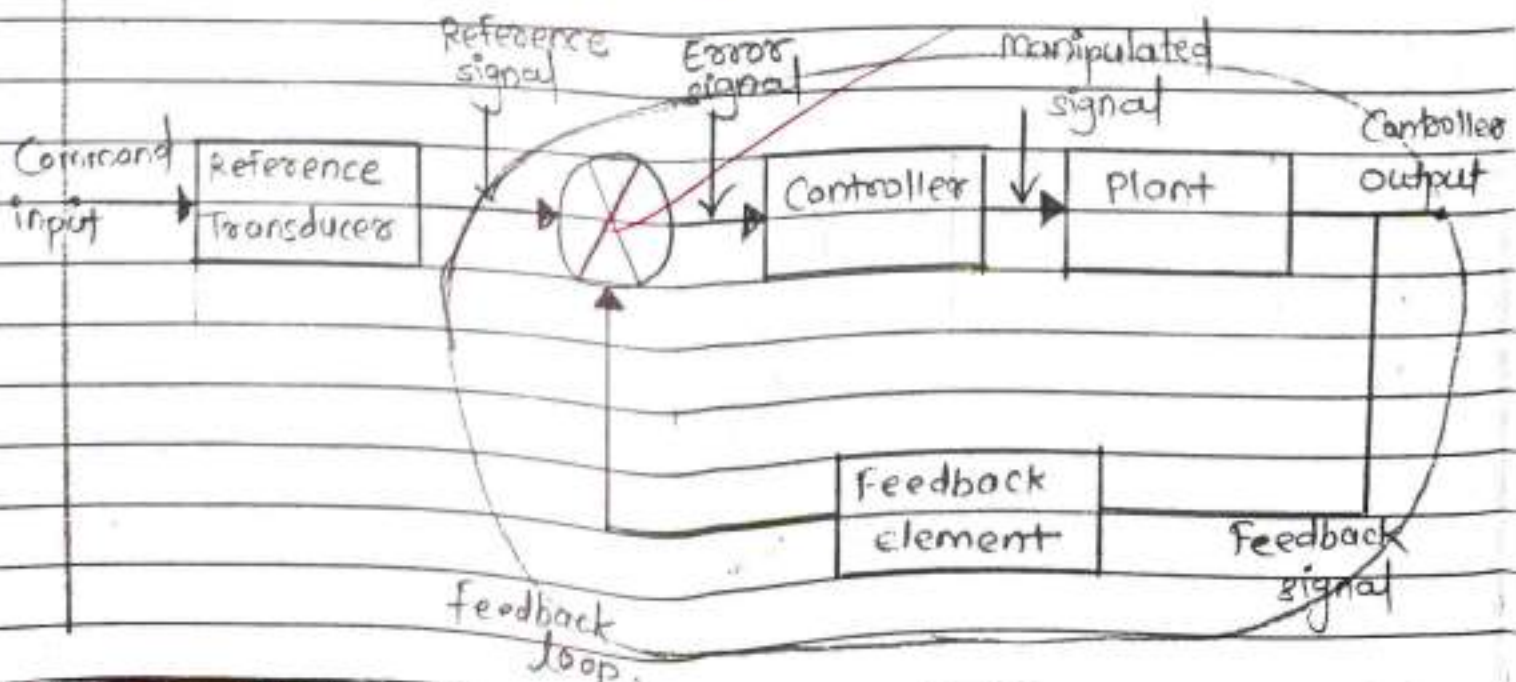
Open loop control system is very cheap to install and easy to operate.

Therefore, it can operate in ~~the~~ domestic as well as in industries.

The output of the open loop system is independent of control signal.

Examples: Automatic sprinklers, toaster, hair drier, hand drier, etc.

Closed loop control system



In closed loop control system, the output is feedback with input.

~~The error~~ between

The difference between actual value and set value is called error and it can be corrected by the controllers.

Examples: DC motor, electric iron,

Closed loop control system also called as feedback control system.

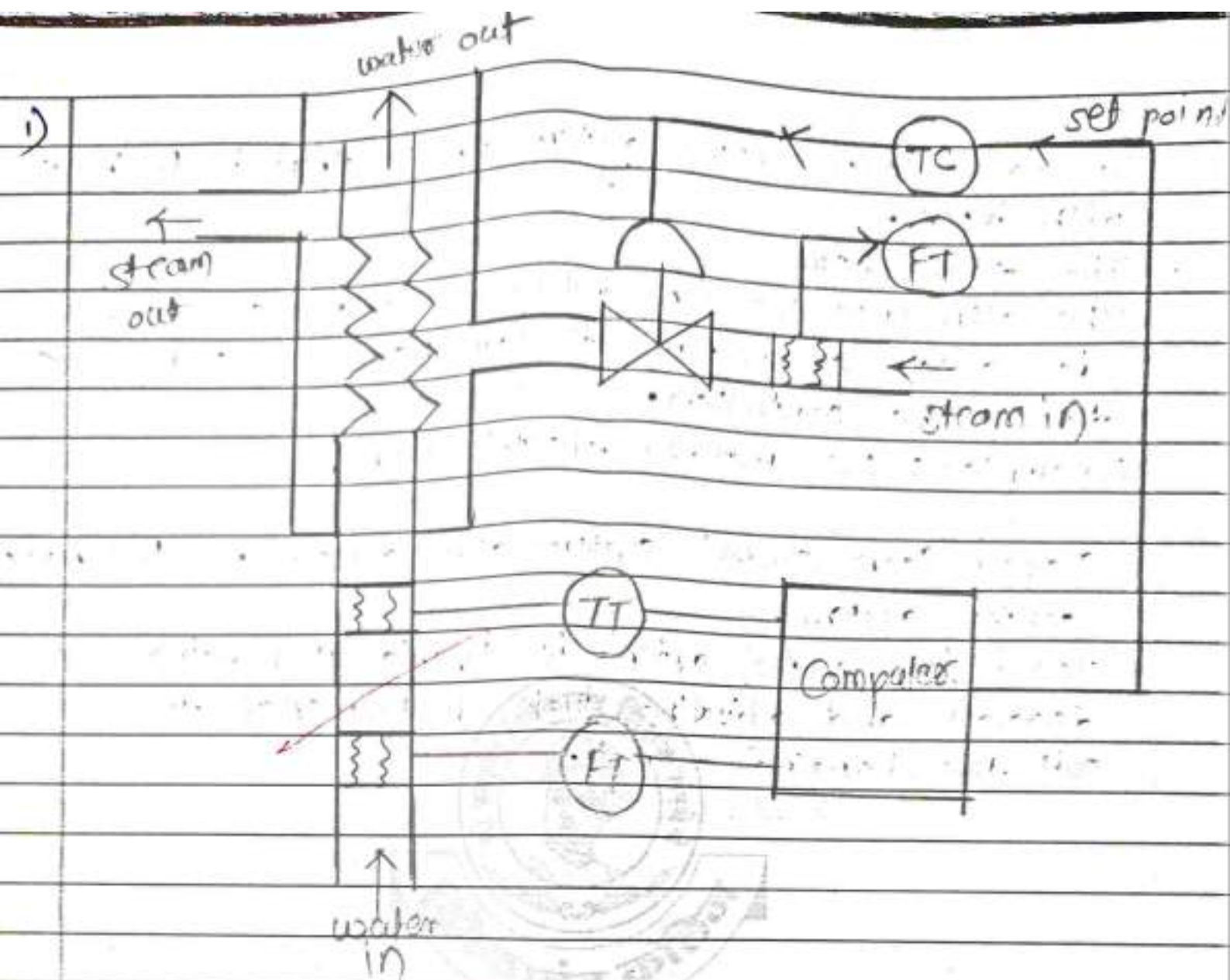
Closed loop control system is capable of making decision and adjusting their performance to suit the changing output.



1) Feedforward control system.

In feedforward control system, the input is feedforward with the output.

Controllers can correct the error which is the in between actual and set values.



Consider water heating system.

There are two main dominant parameters which can act as a ~~sign~~ disturbance and that can affect the output. First parameter is flow of water inlet.

Second parameter is flow of temperature inlet.

If the flow of inlet water increases, the temperature of outlet decreases due to insufficient time.

If the flow of inlet water decreases, the temperature of outlet increases due to expose of heat for more time.

These are all disturbances in control system.

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Suppliment No. :

Roll No. : 8370

Class : BSc III

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Subject : Electronics [PLC]

Test / Tutorial No. :

Div. :

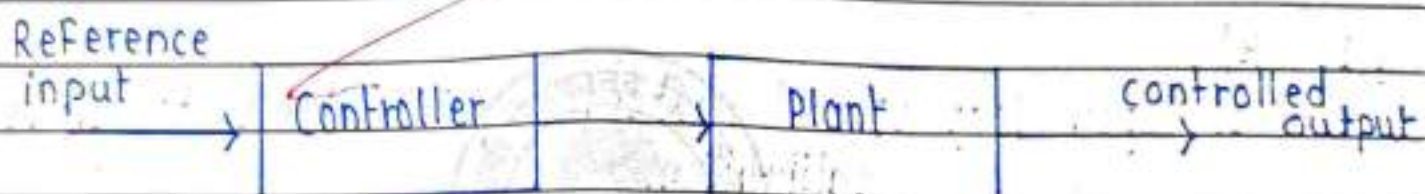
Q1 A]

1. Open loop control system requires time to time calibration.
2. In open loop control systems are Less stable
3. Sprinkler is an example of Open loop system.
4. Feedback loop system is also called Feed Forward ^{closed loop} system.

07

Q 2

→ 2. Open loop control system : A open loop control system that can process an input condition to produce a specified output. It is also the most common form of control system used widely in domestic as well as in industries system. because it is cheap to install and simple to operate. A control system in which the control action is independent of the output is called a open loop control system.



Open loop control system

Example - 1. Automatic Sprinklers

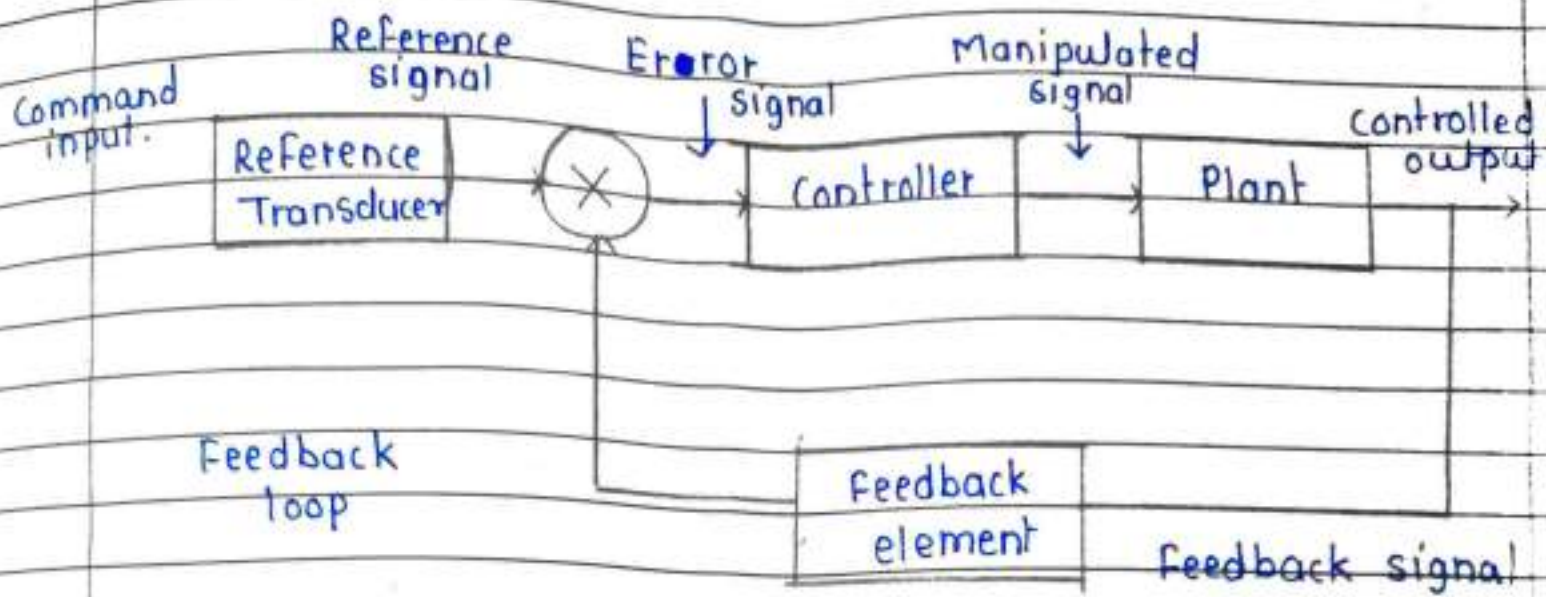
2. Automatic Toaster

3. Stepper motor

4. Washing machine

5. Electric room heater

Closed system - Control system in which the controlled action is dependent on the output is called as closed loop control system.



Closed loop control system

In closed loop control the value of the output is constantly monitored as the system operates and this value is compared with the set.

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Suppliment No. :

Roll No. : 8360

Class : IIIrd

Q

1

open-loop
closed-loop

1) Control system requires time to time calibration

2)

In open-loop control system are less stable

3)

spinkler is an example of open-loop systems

4)

feed back loop system is also called as feed-forward system

closed-loop

Q 2

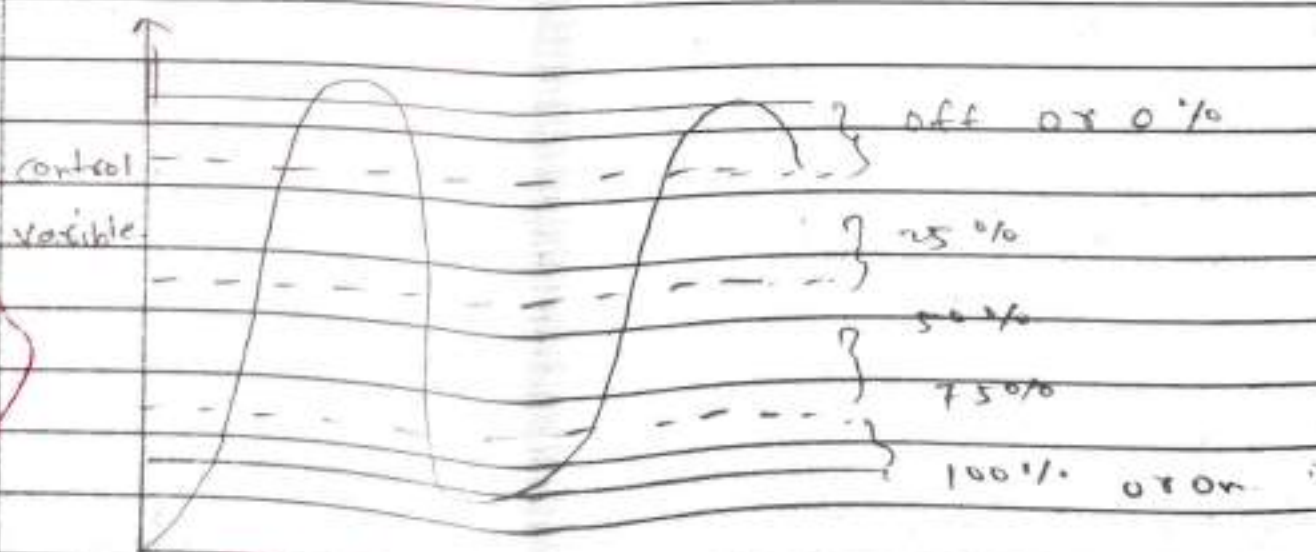
→ 3

In multi position control in the system control element, is moved the three or more than three, fixed position in the each correspond to a definite range of value of the control variable.

ii) In this control mechanism value is fully closed when the process variable is above the highest set point

iii) value remains half-open when the process variable is at mid band and it fully open when it crossed the lowest set point

iv) the major drawback of the two position control multi position control is that they rarely produce exact output



Name - Shivani Dipak Todakar

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Suppliment No. :

Roll No. : 8373

Class : BSC III

Subject : Electronics

Test / Tutorial No. :

Div. :

