KINGS COLLEGE OF ENGINEERING

Recognised under 2(f) & 12(B) of UGC
Approved by AICTE, New Delhi.
Affiliated to Anna University, Chennai.

ACCREDITED WITH GRADE B++ NAAC

ACADEMIC YEAR 2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

STRUCTURAL ANALAYSIS - I

DISTRIBUTION AND CARRY OVER FACTOR

ASSIGNMENT NO :- 2

05/10/2023

NAME :- J. MOHAMMED RIYAS

CLASS :- 3rd YEAR CIVIL

SUB :- SA-I

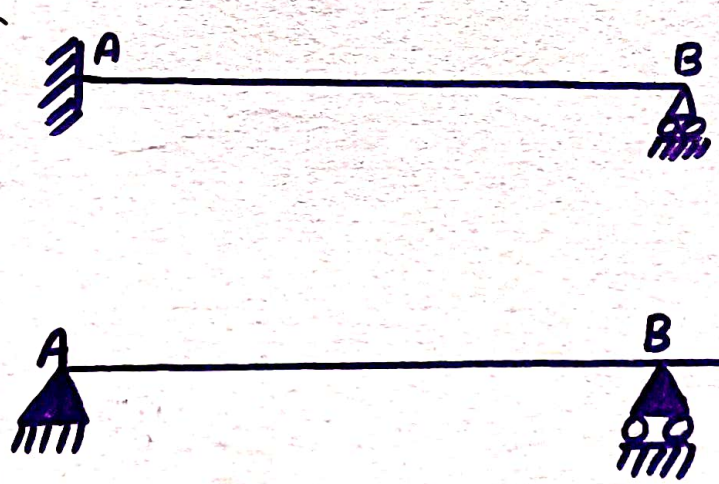
SUB CODE :- CE 3502

DATE :- 05/10/2023

Distribution Factor :-

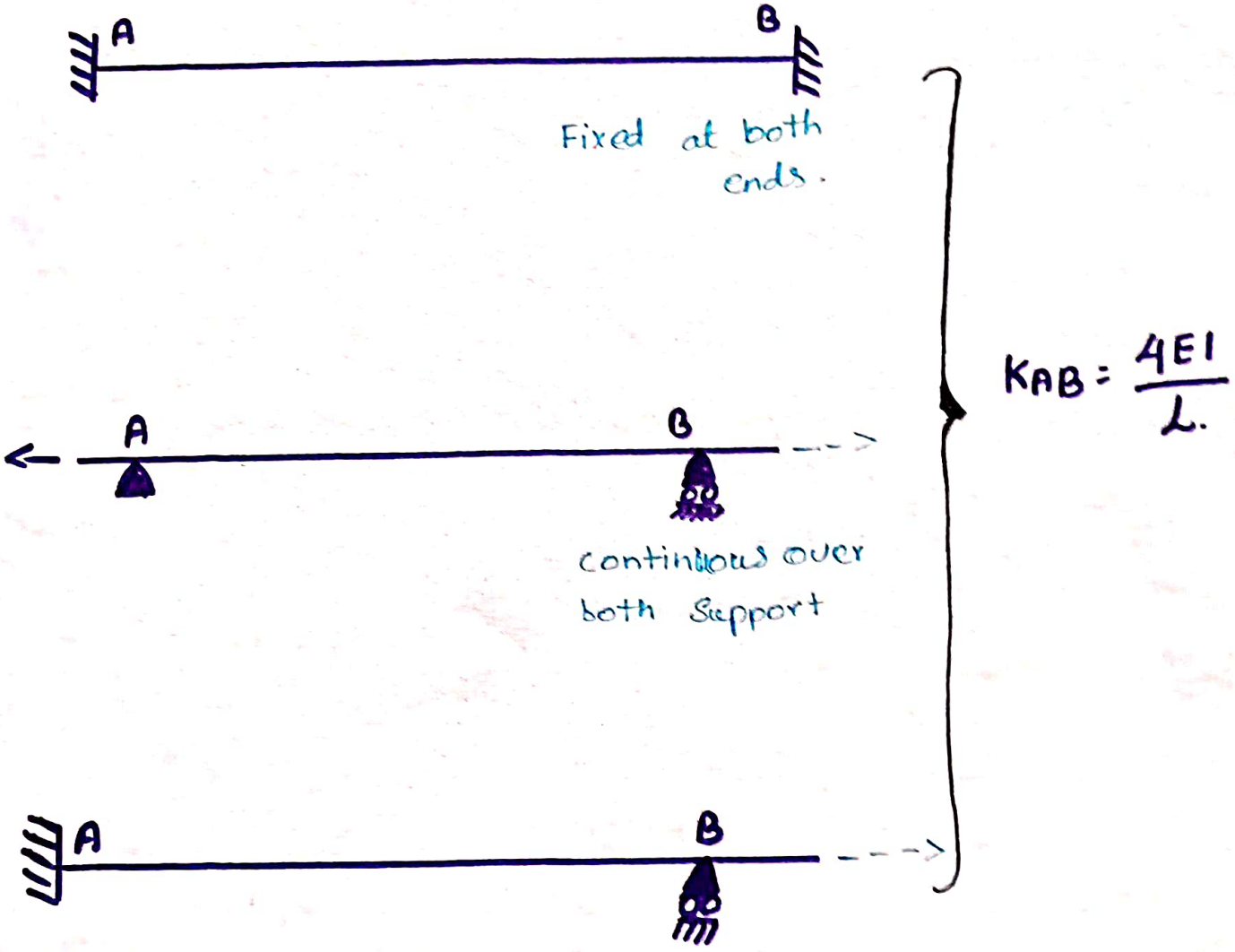
The (DF) for a member at a joint is the ratio of the stiffness (or relative stiffness) of the member to the total stiffness (or total relative stiffness) of all the members meeting at a joint