Q.1

1) ~~A) closed loop~~ D) open-loop

2) ~~B) less~~

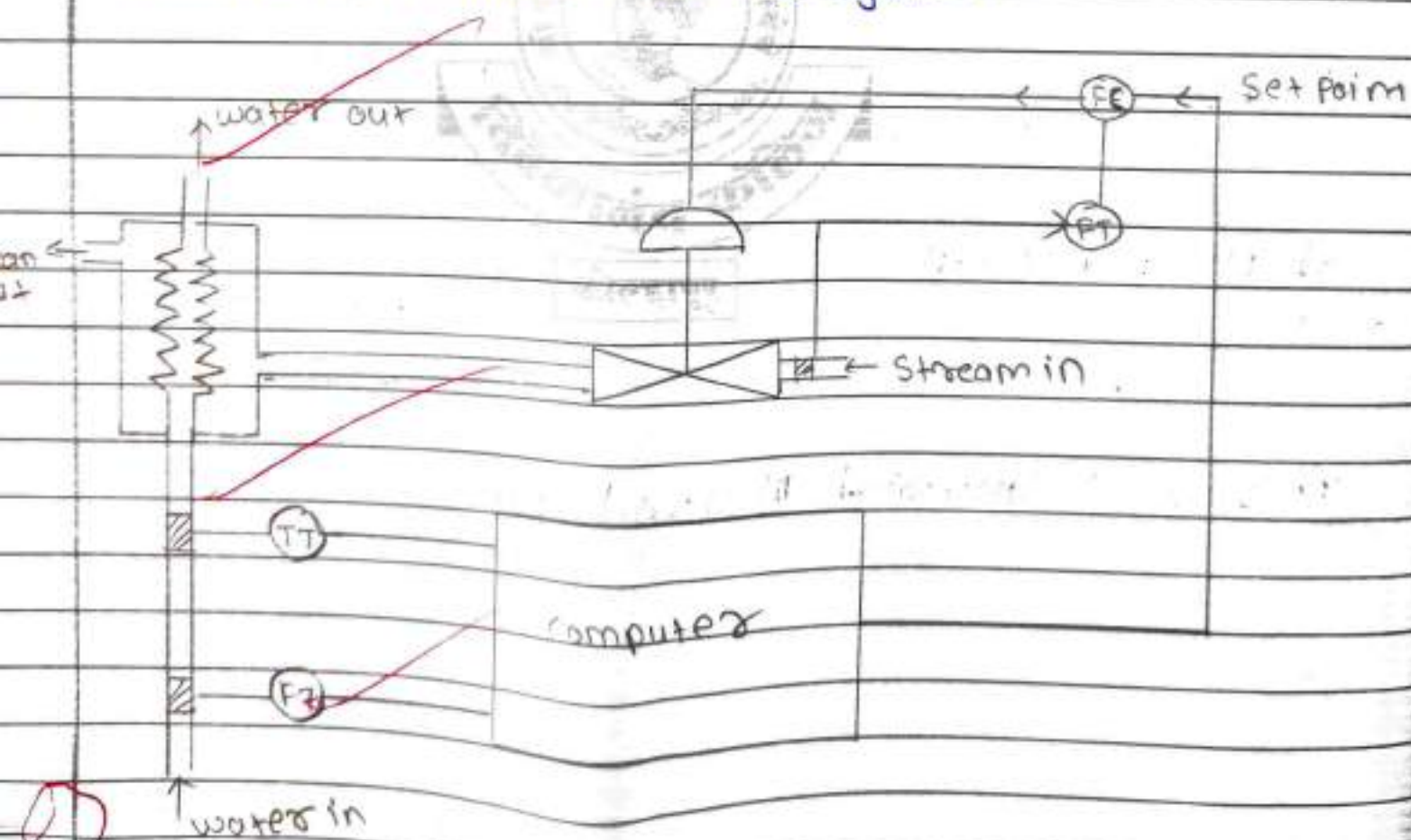
3) ~~B) open loop~~

4) ~~B) feed forward~~ A) closed loop

09

1. In feedback system. If the disturbance hits the system then and then controller corrective action is taken to maintain the output. In feedback system this is the major drawback because the action is taken when the output is shifted from set point.

IF the disturbance is measurable. In feed forward control mechanism the disturbance is measured before hitting the system and corrective action is taken. The corrective action is taken without waiting for a effect due to disturbance to show up in the output. This mechanism is called feed forward control system.



2.

→ * Advantages of open-loop control system.

- 1) open loop control system is easy to design
- 2) easy to maintain
- 3) This system is normally time dependent
- 4) open loop control system is much more economical solution

* Disadvantages

- 1) Time to time calibration is required.
- 2) ^{Prone} sensitive to environmental changes.
- 3) less stability.



Ketan A. Kamble.

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Subject: Electronic (PLC)

Test / Tutorial No. :

Div. :

Suppliment No. :

Roll No. : 8361

Class : BSC.III

Q1)

1) Control system requires time to time calibration.

→ ~~A) closed loop~~ ~~B) open loop~~

2) In open-loop control systems are stable.

→ ~~A) More~~ B) Less

3) Sprinkler is an example of system.

→ ~~A) Closed-loop~~ B) Open-loop

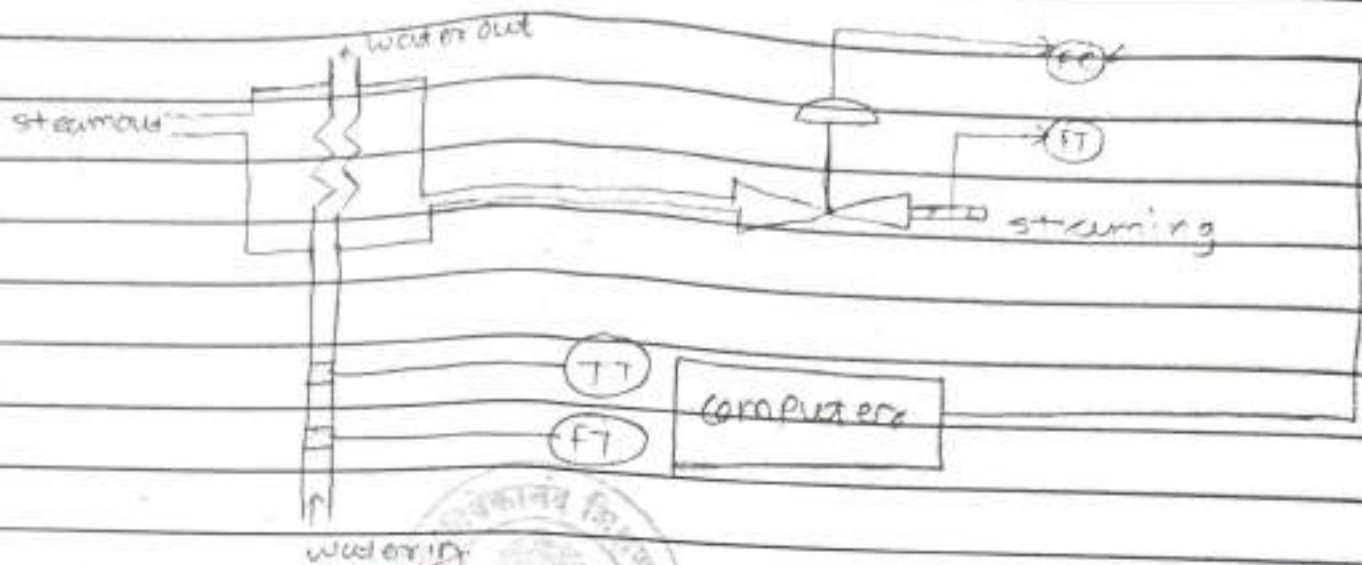
4) Feedback loop system is also called as system.

→ ~~A) Feed forward~~ B) closed-loop

OK

(Q2)

1.



In ~~feedback~~ control system, if the ~~disturbance~~ hits the system and then the controller corrective ~~answer~~ action taken to maintain the output. In feedback system this is the major drawback because the action is taken when output is shifted from set point.

If the disturbance is meanwhile in ~~feed forward~~ control mechanism the disturbance is action is taken. The corrective action is taken without waiting for effect due to disturbance to show up in the output. This mechanism is called feed forward control system.

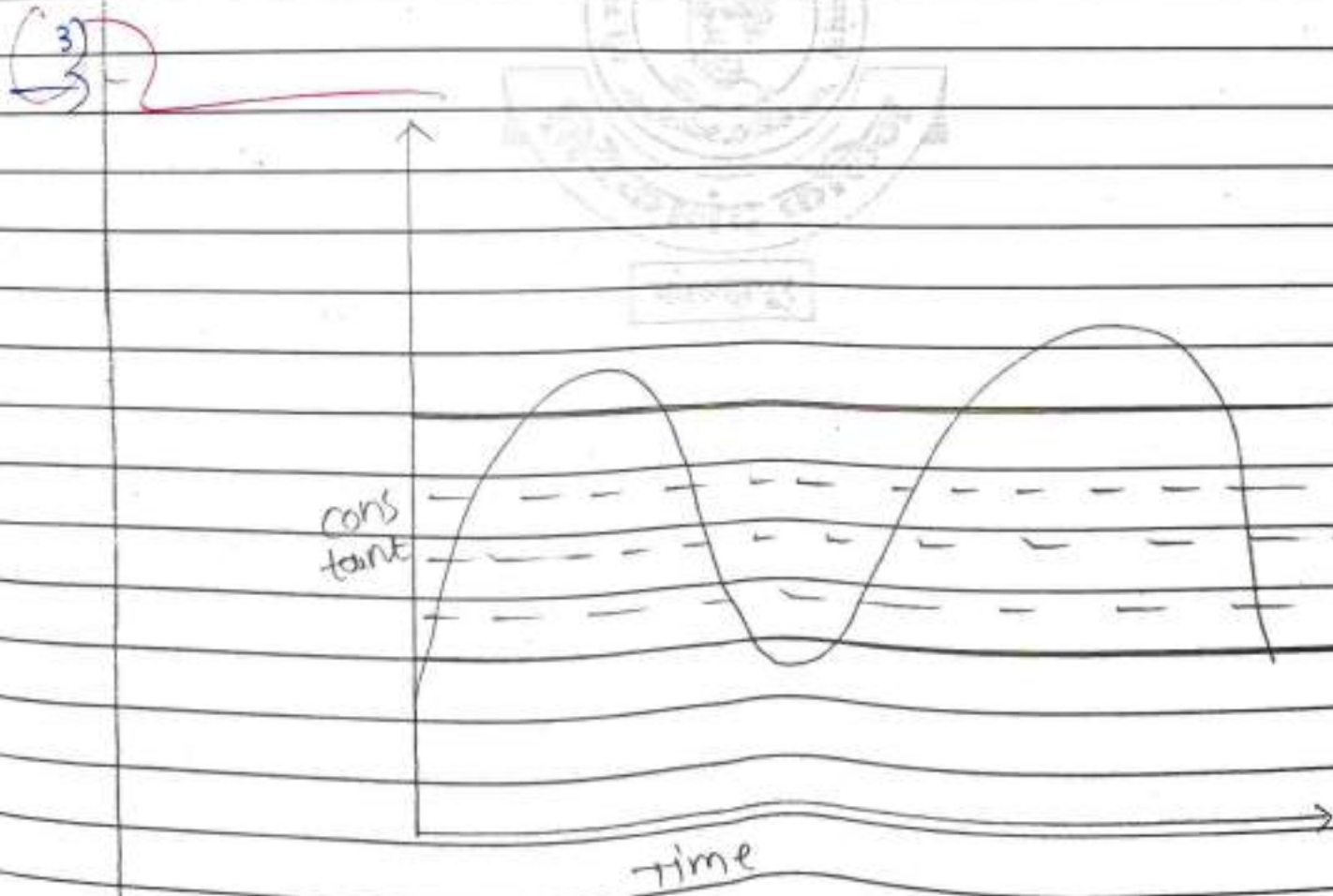
2)

→ Advantage -

- 1) open loop control system is easy to designed
- 2) open loop control system is easy to maintain.
- 3) This system is normally time dependance.
- 4) open loop control system is much more economical solution.

Disadvantages.

- 1) time to time calibration is required.
- 2) prone to environmental changes.
- 3) Less stability.



B.Sc. Part- III (Electronics) (Sem-VI) Internal Examination: April -2023

Course Code: DSE - 1005F1

Section - II: Advanced Microcontroller and Embedded System

Day: Tuesday

Time: 01.30 pm to 02.15 pm

Date: 11/04/2023

Marks: 10

.....
1. Explain hardware architecture of embedded system. (4)

2. What is embedded system? Give the applications of embedded system. (4)

or

What is embedded system? Explain characteristics of embedded system. (4)

3. Embedded system is configured to perform a _____ application. (1)

A) specific dedicated B) general purpose

C) non- dedicated D) none of these

4. Embedded system is combination of _____. (1)

A) hardware and software B) hardware

C) software D) none of these

B.Sc. Part- III (Electronics) (Sem-VI) Internal Examination: April -2023

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Name - Prajakta Sunil Bidre.

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Subject : Industrial process control &
PLC Programming

Test / Tutorial No. :

Div. :

Suppliment No. :

Roll No. : 8359

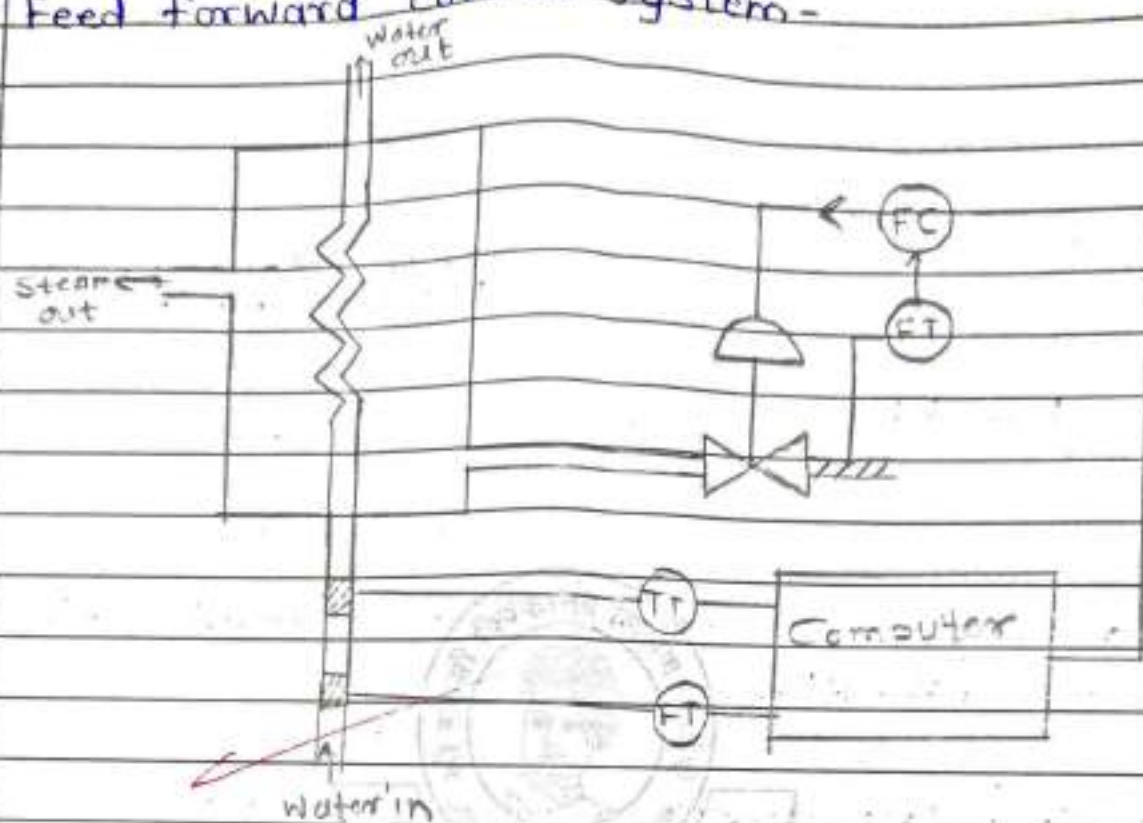
Class : B.Sc. III

Q.1

1. Closed loop control system requires time to time calibration.
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Q.2

1) Feed forward control system -

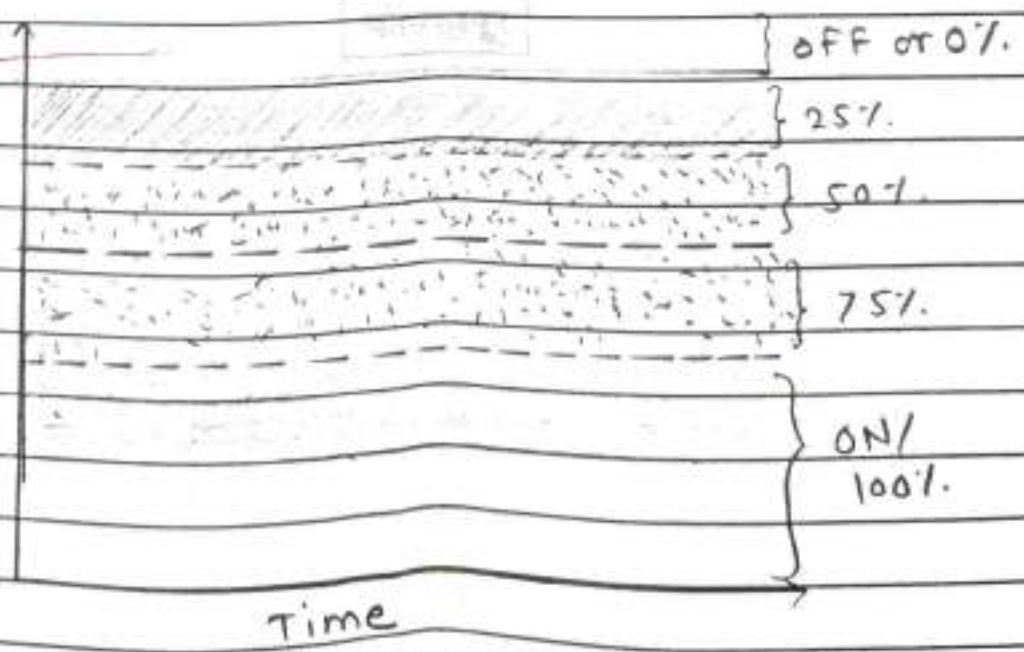


In the feedback control systems, if the disturbance hits the system and then the controller corrective action taken to maintain the taken when the output is shifted from its set value. If the disturbance is measurable, in feed forward control mechanism the disturbance is measured before hitting system and the corrective action is taken: thus the corrective action is taken without waiting for effect due to disturbance to show up in the output. This mechanism is called feed forward control. The fig. shown below is example of feed forward control. In this system there two dominant parameters which can act a disturbance

Q.2

3) Multi-position control-

In multi position control system the control element is moved with three or more than three fixed positions. each corresponds to a definite range of values of controlled variable. In this control mechanism a valve is ~~va~~ fully closed when the processes variable is above the highest set point. valve remains half open when the processes variable is at mid band and it is fully opened when it crosses the lowest set point. The major drawback of the two position control and multi position control is that they rarely produce the exact output.



Sakshi Tushar Bhopale.

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of
Supervisor

Subject: Advanced microcontroller
and Embedded system.

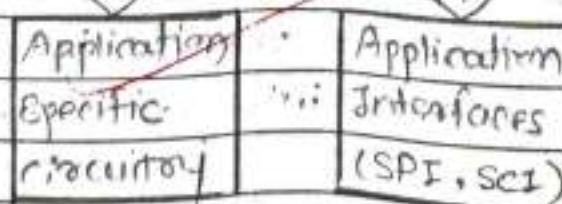
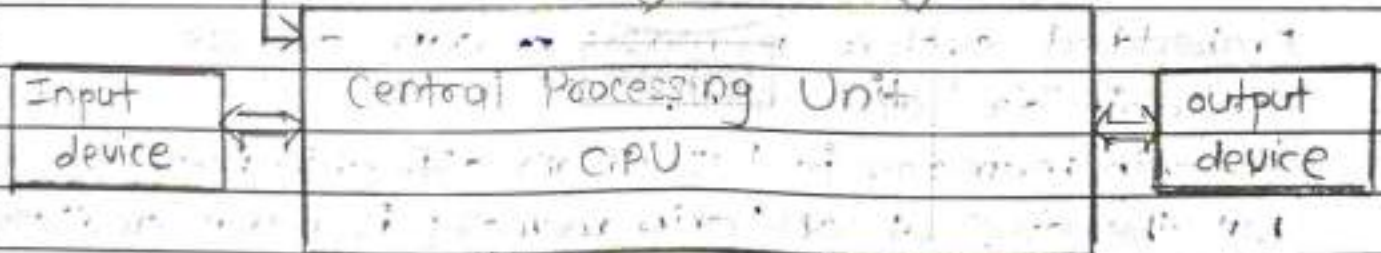
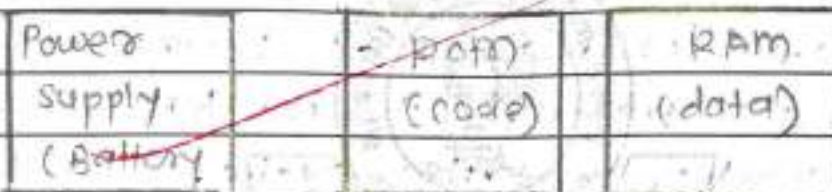
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Div.:

Suppliment No. :

Roll No. : 8358

Class : BSC TY Sem VI



In hardware architecture of embedded system

It consists

⇒ CPU

⇒ I/O ports

⇒ RAM and ROM

⇒ Application specific circuitry

⇒ Application Interfaces.

CPU

A CPU composed of Arithmetic Logic Unit (ALU), control unit (CU) and internal registers that can be connected by buses.

ALU can perform all mathematical operation, logical operations, shifting operations.

A CPU works in a cycle of fetching instruction, decoding it and execute it, known as fetch-decode-execute cycle.

Memory

Embedded system memory can access on-chip or off-chip.

on-chip memory is fast than off-chip memory but the size of on-chip memory is much smaller than off-chip memory.

Usually, it takes two I/O ports.

Generally, the data is stored in RAM and the program is stored in ROM.

Memory can be divided into data memory and code memory.

Most of the data is stored in RAM and code is stored in ROM.

The RAM memory is readable and writable, faster access and most expensive ~~rather~~ volatile

storage that can be either data or code.

I/O ports.

The embedded system contains input devices and output devices.

The common input devices in embedded system is keyboards, buttons, switches, knobs and all kinds of sensors.

The output devices are LED, LCD, alarms, printers, etc. actuators etc

Application specific circuitry

Embedded system the input is receives from sensors or actuators.

In such a situation, certain signal conditioning is needed.

The hardware devices are DAC, op. amps, ADC

Such a circuitry provided correct output.

3) Embedded system is configured to perform a specific dedicated application.

4) Embedded system is combination of hardware and software.

2) Embedded system

Embedded system is an electronic system, which includes single chip microcomputers like 8051, PIC, ARM or cortex.

It is configured to perform a specific dedicated application.

An embedded system is some combination of computer hardware and software.

Here, the microcomputer is embedded or hidden in system.

Every ~~emb~~ microcomputer embedded system accepts 'input', perform specific computing and provide specific generated output and runs in "real time".

Examples: Cell phones, DVD, mp3, microwave, smart cards, elevator, dish washers, washing machine.

characteristics of embedded system

- 1) Speed (byte/sec): ~~fast~~ should be very high speed
- 2) Power (watts): Low power dissipation.
- 3) Size and weight: As far as possible small in size and low weight.
- 4) Accuracy (% error): Must be very accurate.
- 5) Adaptability: Highly adaptive and accessive.
- 6) Reliability: Must be very reliable over a long period time.

Name - Prajakta Sunil Bidre.

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Suppliment No. :

Roll No. : 8359

Class : BSc. III

Subject : Advanced Microcontroller & Embedded system.

Test / Tutorial No. :

Div. :

2) What is embedded system? Give the applications of embedded system.

→ An embedded system is a electronic system which include single chip microcomputers like for 8051, PIC or cortex. It is configured to perform a specific dedicated application.

4 → An embedded system is some combination of computer hardware and software fixed in capability or programmable. that is designed for a specific function or for specific function within a larger system. Here the microcomputer is embedded or hidden inside the system.

Every embedded microcontroller system accepts inputs performs computation & generates outputs & runs in real time.

Ex. - e.g. cell phone, digital camera, microwave and automatic sprinklers, etc.

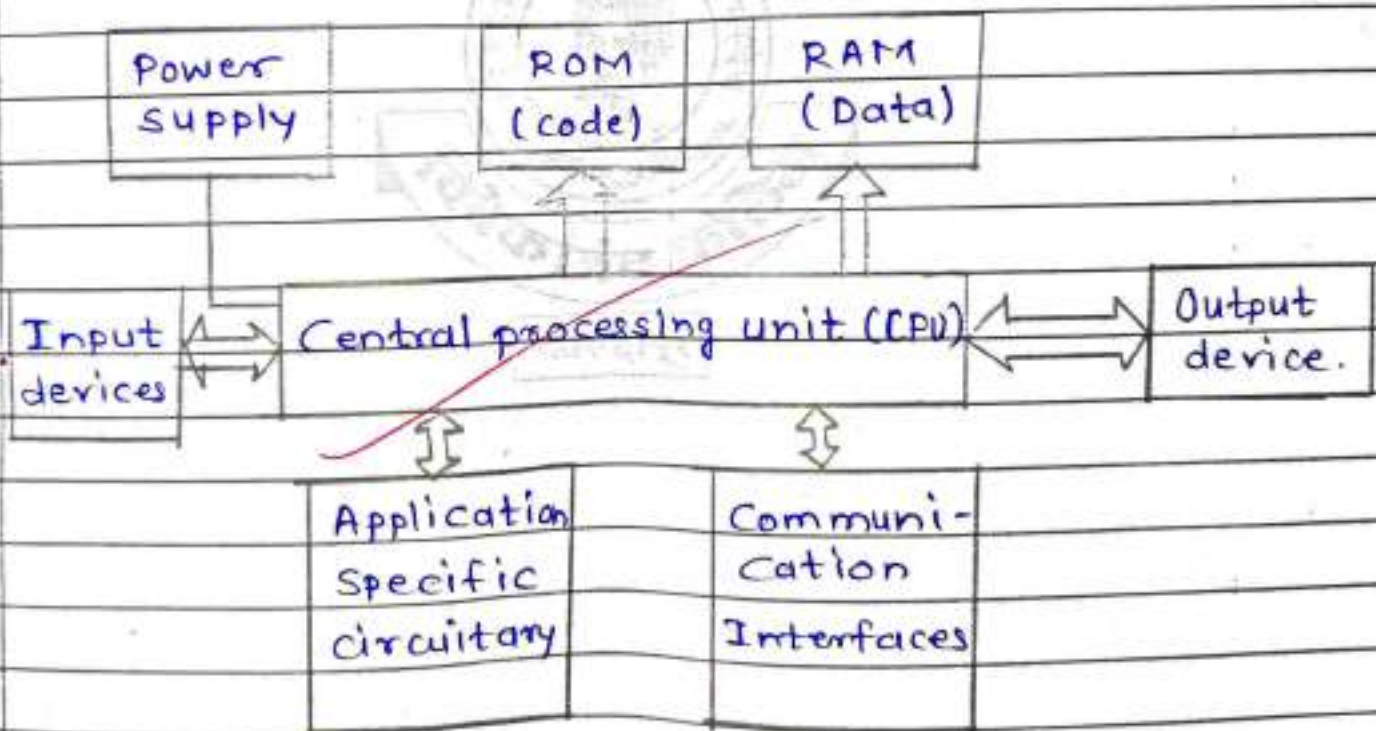
Applications of embedded system -

Embedded system	Applications.
1) Home appliances	Dishwasher, washing machine, microwave, automatic sprinkler, Tap-Set box, DVD.
2) Academia	Smart board, smart room, ocr, calculator, smart card.
3) Personal	PDA, Iphone, palmtop, data organizer.
4) miscellaneous	Elevators, trade mill, gen smart card, security door.
5) Bank and finance	ATM, Smart vendor machine, share market.
6) Security	face recognition, finger recognition, eye recognition, building security system, airport security system.

3. Embedded system is configured to perform a specific dedicated application.

4. Embedded system is combination of hardware and software.

1. Hardware architecture of embedded system -



• A CPU is composed of an Arithmetic Logic Unit (ALU), a control unit (CU) and many internal registers that are connected by buses.

Name :- Ankhita Balaso Khot

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Roll No. : 8362

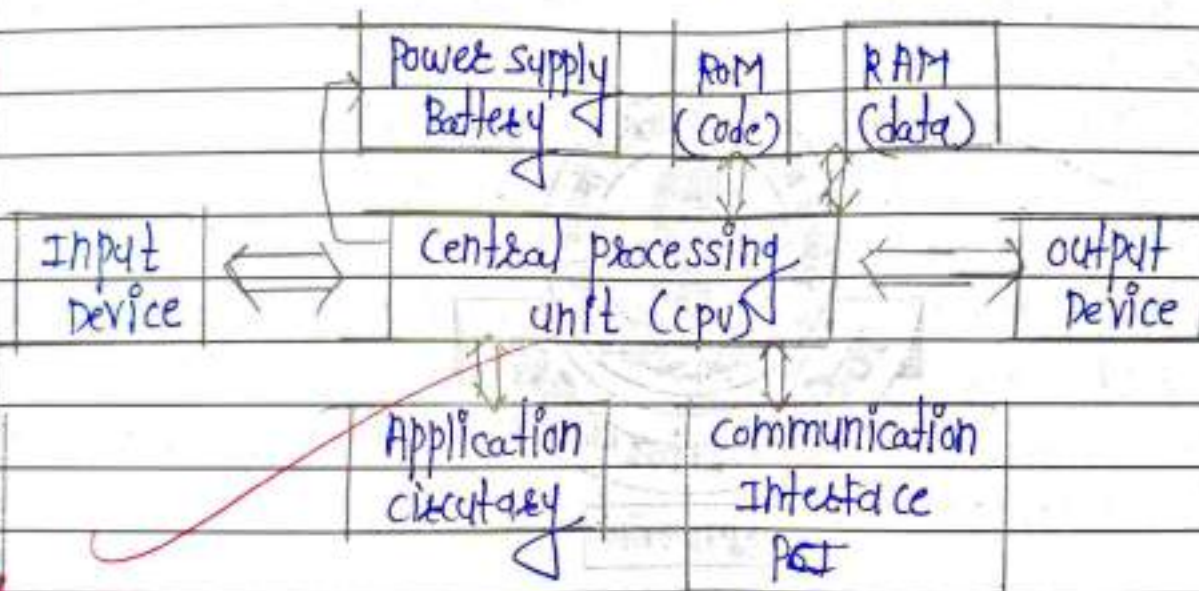
Class : BSC-III

Subject : Advanced microcontroller

Test / Tutorial No. : Internal

Div. :

1)



central processing unit (cpu) :-

• The central processing unit (CPU) composed into an arithmetic logic unit (ALU) and control unit (CU) or internal registers are connected in a buses.

• An Arithmetic logic unit (ALU) performs all mathematically operations (ADD, SUB, MUL, DIV) logical operations (AND, OR) and shifting operations within the CPU.

• The timing and sequencing of all CPU operations are controlled by CU, which is actually built of many section circuits including latches and decoders.

- The CPU works in a cycle of fetching an instruction, decoding it and executing it known as the fetch-decode-execute cycle.

Memory :-

- Embedded system memory can be either on-chip or off-chip.
- On-chip memory access is much faster than off-chip memory, but the size of on-chip memory is smaller than the off-chip memory.
- Usually it takes at least two I/O ports as external address line plus a few control lines such as P1W and ALE control lines to enable the extended memory.
- Generally, the data is stored in RAM and the code is stored in ROM.
- The ROM, EPROM and EEPROM flash memory are the read-only type of memory.
- In an embedded system, the code is stored in ROM and data is stored in RAM.

I/O Ports :-

- The I/O ports used in connected for input and output devices.
- The common input devices for embedded systems include keyboards, switches, knobs.

Application specific circuitry :-

- The embedded system some times receives the input from the sensors or actuators.
- In such situations, certain signal conditioning circuitry is needed.

2) Embedded system:-

• An embedded system is an electronic system in which include single chip microcomputer like 8051, ARM or cortex.

- It is configured to perform to dedicated application.
- An embedded system is an combination of computer hardware and software either fixed in capability or programmable that is designed for a specific function or for specific functions within a larger system.
- eg:- cell phone, digital camera, microwave oven, mp3 player.

Characteristics of embedded system:-

The important characteristics of embedded system are:

- speed (bytes / sec):- should be high speed
- power (watts):- Low power dissipation
- size and weight :- As far as possible small in size and low weight.
- Accuracy :- High must be high accuracy
- Adapability :- High Adapability and assessibility
- Reliability :- must be reliable over a long period time.

3) Embedded system is configured to perform a specific dedicated application.

4) Embedded system is combination of (a) hardware and software.



Muskan Kripashankar Maurya

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Suppliment No. : ①

Roll No. : 8365

Class : T.Y

Subject : Electronics

Test / Tutorial No. : Internal Exam

Div. :

2] What is embedded system? Give the application of embedded system.

Ans Embedded system is combination of hardware & software application. It is used in all the type of computers & the microprocessor & microcontroller. Embedded system is configured to perform a specific dedicated application. A embedded system is electronic system which include single chip microcomputers like for 8051, PIC or cortex. It is configured to perform a specific dedicated application. Every embedded or microcontroller system accepts inputs performs complex computers & general purpose output in real time. This embedded system is desined with the hardware & software application for the better use & using microcontroller.

Application of embedded system is as following:-

Embedded System

Applications.