$$K_{AB} = \frac{3EI}{L}$$



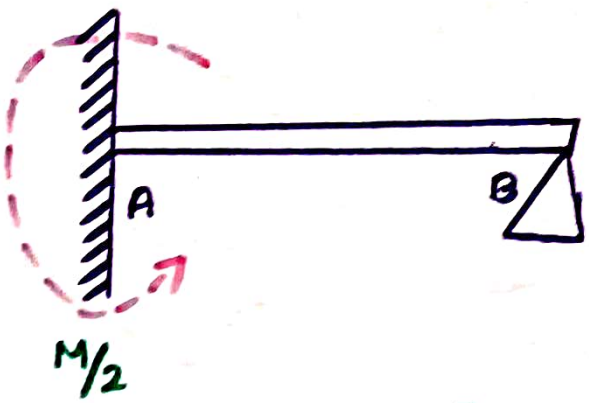
Fixed at one end and pinned at the other without continuity.

Pinned at one end and continuous at the other


A
B
Fixed at both ends.
A
B
continuous over both Support
A
B
Fixed at one end and continuous at the other.
$K_{AB} = \frac{4EI}{L}$

Carry Over Factor :-

It is the Ratio of Moment Transferred to the for end and moment applied to the other end of the beam. **Distribution factor**. This the factor by which moment at the junction of beam is distribution to a beam.



Carry over factor = $\frac{M_{AB}}{M_{BA}}$

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2023-2024 (ODD SEM)

CE3502 – STRUCTURAL ANALYSIS I

PCE ACTIVITY - SEMINAR

ANALYSIS OF TRUSSES

PRESENTATION BY
M.SANJAIMANI
III YR CIVIL
KCE

30/08/23

ANALYSIS OF TRUSSES

While analyzing a truss structure, a person needs to assume some things to keep things simple:

1.The joint is where the entire load is applied, and all other forces on the member are to be neglected.

2.The weight of a member is very insignificant to the amount of load that has been applied to it. Hence, it will not be considered in further calculations. However, some methods may take in account half of the weight of the member as acting on each individual joint of the member.

6

Truss Analysis

MAINLY THERE ARE ONLY TWO TYPES OF TRUSSES

(1)Perfect truss
(2)Imperfect truss
(a)Deficient truss
(b)Redundant truss

(1)PERFECT TRUSS:-

A pin jointed truss which has get just sufficient number of members to resist the load without under-going any deformation in shape is called a perfect truss.

Triangular frames is the simplest perfect truss and has three joints and three members.

There is a mathematical formula by which we decide the given truss is perfect or imperfect

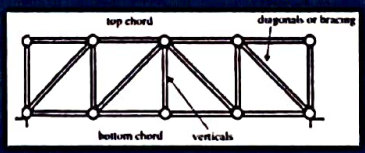
$$m=2j-r$$

m=number of members
J=number of joints
R=number of support reaction component

7

WHAT IS TRUSS?

- A truss is a structure comprising one or more triangular units constructed with straight members whose ends are connected at joints.
- If all the bars lie in a plane, the structure is a planar truss.
- The main parts of a planar truss.



(2)IMPERFECT TRUSS:-

A truss which doesn't satisfies the relation m=2j-r is called an imperfect truss

Following are the two imperfect trusses.

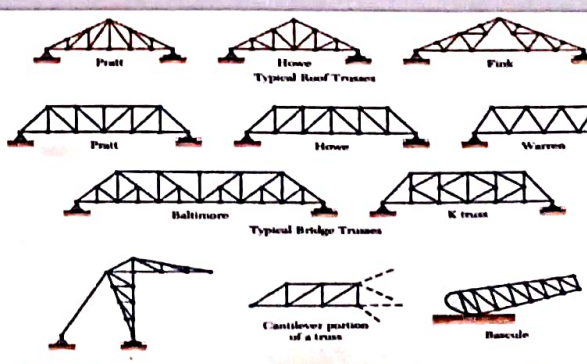
a)Imperfect deficient truss:-

A truss which satisfies the relation m<2j-r is called a deficient truss . It is unstable and may collapse under external forces.

(b)Imperfect redundant truss:-

A truss which satisfies the relation m>2j-r is called a redundant truss.it can't be completely analysed by static equilibrium condition , Therefore it is an indeterminate structure

There are many types of trusses available here, I am showing some common types of trusses.



SPECIAL CASE:-

In general we should not cut more than three members because we have three equations of equilibrium to find three unknown, but in exceptional cases we found that , there are many members are collinear. Then in this condition more than three member can cut. After which choose a centre through which some moment becomes zero and required unknown calculated.

Advantage of section method:-

In section method we do not have to analyse the entire truss if any intermediate member force is desired to be obtained . It can directly be obtained by selecting proper position of section , so it is less time consuming as compare to joint method.

=>Assumption for a perfect truss:-

(1)All the members of truss are straight and connected to each other at their ends by frictionless pins.
(2)All external forces are acting only at pins.
(3)All the members are assumed to be weightless.
(4)All the members of truss and external forces acting at pins lies in same plane.
(5)Static equilibrium condition is applicable for analysis of perfect truss.

I.e.,
summation of f in x=0
summation of f in y=0
Summation of f in z=0
Summation of moment at one point =0

APPLICATION:-

Trusses are usually designed to transmit forces over relatively long span. Common examples being bridge trusses , Roof trusses , Transmission tower etc... Truss is a building invent that allows the weight of a roof to be distributed to the outer walls for better support . Truss gives more support and allows the builders to use fewer materials to achieve any construction. It allows distribution of load. It increases the span of any construction like bridge or building.

Two force member concept:-

By the assumption of perfect truss , all the members of truss should have straight .Connected to each other at their ends by frictionless pins and no external force is acting in between their joint , identifies each truss member as a two force member which may be in tension or compression.
=> The two common techniques for computing the internal forces in a truss are the "Method of joints" and "Method of sections".

Truss Analysis Method of joints

Procedure for method of joints:-
(1)For simply supported truss , consider the F.B.D of entire truss. Applying condition of equilibrium and find support reaction
(2)Consider the F.B.D of joints from the truss at which not more than two member with unknown force exists.
(3)Assume the member to be in tension or compression by simple inspections and applying condition of equilibrium.to find the answers.
(4)The assumed sense can be verified from the obtained numerical results . A positive answer indicates that the sense is correct and vice versa.
(5)Select the new F.B.D of joints with not more than two unknowns in a member and repeat the points 3,4 and 5 for complete analysis,
(6)Finally calculate the answer in required member magnitude of force and their nature.

CONCLUSION:-

After study about truss, I conclude that concept of trusses are very useful in our real life , because concept of truss are help us to make bridge , roof , and tower etc... so trusses are very useful for us.it also have some disadvantage. In truss bridge, it takes up more space and can some-times become a distraction to drivers. It also have higher maintenance demand of all joint and fitting more calculation to determine that it will take the maximum load . Determination of forces in member is carry out by two process , method of joint & section . By this we conclude forces in each member and at each joint . Truss play a vital role in our surrounding i.e. everywhere like in bridge, building , roof top , etc.