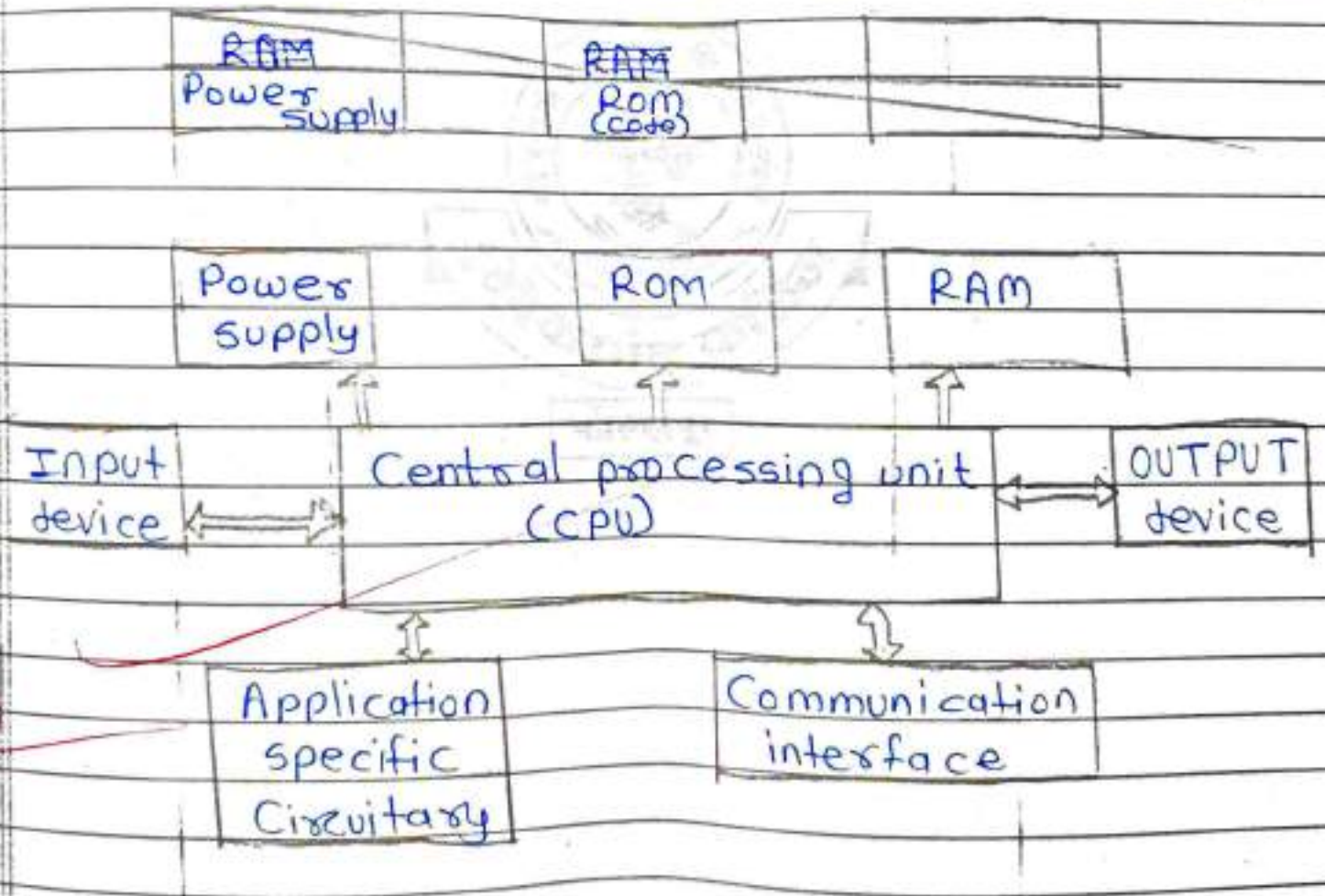
- ① Home appliances → Dishwasher, washing machine.
- ② Office purpose → Fax, data transfer, web network.
- ③ Entertainment → DVD, Online games, all the television programs.
- ④ Realibility →
- ⑤ Academia → Smart board, ~~star~~ smart room
- ⑥ Bank & finance. → ATM, Smart vendor machines, Share marker

③ Embedded system is configured to perform a A) Specific dedicated application.

④ Embedded system is combination of A) Hardware & software.

Q 3] Explain hardware architecture of embedded system.

Ans



Nikhil Sunil Patil

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SUPPLIMENT

Suppliment No. : 1

Roll No. : 8367

Class : BSc III

Signature
of
Supervisor

Subject: Electronic's

Test / Tutorial No. :

Div. :

Q.2

what is embedded system? Explain characteristics

→ (1) The embedded system is the electronic system.

(2) Include the single chip micro computer are there.

(3) The embedded system is combination of computer is the hardware & software are there.

(4) specific function & larger system.

(5) The embedded system every accept input of micro computer.
example of these :-

(1) cell phone

(2) Digital camera

(3) MP3 player

(4) Agricultural.

(6) Embedded system is configured to perform a specific dedicated application.

→

② characteristics of embedded system.

- speed : The high speed system
- power : low power
- size and weight : possible small size & low weight
- Accuracy : (100%) Accurate
- Adaptability
- Reliability

Q.2] what is embedded system? Give the application of embedded system.

→ The embedded system is electronic system. Include the signal chip micro computer. The combination to computer is hardware & software. specific function & larger system. The embedded system is accept the input of the micro-computer.

embedded system	Application
① Home Appliances	DVD, Dish, washin machine.
② personal	iphone, Data reg.
③ security	finge, face recognition, Alaram system, Airport Security System.
④ Bank & finance	ATM machine, share market.
⑤ Instrumentation	signal operator, signal processor

⑤ Entertainment

MP3 player, TV

⑥ office

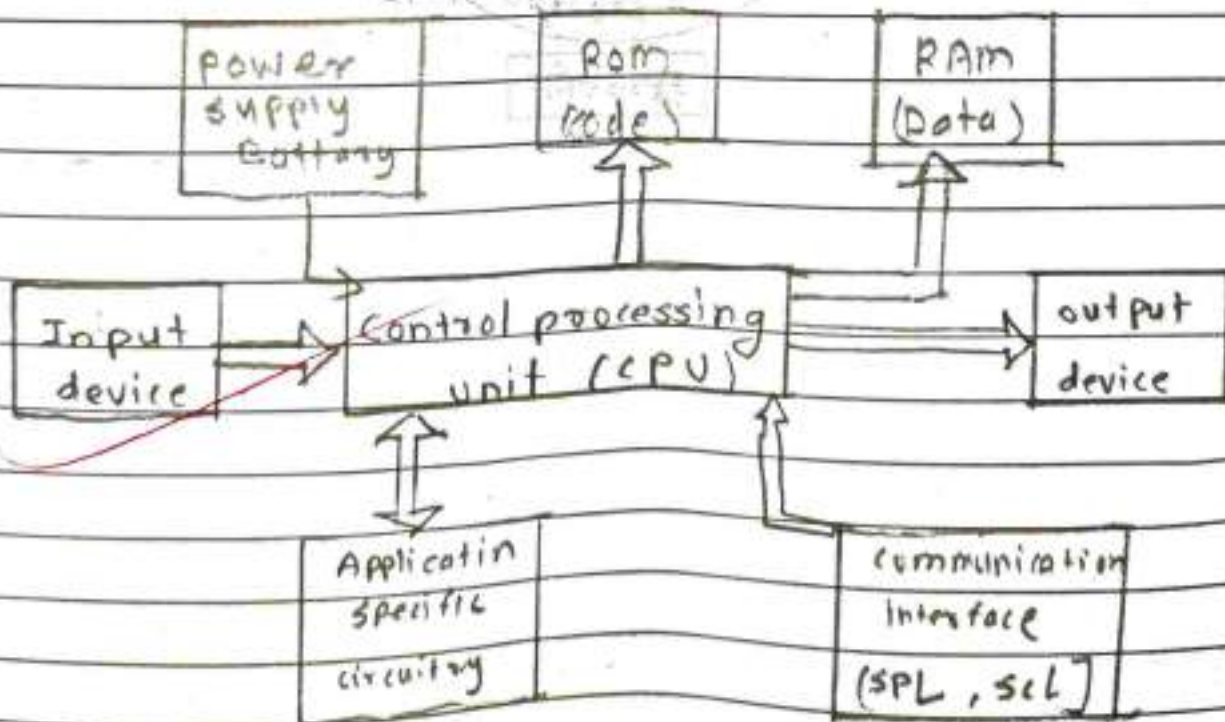
Scanner machine
printer

Q.3.

Embedded system is configured to perform a specific dedicated application.

Q.4 Embedded system is combination of hardware and software.

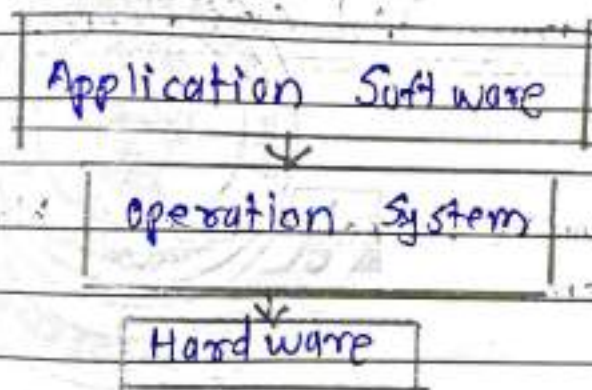
Q.1 Hardware, architecture, block diagram of embedded system.



The block diagram of Architecture of embedded system.

Q. 1. The hardware architecture of embedded system

- ① The Architecture of a built customer support by CPU which heart of the micro processor & micro controller are there.
- ② micro controller is integrated chip built in memory, I/O port, Timer & other component.
- ③ micro computer run faster custom built system.
- ④ microprocessor because all component integrated within a single chip.
- ⑤ high end application apply use operating system.



VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part- III (Electronics) (Sem-VI)

Internal Examination 2023

Course Code: DSE - 1005 F2

Section - I: Power Electronics

Date - 12/04/2023

Q.1) Select most correct alternatives for the following (one mark each)

[2 Marks]

1. The forward breakover voltage of SCR decreases with increase in -----.
A) Cathode current B) Anode current
C) Gate current D) None of the above
2. In the forward blocking mode of a silicon controlled rectifier, the SCR is -----
A) in on state B) in natural state
C) forward biased state D) in off state

Q.2) Attempt any Two (Four marks each)

[8 Marks]

1. State the different method use to turn on the SCR. Which method widely used to turn on the SCR and explain it shortly?
2. Explain the operation and V-I characteristics of DIAC.
3. Describe two transistor model of thyristor with neat diagram. Draw its equivalent circuit.

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

B.Sc. Part- III (Electronics) (Sem-VI)

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Sakshi Tushar Bhopale,

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$\frac{6+2}{10} = \frac{8}{10}$

Suppliment No. :

Roll No. : 8358

Class : BSC TY Sem VI

Subject : Power electronics

Test / Tutorial No. : Internal Exam.

Div. :

Q.1]

A]

1]

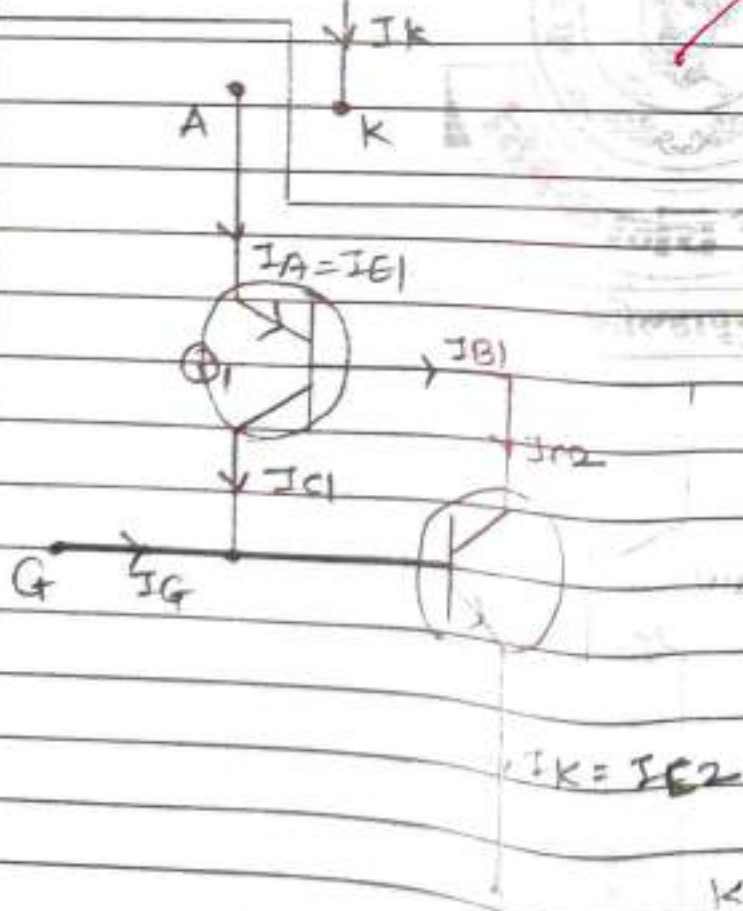
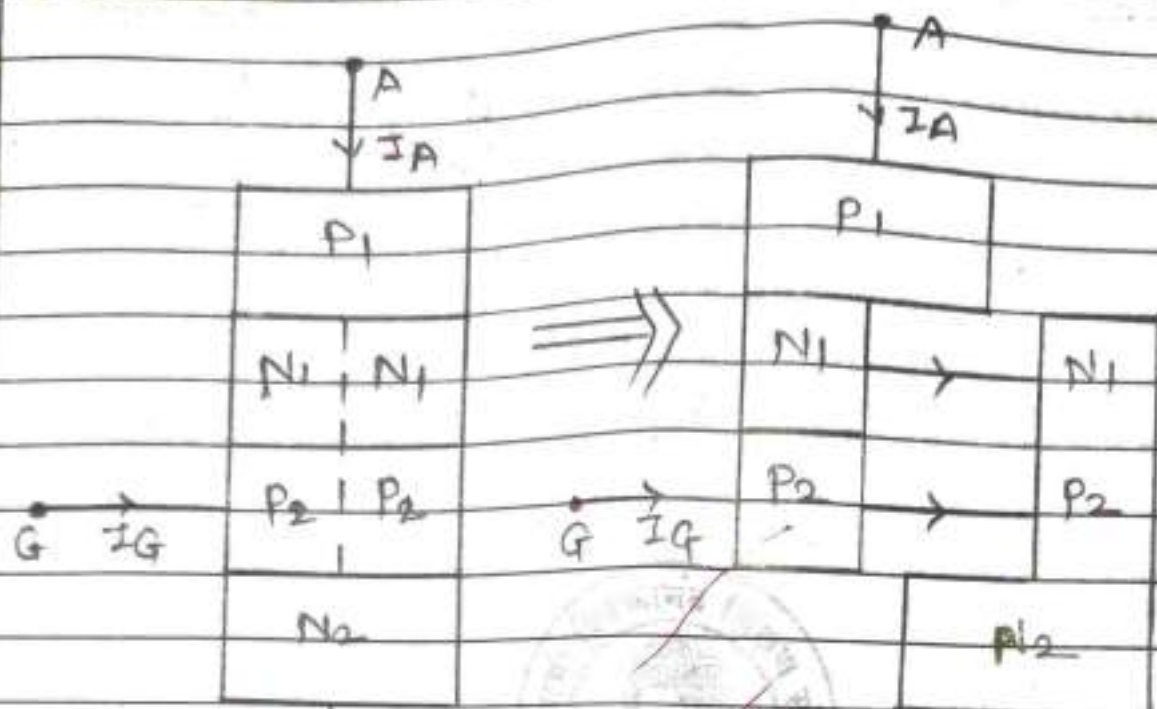
The forward breakover voltage of SCR decreases with increase in Cathode current

2]

In the forward blocking mode of silicon controlled rectifier, the SCR is in off state.

2]

3] Two model transistor



For any bipolar transistor,

$$I_A = \alpha I_C + I_{CBO} \quad \text{--- (1)}$$

where α is the emitter current gain

I_{CBO} is the collector leakage current.