Analysis in method of joints:-

While using the method of joints to calculate the forces in the member of truss, The equilibrium equation are applied to individual joints of the truss.
Consequently two independent equilibrium equations are available for each joints.
i.e. summation of f in x=0
summation of f in y=0

Special conditions

Identification of zero force member by inspections(without calculation)
(1)If any joint is identified without external force acting on it such that joint is formed by three members and two of them are collinear ,t hen the third non collinear member should be identified as zero force member.
(2)If any joint is formed by two non collinear members without any external force acting on it then both the members are identified as zero force members.

- (3)If any joint is formed such that only four forces are acting and are collinear in pairs then each collinear forces are equal.
- (4) If a given truss is symmetrical in geometry as well as in loading and support reactions are symmetrical then the forces in members on half side of symmetric is equal to the force in members on the other half.

THANK YOU

Method of sections for trusses

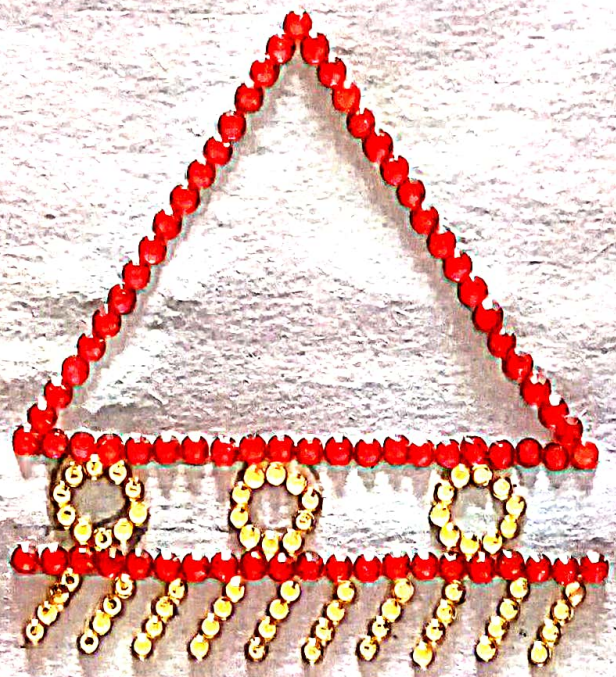
Procedure for method of sections
(1)Consider the F.B.D of entire truss and find the support reactions applying equilibrium conditions.
(2)Select the cutting sections to cut the truss into two parts such that it should not cut more than three unknown members.
(3)Select the F.B.D of any one of the two parts considering all internal and external forces acting on that part.
4)Assume tension or compression in the cut members and applying equilibrium condition it's numerical values can be obtained . If the obtained values is negative ,do the required change in nature of force.
(5)Though three equations of equilibrium are available
i.e.,
summation of f in x=0
summation of f in y=0
Summation of moment at one point =0
Preferable use "summation of M=0" by selecting appropriate point for moment such that two known passes through that point . Moment of center may or ,may not lie on the F.B.D of truss.
(6)Do not consider the effect of uncut member in F.B.D.

POSTER PRESENTATION

TOPIC

TYPES OF SUPPORTS

1. ROLLER SUPPORT

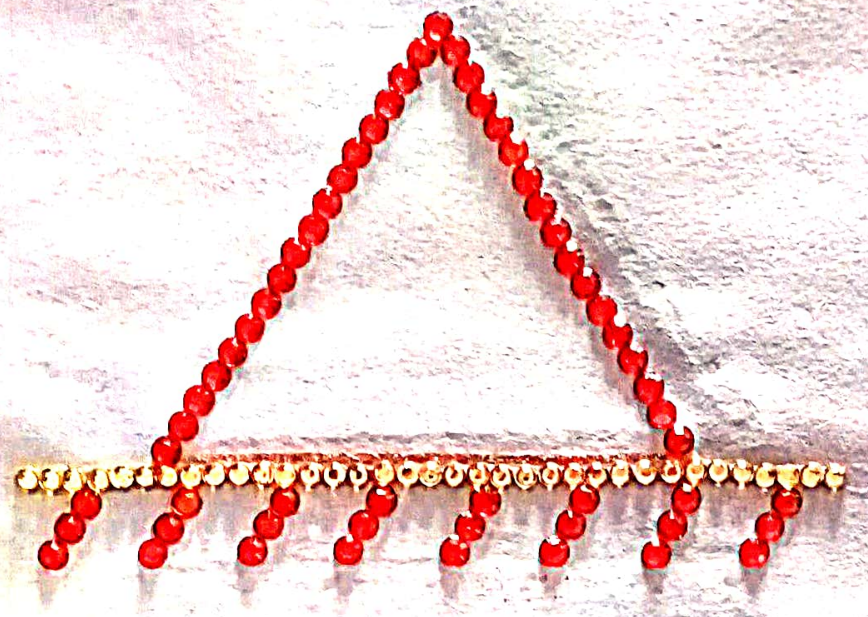


* A roller support allows rotation about any axis and translation (horizontal movement) in any direction parallel to the surface on which it rests.

* It restrains the structure from movement in a vertical direction.

* The idealized representation of a roller and its reaction are also shown.

2. HINGED SUPPORT



* If the beam is supported on hinge or pin then such a support is called as Hinged or pinned support

* In hinged support the beam cannot move in any direction.

* In hinged beam the reaction may be vertical (V_A), Horizontal (H_A) or Inclined (R) depending upon the type of loading.

3. FIXED SUPPORT

* If the end of the beam is fixed or built-in, then such a support is called as fixed support.

* In fixed support the reaction may be vertical (VA), Horizontal (HA) or Inclined (R) and in addition there will be a moment (MA) acting at fixed ea end as shown.

* It has three reaction.

APPLICATION OF CONCEPTS

Tension Co-efficient Method

CE 3502 - Structural Analysis

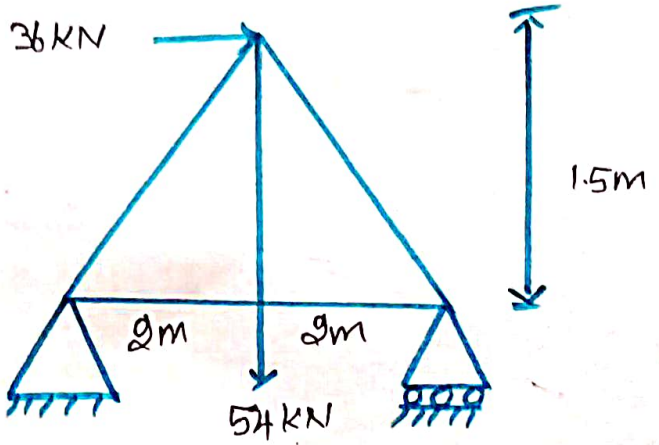
A0

30/08/2023

ASSIGNMENT NO: 1

NAME : M. Arun Kumar
class : III \ civil
Subject : Structural Analysis-1
Sub code : CE-3502
Roll NO : 21CE04
DATE : 04\09\2023

① using tension co-efficient method, analysis the plane truss show in the fig. and find the forces in the members.



Step 1 :-

$\sum M = 0$

=> Taking moment about A,

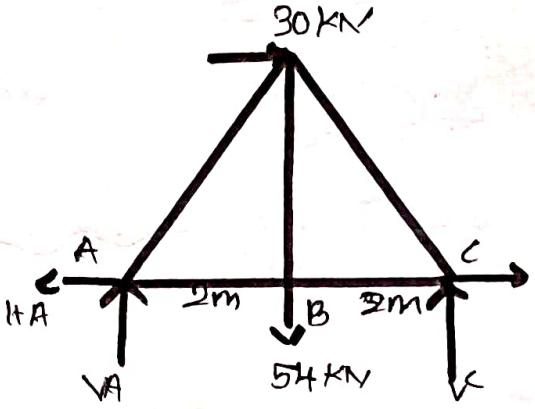
=> $54 \times 2 + 36 \times 1.5 - V_C \times 4m = 0$