For transistor Q_1 ,

$$I_{C1} = \alpha_1 I_{E1} + I_{CBO1} \quad \text{--- (2)}$$

For transistor Q_2 ,

$$I_{C2} = \alpha_2 I_{E2} + I_{CBO2} \quad \text{--- (3)}$$

But we know that,

$$I_{E1} = I_A \quad \text{and} \quad I_{E2} = I_K$$

By putting these values in (2) & (3) equation becomes,

$$I_{C1} = \alpha_1 I_A + I_{CBO1} \quad \text{--- (4)}$$

$$I_{C2} = \alpha_2 I_K + I_{CBO2} \quad \text{--- (5)}$$

Now, by applying KCL at Q_1

$$\therefore I_A = I_{C1} + I_{B1} \quad \text{--- (6)}$$

putting these in (4)

we get,

$$\therefore I_{C1} = \alpha_1 I_A$$

Also we know that, $I_{B1} = I_{C2}$

equation (6) becomes

$$I_A = I_{C1} + I_{C2} \quad \text{--- (7)}$$

put (6) in (7)

$$\therefore I_A = \alpha_1 I_A + I_{CBO1}$$

Applying KCL at ϕ_2

we get $I_K = I_G + I_A$ — (9)

putting these in (8)

we get,

$$I_A = (\alpha_1 I_A + I_{CB01}) + (\alpha_1 I_G + \alpha_1 I_A) + I_{CB02}$$

$$I_A = \alpha_1 I_A + I_{CB01} + \alpha_2 I_G + \alpha_2 I_A + I_{CB02}$$

$$I_A = (\alpha_1 + \alpha_2) I_A + \alpha_2 I_G + I_{CB01} + I_{CB02}$$

OR,

$$I_A = \frac{\alpha_2 I_G + I_{CB01} + I_{CB02}}{1 - (\alpha_1 + \alpha_2)}$$

Name :- Ankita Baldeo Khot

॥ ज्ञान, विज्ञान आणि सुसंस्कार वांछनी शिक्षण प्रसार ॥

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$\frac{9}{10}$ ✓

Suppliment No. :

Roll No. : 8362

Class : BSC-III

Subject : Power Electronics

Test / Tutorial No. : Internal

Div. :

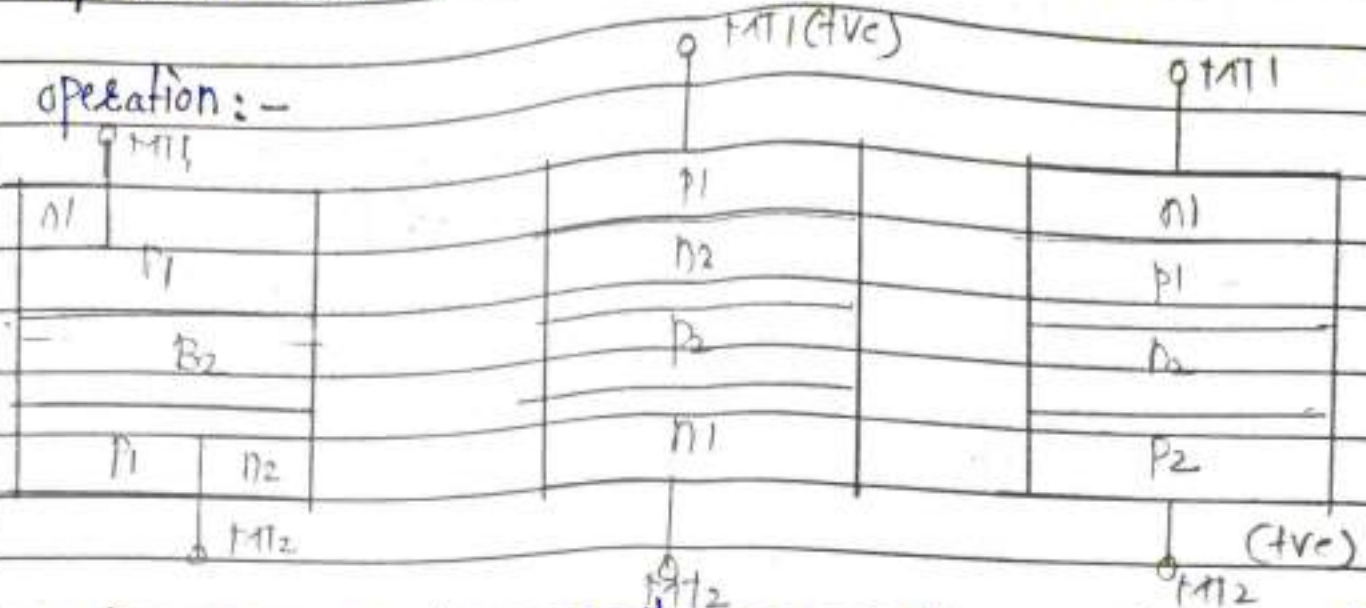
Q1)

1) C) Gate current ✓

2) D) in off state ✓



Q2) operation and V-I characteristics of DIAC.

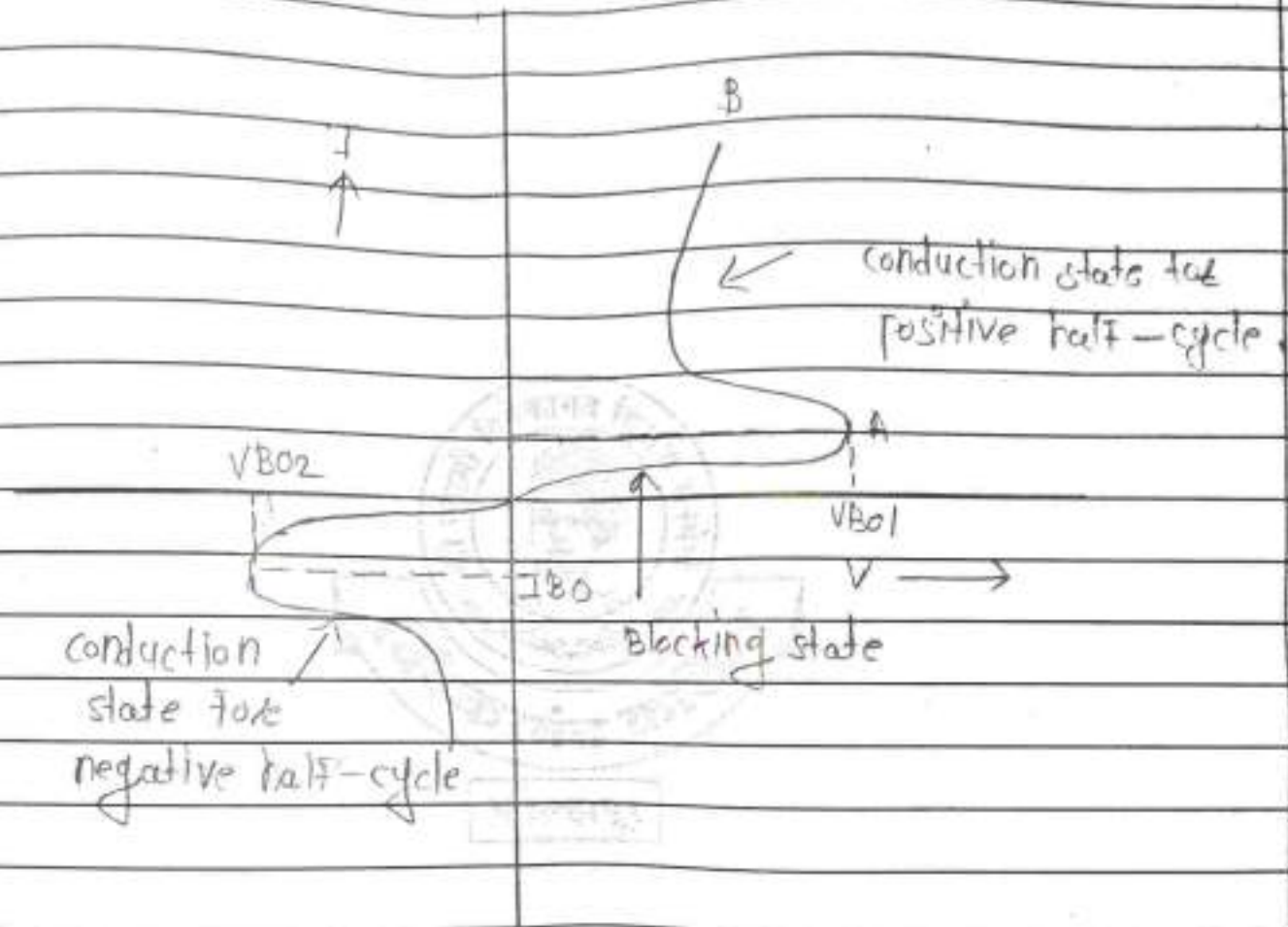


The clear operation of the Diac with respect to the polarities. Consider the MT_1 terminal to be positive, then the p_2 layer near MT_1 will be activated so the conduction will be taking place in the order of $p_1 - n_2 - p_2 - n_1$. When the current is flowing to the MT_1 to MT_2 the junction between the $p_1 - n_2$ and $p_2 - n_1$ are forward biased and the junction between $n_2 - p_2$ is reverse biased. Similarly, if we consider MT_2 terminal to be positive, then p_2 layer near MT_2 will be activated then the conduction will be take place in order in $p_2 - n_2 - p_1 - n_1$. The current will be flowing from MT_2 to MT_1 and the junction between $p_2 - n_2$ and $p_1 - n_1$ are forward biased and the junction between $n_2 - p_1$ is reverse biased. Hence the conduction will be possible in both the directions.

V-I characteristics :-

The V-I characteristics curve of the Diac will be in the shape of a Z and the curve will be lying on the first and third quadrants because they conduct in both the positive and negative polarity. The first quadrant

represents the positive half cycle where the current will be flowing from $M1$ to $M2$ and the second quadrant represents the negative half cycle where the current will be flowing from $M2$ to $M1$.



- i) Forward - voltage triggering
- ii) Gate triggering
- iii) Temperature triggering
- iv) dv/dt triggering
- v) light triggering

Gate triggering :-

This is most widely used SCR triggering method.
Applying a positive voltage between gate and cathode

can turn off a forward biased thyristor. When a positive voltage is applied at the gate terminal, charge carriers are injected in the inner p-layer thus by reducing the depletion layer thickness. As the applied voltage increases, the carrier injection increases. Thus for the voltage at which forward break-over occurs decreases.

3



Souabh Sanjay Korgaole

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Suppliment No. :

Roll No. : 8363

Class : BSC-TT

Subject : Electronics

Test / Tutorial No. :

Div. :

Q.1

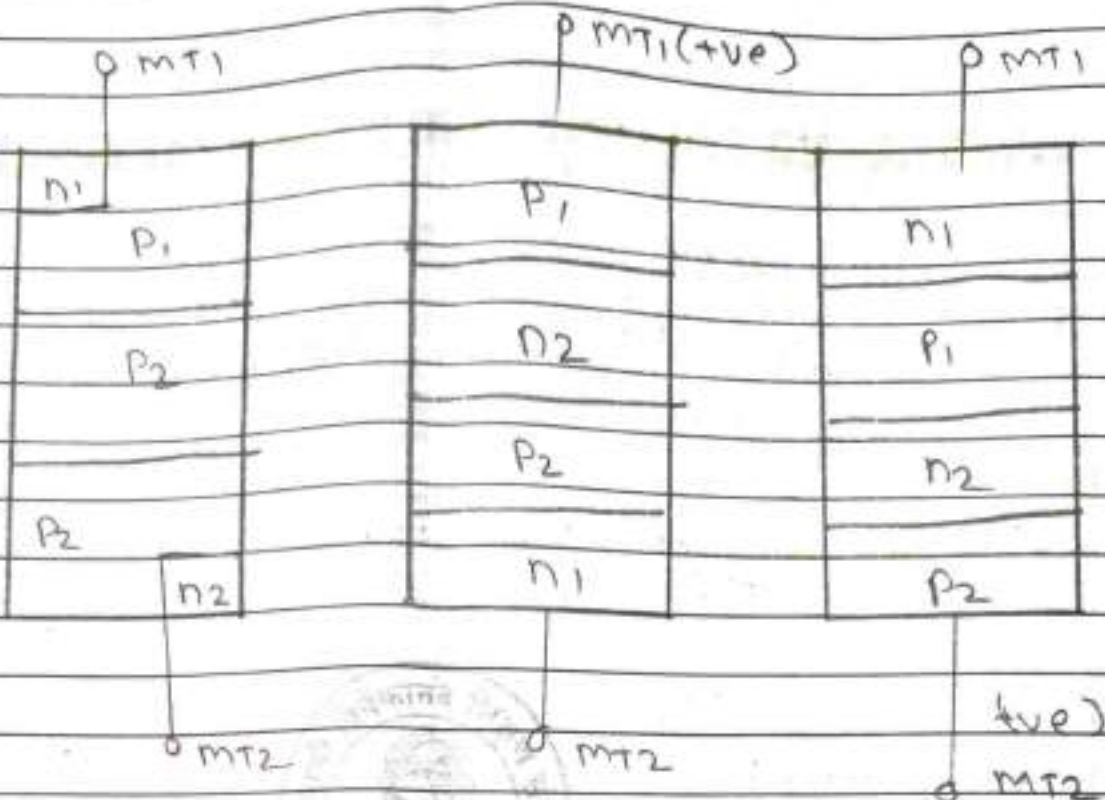
A → Gate current

B → In natural state

2



Q.2

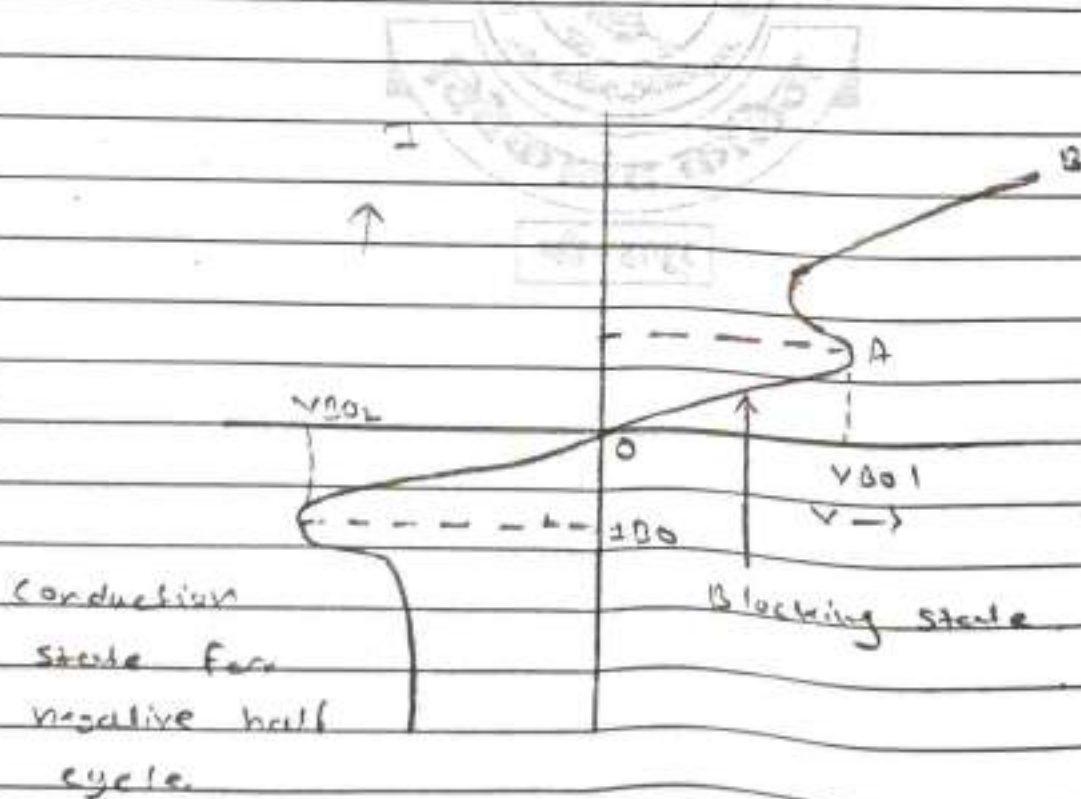


The clear operation of the DIAC with respect to the polarities. Consider the MT₁ terminal to be positive, then the P₁ layer near MT₁ will be activated so the conduction will be activated. So the conduction will be taking place in the order of P₁ - N₂ - P₂ - N₃. When the current is following to the MT₁ to MT₂, the junction between the P₁ - N₂ and P₁ - N₃ are forward biased and the junction between N₂ - P₂ is reverse biased. Similarly, if we consider MT₂ terminal to be positive then P₂ layer near MT₂ will be activated then the conduction will be take place in order in P₂ - N₂ - P₁ - N₃. The current will be following from MT₂ to MT₁ and the junction between P₂ - N₂ and P₁ - N₂ are forward biased and the junction between N₂ - P₁ is reverse ~~biased~~ biased. Hence the conduction will be possible.

In both the direction.

V-I characteristics.

The V-I characteristics curve of the Diac will be in the shape of a Z and the curve will be lying on the first and the second quadrants because they conduct in both the positive and negative polarity. The first quadrant represents the positive half cycle where the current will be flowing from $M T_1$ to $M T_2$ and the second quadrant represents the negative half cycle where the current will be flowing from $M T_2$ to $M T_1$.



1) →

- 1) forward-voltage triggering.
- ii) Gate triggering
 - iii) Temperature triggering
 - iv) dv/dt triggering
 - v) light triggering

Gate triggering :-

- This is the most widely used SCR triggering.

method :-

Applying a positive voltage between gate and cathode can turn on a forward biased thyristor when a positive voltage is applied at the gate terminal.

Name - Muskan Krupashankar Mauxya

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

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10/2

Suppliment No. : ①

Roll No. : 8365

Class : TY

Subject : Electronic

Test / Tutorial No. : Internal Exam

Div. :

Q1] The for

1] The forward breakover voltage of SCR decreases with increase in A) Cathode current

2] In the forward blocking mode of a silicon controlled rectifier, the SCR is 1] in off state

Q1) Describe two transistor model

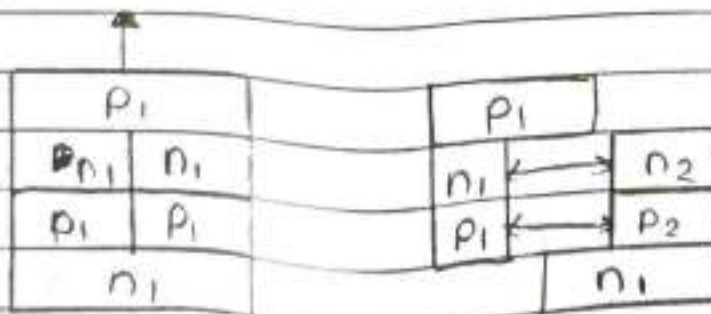
Q2)

Q3) Describe two transistor model of thyristor with neat diagram. Draw its equivalent circuit.

Ans. The PNP waveform of thyristor can be considered as the two transistors T_1 & T_2 connected in cascode mode, as shown in fig. T_1 & T_2 are PNP & NPN transistors such as the collector of the T_1 provides the base drive for T_2 . The gate current & collector current T_1 provides the base current T_2 . When a small base current is supplied to the base of T_2 , it collects a current βI_B which is amplified current generator very large collector current for T_2 .

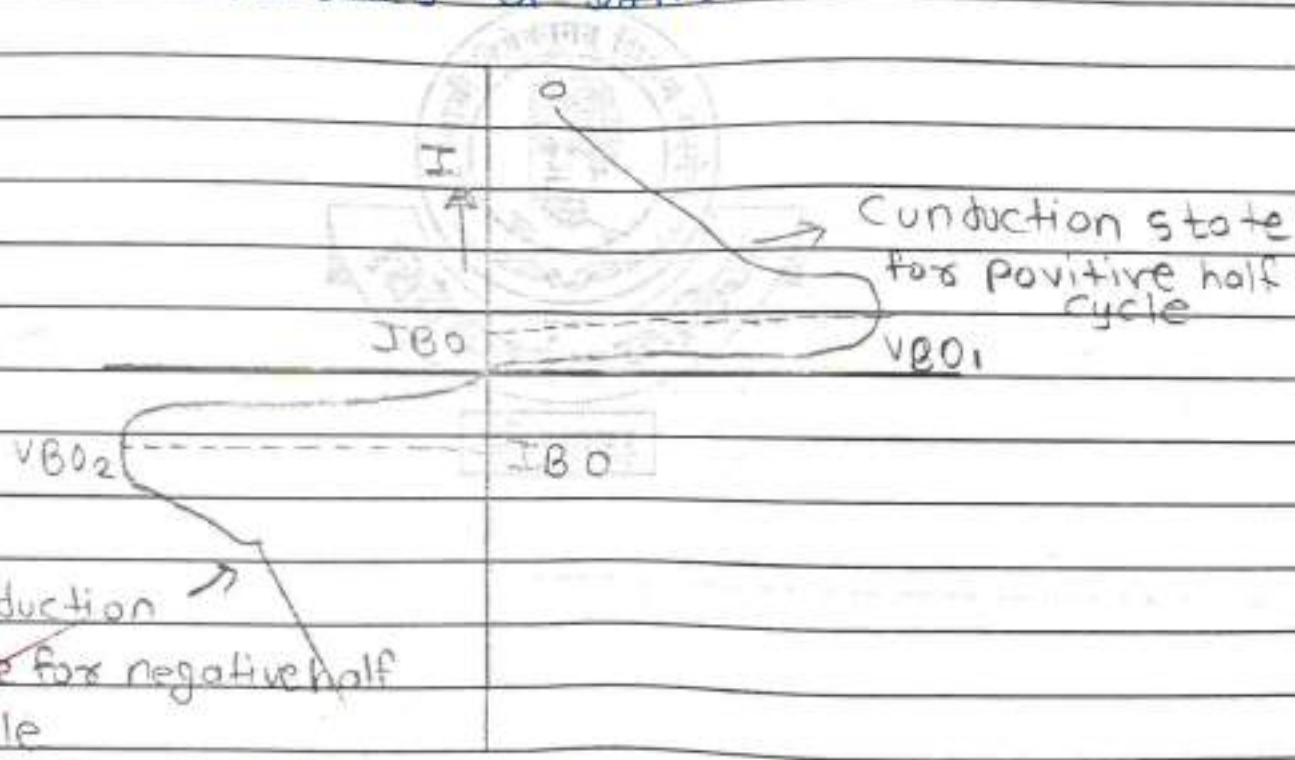
This current is again supplied to the base of T_1 . Thus the positive feedback is initiated & within few microseconds, saturation is immediately reached. The current is only limited by the external load connected with transistors for any bipolar transistors. $I_C = \alpha I_E + I_{CBO}$.

Diagram of two transistor as shown in figure:-



Q2] Explain the operation & V-I characteristics of DIAC.

Ans V-I characteristics of DIAC.



The V-I characteristics curve of DIAC will be in the shape of a 2. The curve will be laying on the first & third quadrants, because they conducts both the positive & negative polarity first quadrant represents the positive half cycle & third quadrant represents negative half cycle.

Nikhil sunil Patil.

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Class : BSc III

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$\frac{6}{10}$ 2

Subject : Electronic's

Test / Tutorial No. :

Div. :

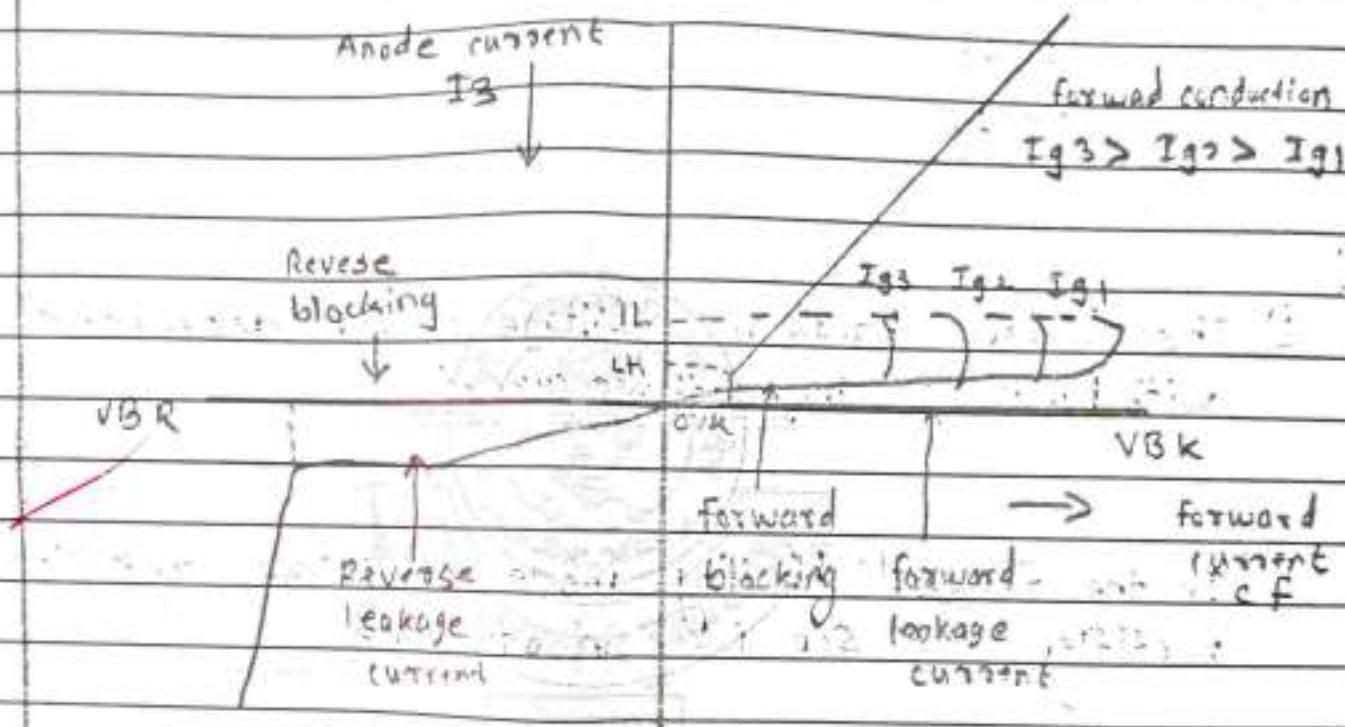
Q.11

- ① The forward break over voltage of SCR decreases with increase in cathode current.
- ② In the forward blocking mode of silicon controlled rectifier the SCR is in off state.

Q. 2 The method of SCR method. The Three different method of SCR

- ① forward blocking method mode
- ② Reverse blocking mode
- ③ forward conduction mode.

SCR



2 The characteristics of SCR

① forward blocking mode :-

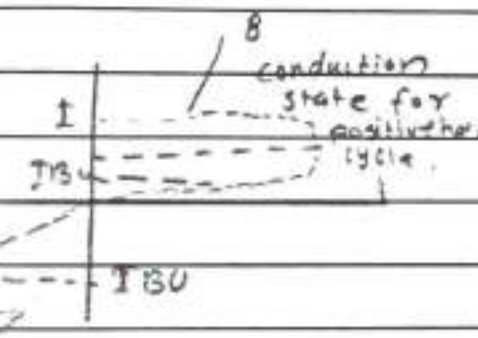
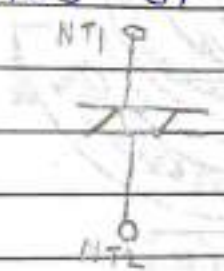
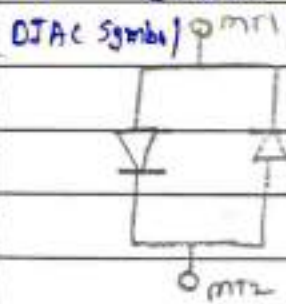
The blocking mode SCR is very high resistance current. The SCR Act forward blocking mode current flowing of the SCR.

Reverse Blocking mode:-

A negative mode voltage applied to the anode and positive to cathode. The SCR is in reversible mode making J_1 and J_3 reversed biased J_2 forward biased. Two diodes connected in series with a small leakage current is called Reverse Blocking mode.

forward conduction mode :- This mode creating voltage between anode and cathode beyond the breakover voltage or by applying a positive pulse of the gate called forward conduction mode.

2. V-I characteristics of DIAC



DIAC is the symbol of given as three diodes are connected parallel and opposite to on another and this has two terminal

The V-I characteristics of diac will be to shape of Z and curve will be lying on quadrant 3rd and generated first because they conduct the positive half cycle in first quadrant and negative half cycle in third quadrant. The first quadrant represent the half cycle where current will be flow from MT1 and MT2. The Third quadrant represent the negative half cycle, where the current flow from MT2 to MT1.

→ ① DIAC is the Alternating current. Two Terminal five layer of directional semi conductivity. Switch can be both forward resistor reverse direction. The DIAC symbol family: Intergrated.



Name :- Shivani Dipak Tedakar

08/10

॥ ज्ञान, विज्ञान आणि सुरास्कार यांसाठी शिक्षण प्रसार ॥

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SUPPLIMENT

Suppliment No. :

Roll No. : 8373

Class : BSC III

Signature
of
Supervisor

Subject : Electronics

Test / Tutorial No. :

Div. :

Q.1

- 1) Programmable Read only memory is one time programmable
- 2) vertical and horizontal directions in FPGA are separated by a line

Q.2

1) Clock distribution topologies -

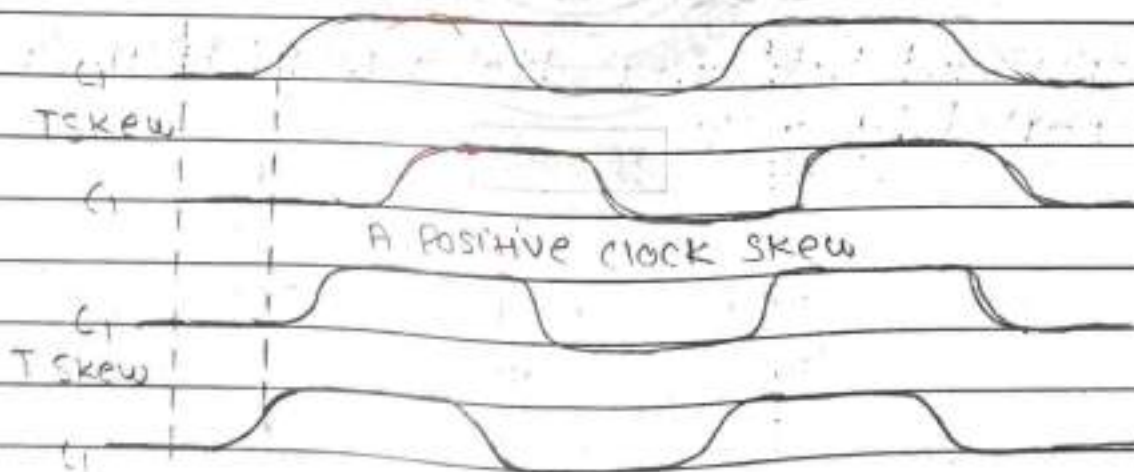
1) The clock distribution network is the metal and the buffer network that distribute clock to all clocked element.

2) A clock generator is a circuit that produces a timing signal for use in synchronised system's operation

3) Its most basic level, a clock generator consists of a resonant circuit and an amplifier

4) The resonant circuit is usually a quartz piezo-electric oscillator or MEMS resonator although simple tank circuit and even RC circuits may be used in some cases.

Example - clock skew



A negative clock skew.

Skew - It is phenomenon in synchronous circuits in which the clock signal arrives at different components at different times.

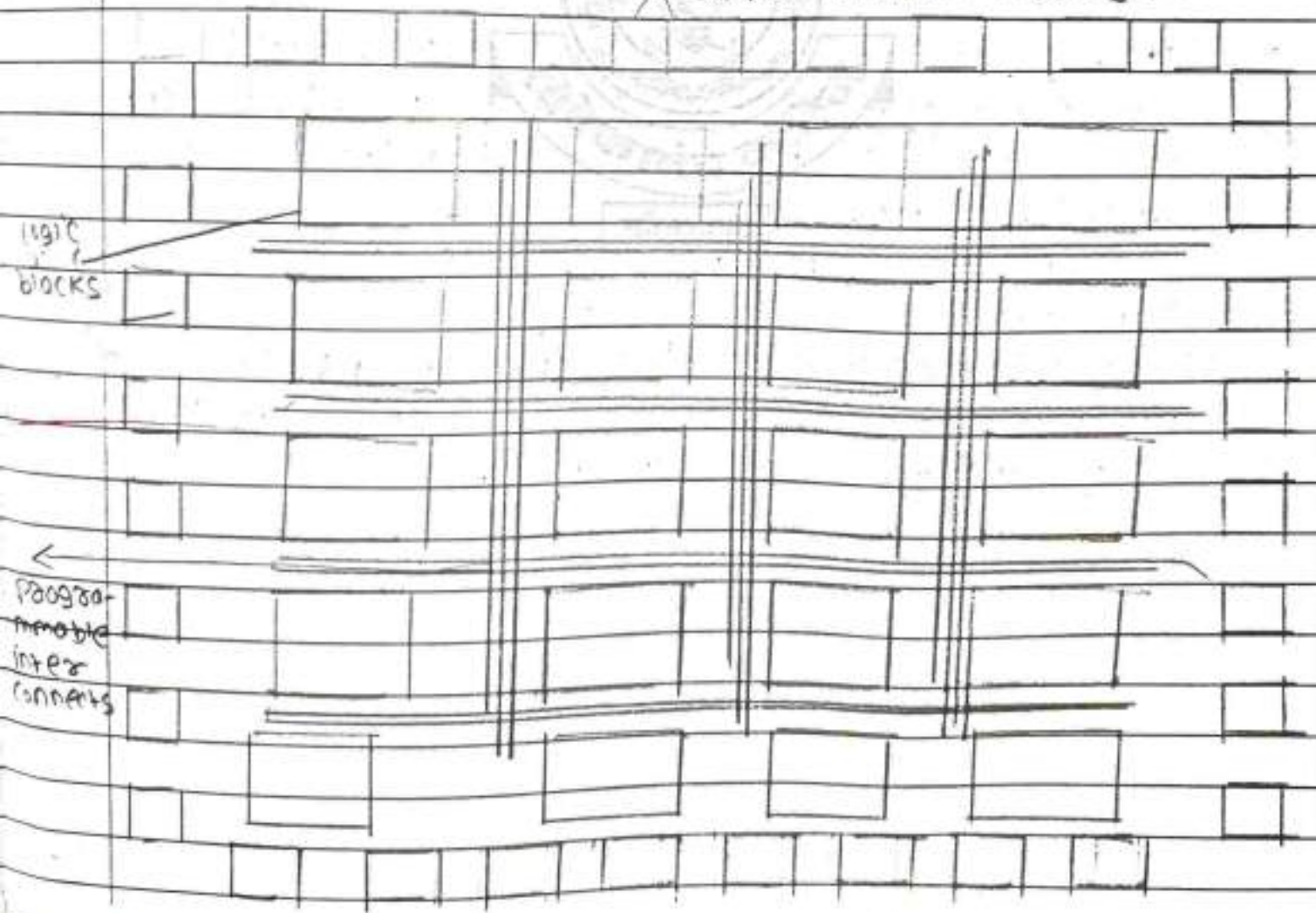
- clock skew is due to the unbalanced of the data.
- strategies to remove skew is
 - a) locate all clock inputs close together; but it is difficult implement in a large circuit.
 - b) Derive them from the same source and balance the delays.

2)

→ FPGA :

↳ circuit design is done in Hardware description language which is then synthesized to bit stream before into FPGA.

Input output blocks.



Above fig. show the architecture of FPGA containing array of logic blocks, switch blocks, interconnects, I/O blocks.

1) Configurable logic blocks (CLBs)

Provides function elements for constructing the user logic.

2) Input-output blocks (IOBs)

Provide the interface between package pins and internal signal lines.

3) Programmable interconnects resource provides the routing path to the input and output of the configurable element.

4) Logic blocks are arranged in two dimensional arrays.

5) Hierarchy of programmable interconnects is programmed to complex circuit.

6) Desired logic blocks is implemented using this logic blocks, then connected together using switches box.

7) Complex designs are first divided into small functions.

8) Logic blocks are used to implement these sub functions and connections are made together using configurable elements.

Q.1. Select the correct alternative

1. Programmable Read Only Memory is.....

- a) One time programmable b) two time programmable
c) Many time programmable d) none of these

2. Vertical and horizontal directions in FPGA are separated by _____

- a) a channel b) a line
c) a flip-flop d) a strobe

Q.2. Solve any Two

(4*2=8M)

1. What are the clock distribution topologies? Explain any one of them.
2. Explain the architecture of FPGA with block diagram.
3. Explain with neat diagram Programmable array Logic (PAL).
4. Write a short note on Programmable Read Only Memory (PROM)

Q.1. Select the correct alternative

(2 M)

3. Programmable Read Only Memory is.....

- a) One time programmable b) two time programmable
c) Many time programmable d) none of these

4. Vertical and horizontal directions in FPGA are separated by _____

- a) a channel b) a line
c) a flip-flop d) a strobe

Q.2. Solve any Two

(4*2=8M)

5. What are the clock distribution topologies? Explain any one of them.
6. Explain the architecture of FPGA with block diagram.
7. Explain with neat diagram Programmable array Logic (PAL).
8. Write a short note on Programmable Read Only Memory (PROM)



Name :- Ketan Ashok Kamble.

eg/10

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Class : Bsc III

Subject : FPGA & VHDL

Test / Tutorial No. :

Div. :

Q 1.

1) Programmable Read only Memory is

→ A) one time programmable

2) Vertical and horizontal directions in FPGA are separated by

→ B) a line.

Q 2)

2)

Input/output blocks

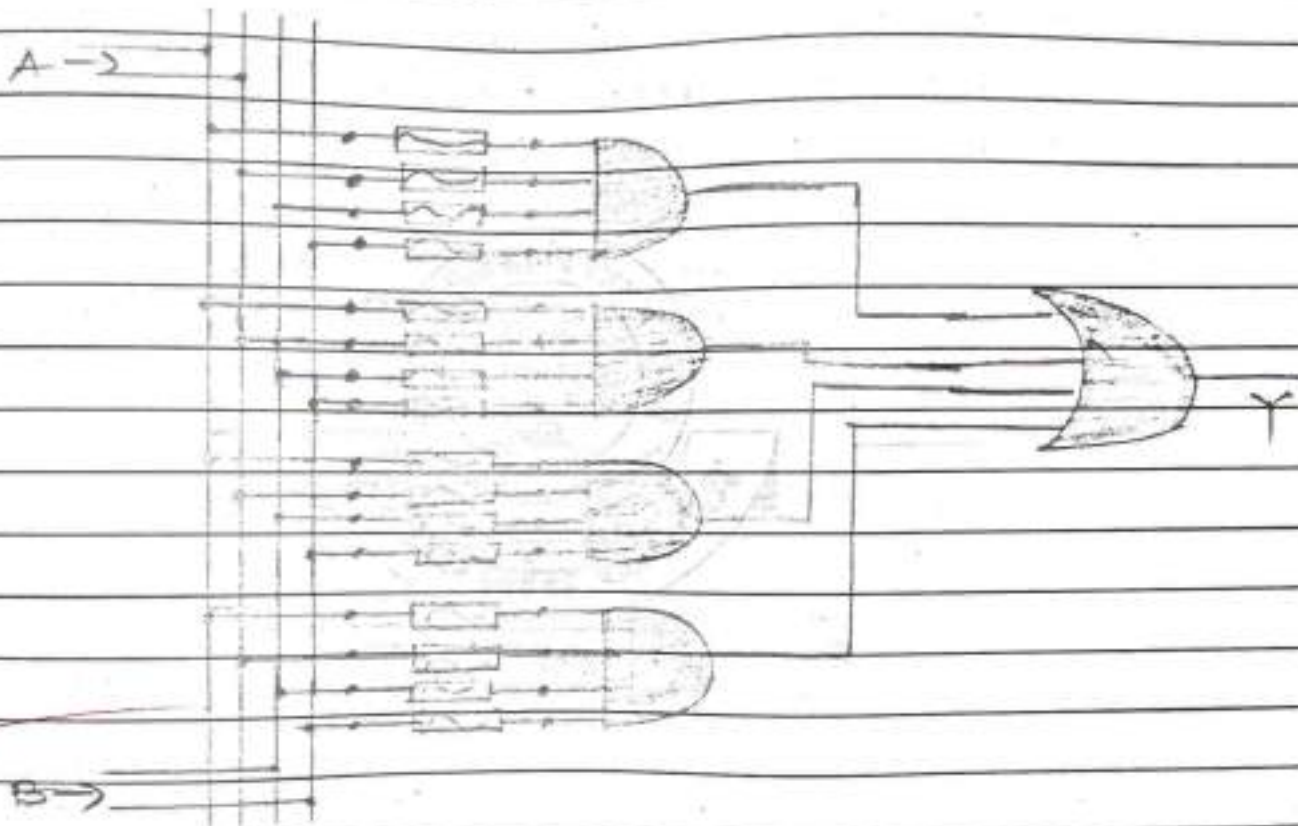


Logic
Blocks

- 1) Configurable Logic Blocks (CLB) provide the functional elements for constructing the user logic.
- 2) Input output blocks provide the interface between the package pins and internal signal line.
- 3) Programmable interconnect the input and output of the configurable element.
- 4) Logic block in FPGA architecture are arranged in two dimensional arrays.

- 5) Hierarchy of reconfigurable interconnects is then programmed to implement complex circuit.
- 6) complex designed are first divided into small functions.

3)



The programmable logic Array (PAL) it is used logical function and digital circuit into two structure of the A PAL.

TO - detected AND array. OR array in this AND array programmable that means connections to be the input of each AND gate through fuses.

Input	programmable AND array	fixed OR array	output
-------	------------------------	----------------	--------

AND array is followed by fixed OR array
In this figure shows programmable array
logic device with only two input this
inverted and non-inverted input are
connected to the AND gate. through fuses
output of the AND gate directly connected
to the OR Gate.

Any two input logic function can be realised
using the input AND gates.

for ex. consider on X-OR gate input
are labelled as a A and B output is Y.

$$Y = AB' + A'B$$

Muskan Krishankar Maurya

10/10

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांच्याशी शिक्षण प्रसार ॥

- शिक्षणपध्दती डॉ. बापूजी साबुंबे

08346

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Subject : FPGA & VHDL Programming

Test / Tutorial No. : Internal Exam

Div. : -

Q1

1) Programmable read only memory is One time program

2) Vertical & horizontal direction in FPGA are the separated by a channel.

Q2

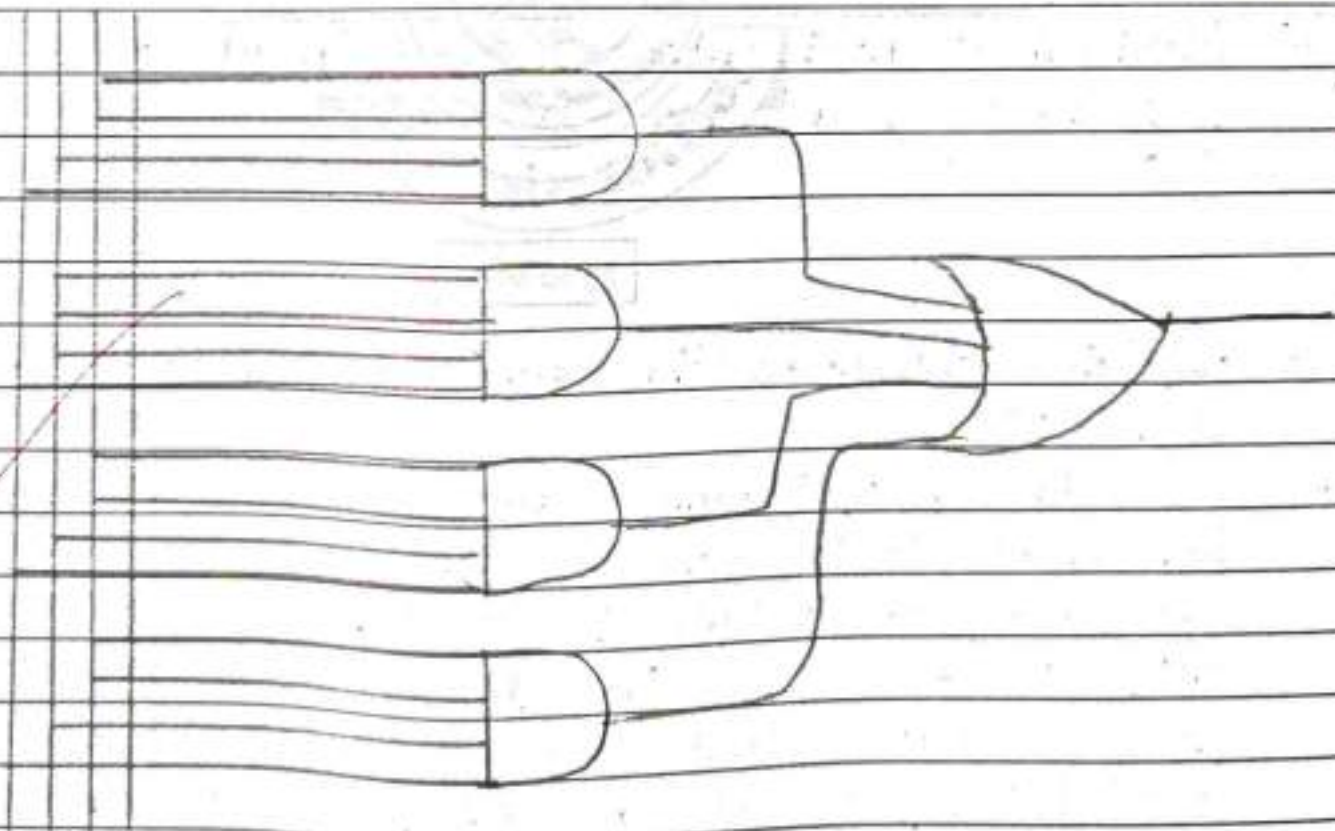
3) Explain with neat diagram programmable array logic (PAL).

Ans PAL programming array logic is used to implement logic function in digital circuits. Structure of a PAL is divided into a two parts AND & OR array. In this AND array is when a programmable that means connection two the inputs of each & AND gate is through fuses therefore when particular input is not required to implement using a specific logic function. it can be burned off. AND array is following by a fixed or array. It is used to be sum

off output from all AND gate array. Therefore no changes can be made in this section of PAL devices.

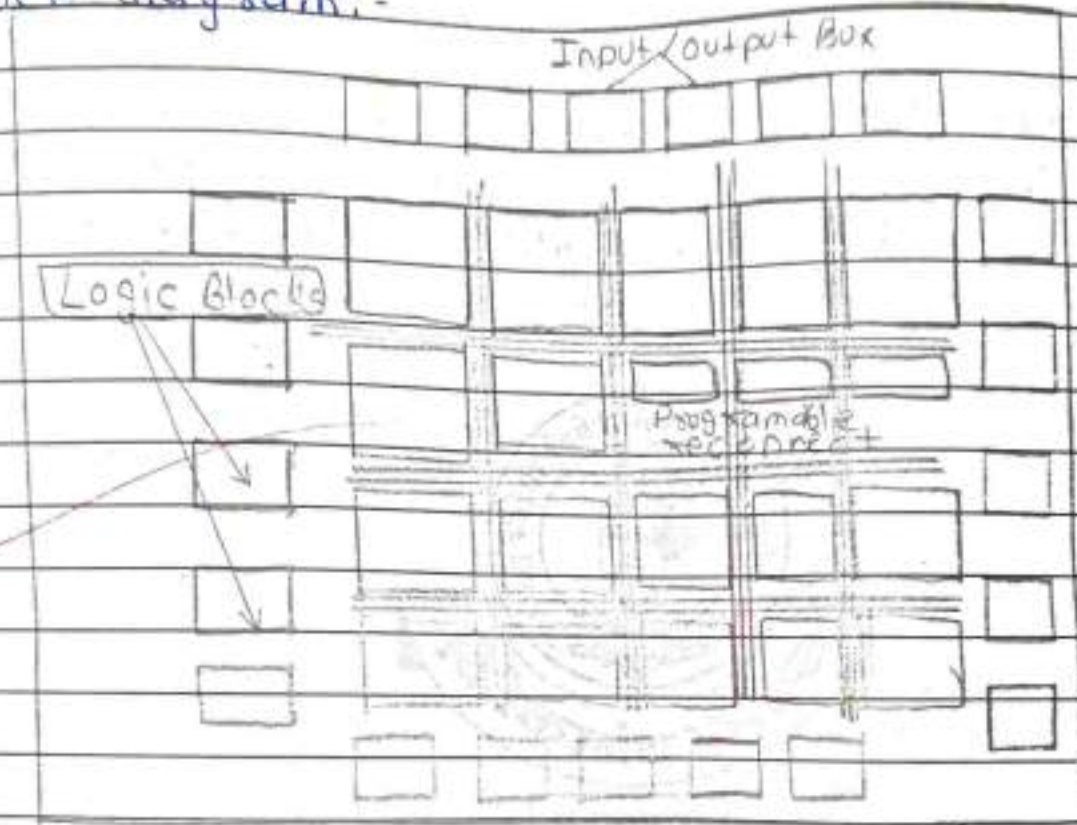


Internal structure of two input PAL logic. The simplest programmable logic device with only two inputs internal internet & non-internated inputs are connected to the AND through few fuses output from AND gate is then directly connected to the or gate. Any two input logic function can be realized using this device by burning of the unwanted fuses at the input of each AND gate.



2) Explain with the architecture of FPGA with block diagram.

Ans Circuit design is done in hardware description language. Which is synthesized to the bit streams before burning into FPGA core.
Block diagram:-



FPGA architecture is shown as following:-

- ① Configurable Logic Blocks (CLBs)
Provide the functional elements for constructing & integrate the user's logic.
- ② Input output blocks.
Provide interface between the package pins & internal signal lines.
- ③ Programmable interconnect resource provide in two dimensional arrays.

- ④ Logic blocks in architecture are arranged in two dimensional arrays.
- ⑤ complex designs are first divided into small functions.
- ⑥ Logic blocks by used to impliment this two sub function & conections are made using programmable interconnects.
- ⑦ Programmable interconnects resource provide ~~as~~ routing paths to connects into inputs & outputs of the configurable elements.

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09/10

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Test / Tutorial No. : internal programming

Div. :

Q1)

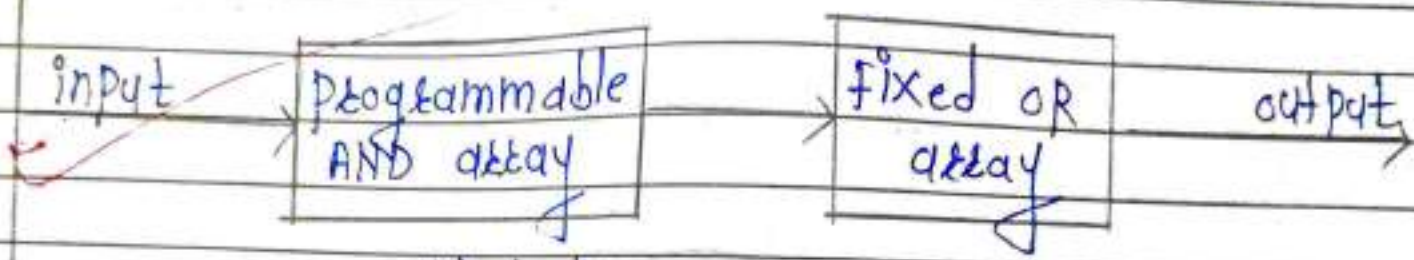
3) a) one time programmable

4) b) a line

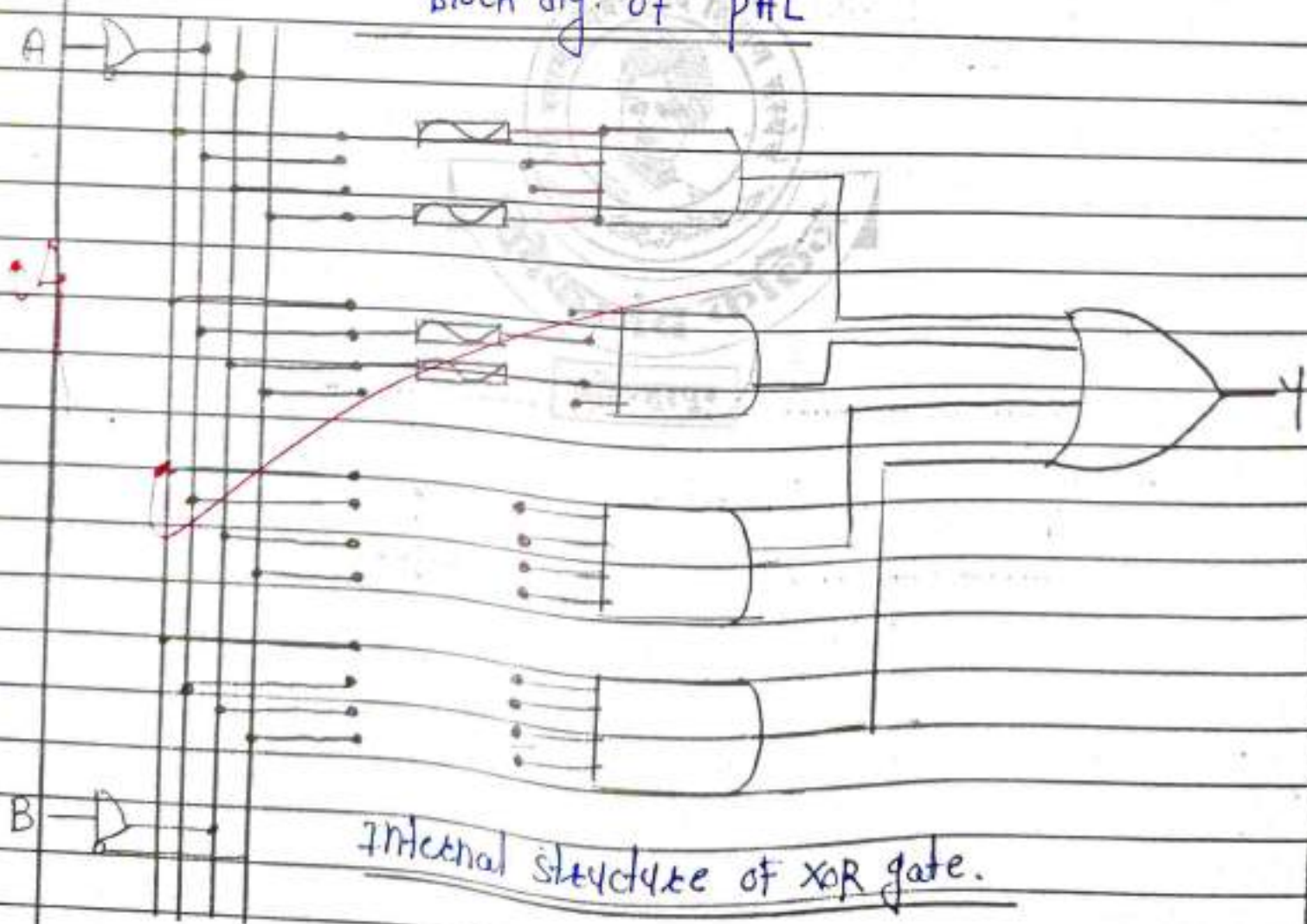


Q2)
 7) Programmable array logic (PAL):-

The programmable array logic is used to implement logic function in digital circuit. The structure of programmable array logic is divided into two parts. AND and OR array. In this array AND is programmable and OR array is fixed.



Block dig. of PAL



Internal structure of XOR gate.

If we consider an example of XOR gate, we consider input $= A'$ and $= B$ the output is given by,

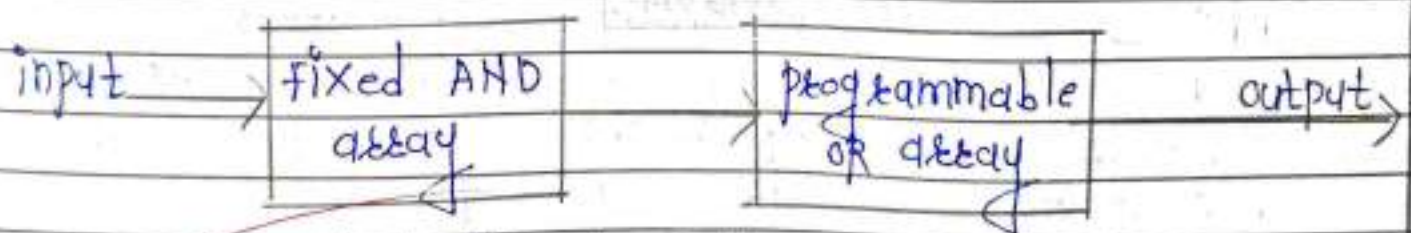
$$Y = AB' + A'B$$

In this below dig. of XOR gate.

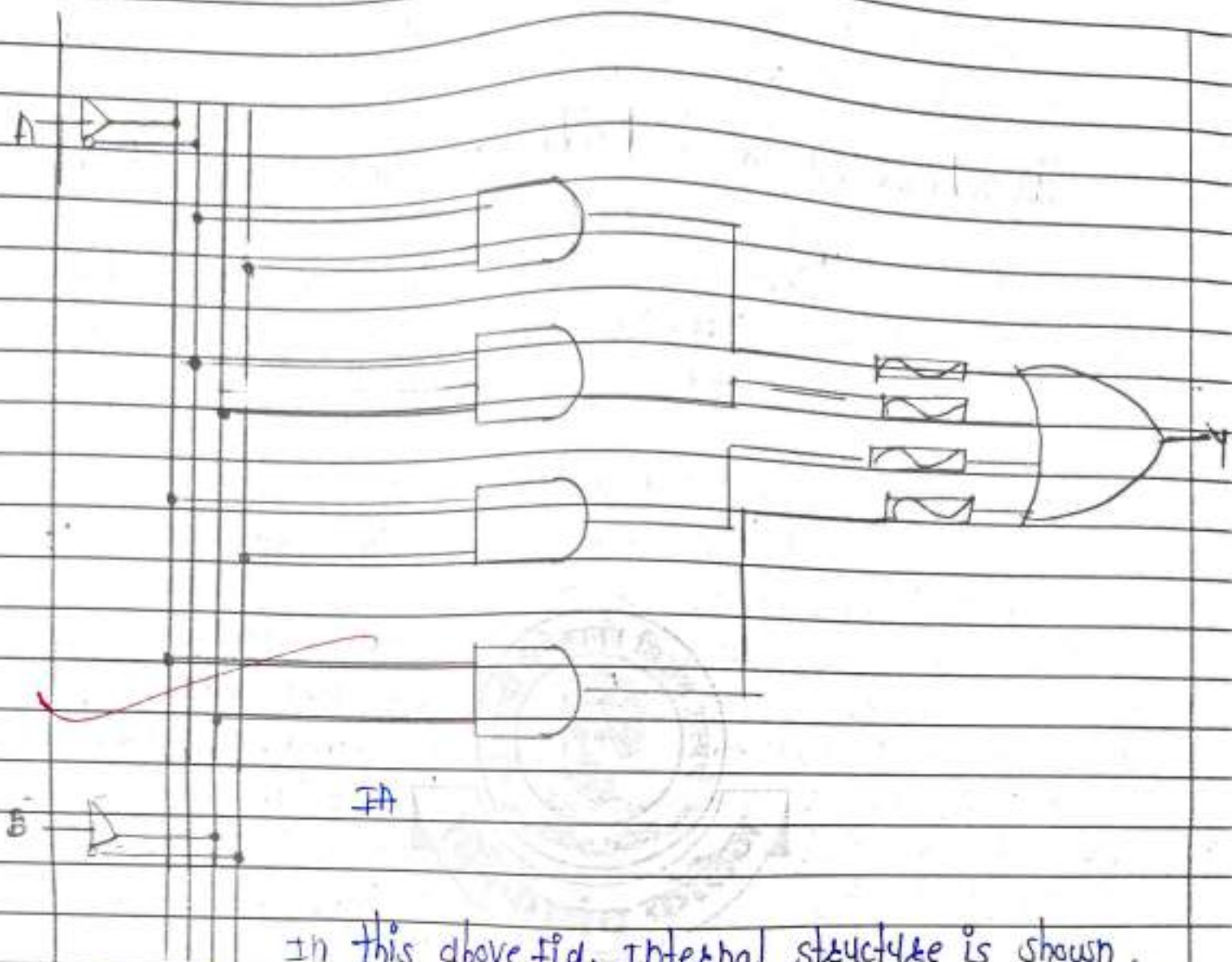
AB' is the first input of AND gate and $A'B$ is the second input of AND gate. Rest two inputs in AND gate is not needed therefore respective fuses turned off.

8) programmable read only memory (PROM): -

programmable read only memory is a memory chip in which the data can be written only once. once the data written into the PROM PAL it is also called one-time programmable memory. The structure of programmable read only memory divided into two parts. In programmable read only memory is inverse of the programmable array logic. In this AND array is fixed. and OR array is programmable.



Block dig. of PROM



In this above fig. Internal structure is shown. A and B are the address input and y is the output. AND array is fixed to select each row of corresponding inputs the data in each memory location is determined by the fuses in OR array. If the fuse is not burned off, charge send through row is received at output, indicating a logic one and when the fuse is burned, detected as logic zero, Thus PROM binary data is stored in fuses.

Example :- Multiplexer, Demultiplexer etc.

08/10

Sakshi Tushar Bhapale.

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Subject : FPGA

Test / Tutorial No. : Internal Exam

Div. :

1) Programmable Read only memory is one time programmable

2) Vertical and horizontal directions in FPGA are separated by a line

Q.2]

2] FPGA

FPGA stands for field programmable Gate Array. A circuit design done in Hardware Description Language and then synthesized to bit stream before burning FPGA code.

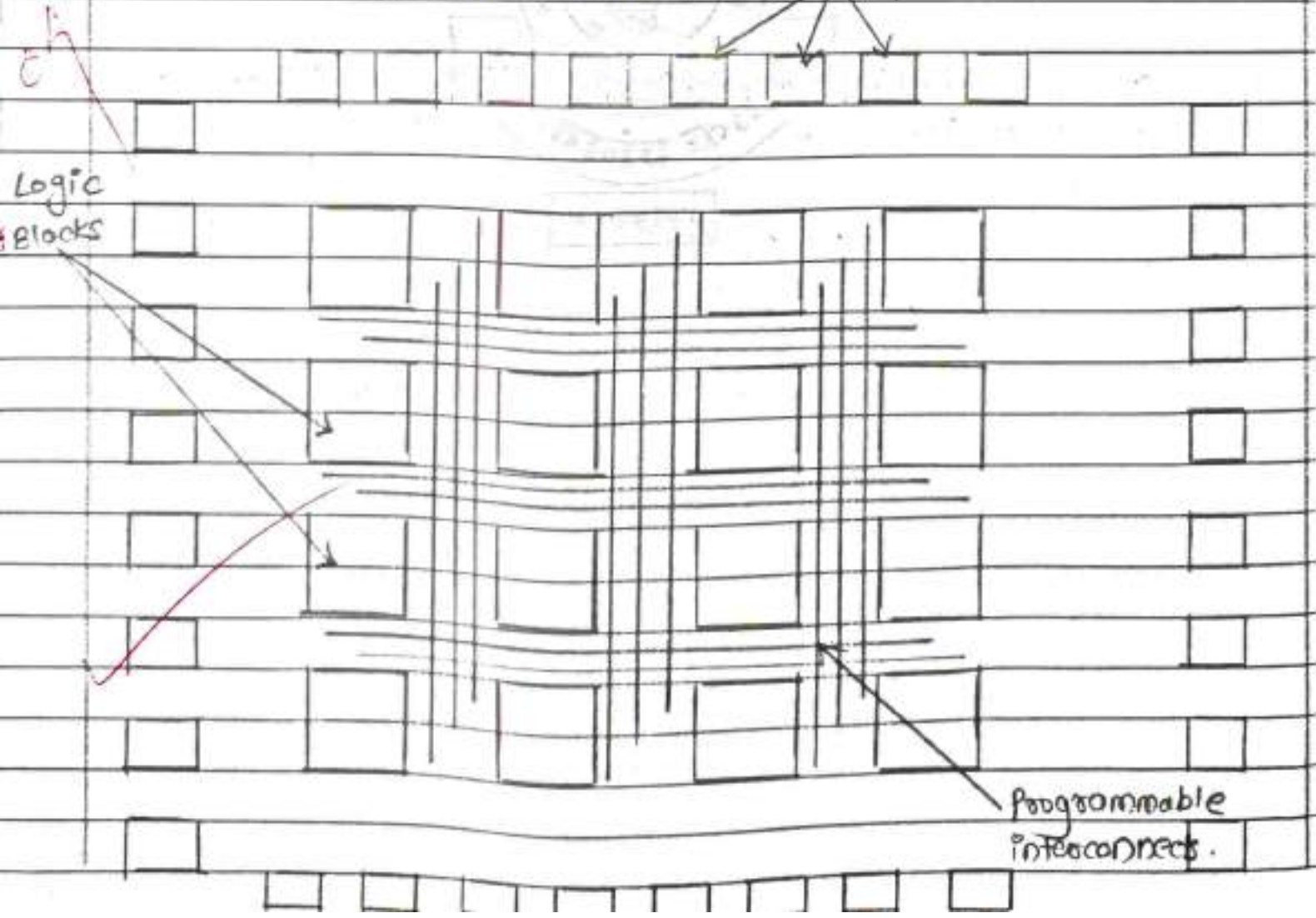
Synthesis is a process where the VHDL is compiled and mapped into implementation technology such as FPGA.

A bit stream is also known as ~~the~~ binary sequence.

FPGA devices :

- ~~Altera~~ Altera
- Atmel
- Actel
- Nantis
- Phillis.

Input-Output blocks..



Above figure show the architecture of FPGA containing arrays of logic blocks, switch blocks, interconnects, I/O blocks.

1) Configurable logic blocks (CLBs)

Provides function elements for constructing the user's logic.

2) Input-output blocks (IOBs)

Provides the interface between package pins and internal signal lines.

3) Programmable interconnects resource provides the routing path to the input and output of the configurable elements.

4) Logic blocks are arranged in two dimensional arrays.

5) Hierarchy of programmable interconnects is the programmed to complex circuits.

6) Desired logic blocks is implemented using this logic blocks, then connected together using switches box.

7) Complex designs are first divided into small functions.

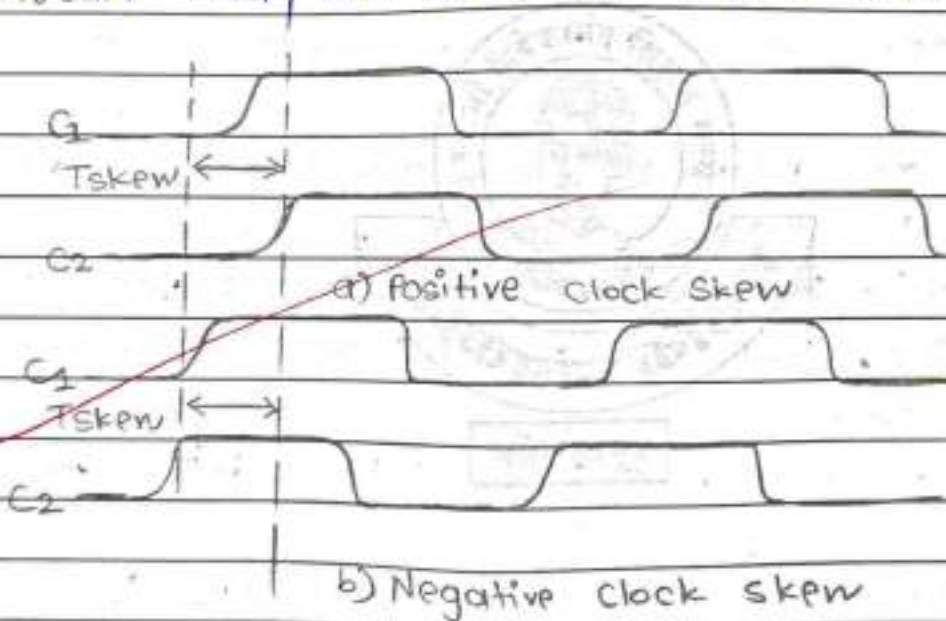
8) Logic blocks are used to implement these sub functions and connections are made together using configurable elements.

1) The clock distribution network is the metal and buffer network that distribute clock to all clocked elements.

A clock generator is a circuit that produces a timing signal for use in synthesized system operation.

Its most basic level, a clock generator consist of a resonant circuit and an amplifier.

The resonant circuit is usually a quartz-B, piezo-electric oscillator or MEMS resonator, although simple tank circuit and even RC circuit may be used in some cases.



skew: It is phenomenon in synchronous circuits in which the ~~the~~ clock signal arrives at different components in different times.
clock skew due to unbalanced data.

Strategies

- 1) locate all clock inputs close together but it is difficult implement in a large circuits.
- 2) Derive a them from the same source and balance the delays.