=> $V_C = 40.5KN$

$\sum F_y = 0$

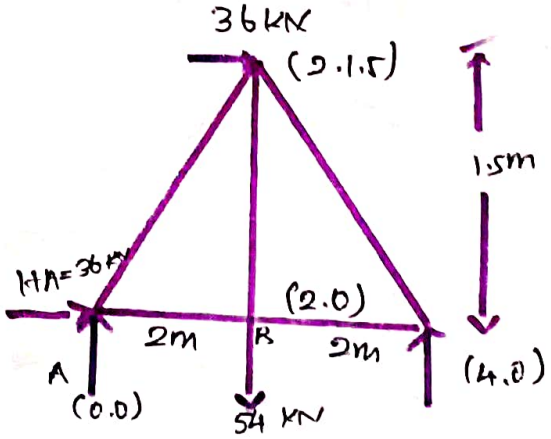
=> $V_A + V_C = 54$ => $V_A = 13.5KN$

$\sum F_x = 0$ => $-H_A + 36 = 0$ => $H_A = 36KN$



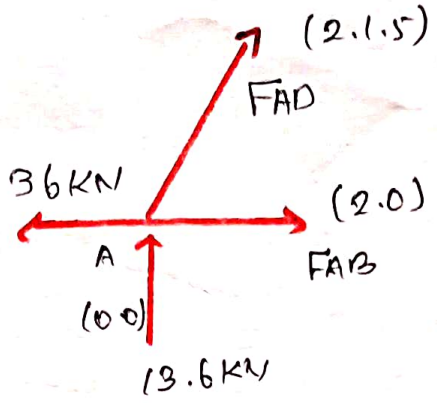
Step 2 :-

let A is origin.



Calculation of tension co-efficient :-

Consider Joint A,



$\Sigma F_x = 0 = \Sigma t_{ij} \cdot x_{ij} + x_i = 0$

$\Rightarrow t_{AB} \cdot x_{AB} + t_{AD} \cdot x_{AD} - 36 = 0$

$\Rightarrow 2t_{AB} + 2 \cdot t_{AD} = 36$

$\Rightarrow t_{AB} + t_{AD} = 18 \longrightarrow (1)$

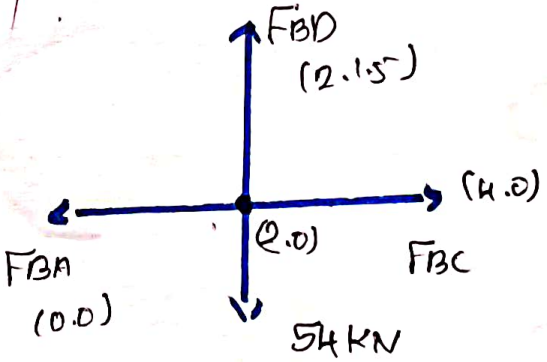
$\Sigma F_y = 0 \Rightarrow \Sigma t_{ij} \cdot y_{ij} + y_i = 0$

$\Rightarrow t_{AD} \cdot y_{AD} + y_i = 0$

$\Rightarrow t_{AB} \cdot 1.5 + 13.6 = 0 \Rightarrow t_{AD} = -13.6/1.5 = -9$ kN/m

$t_{AB} = 27$ kN/m

Consider Joint B:-



$\Sigma F_x = 0$

$\Rightarrow x_{BC} + t_{BC} + x_{BA} \cdot t_{BA} = 0$

$\Rightarrow (4-2)\, t_{BC} + (0-2)\, t_{BA} = 0$

$\Rightarrow 2t_{BC} - 2t_{BA} = 0$

$\Rightarrow t_{BC} = t_{BA} = 27$ kN/m

$\Sigma F_y = 0 \Rightarrow t_{BD} \cdot x_{BD} - 54 = 0$

$\Rightarrow t_{BD} \times 1.5 - 54 = 0 \Rightarrow t_{BD} = 36$ kN/m

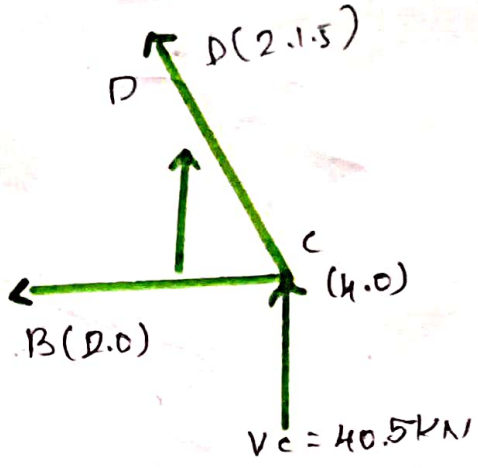
Consider Joint C:-

$\Sigma F_y = 0$

$\Rightarrow F_{CD} - Y_{CD} + 40.5 = 0$

$\Rightarrow 1.5 F_{CD} + 40.5 = 0$

$\Rightarrow F_{CD} = -27 KN/m$



Force in members by tension coefficient Method:-

Members	f_{ij}	L_{ij}	$T_{ij} = f_{ij} K L_{ij}$	Nature.
AB	27	2	54 KN	Tension
BC	27	2	54KN	"
CD	27	$\sqrt{2^2+1.5^2} = 2.5$	67.5KN	"
BE	-9	2.5	-22.5KN	Compression
BD	36	1.5	54 KN	Tension.

DEPARTMENT OF CIVIL ENGINEERING

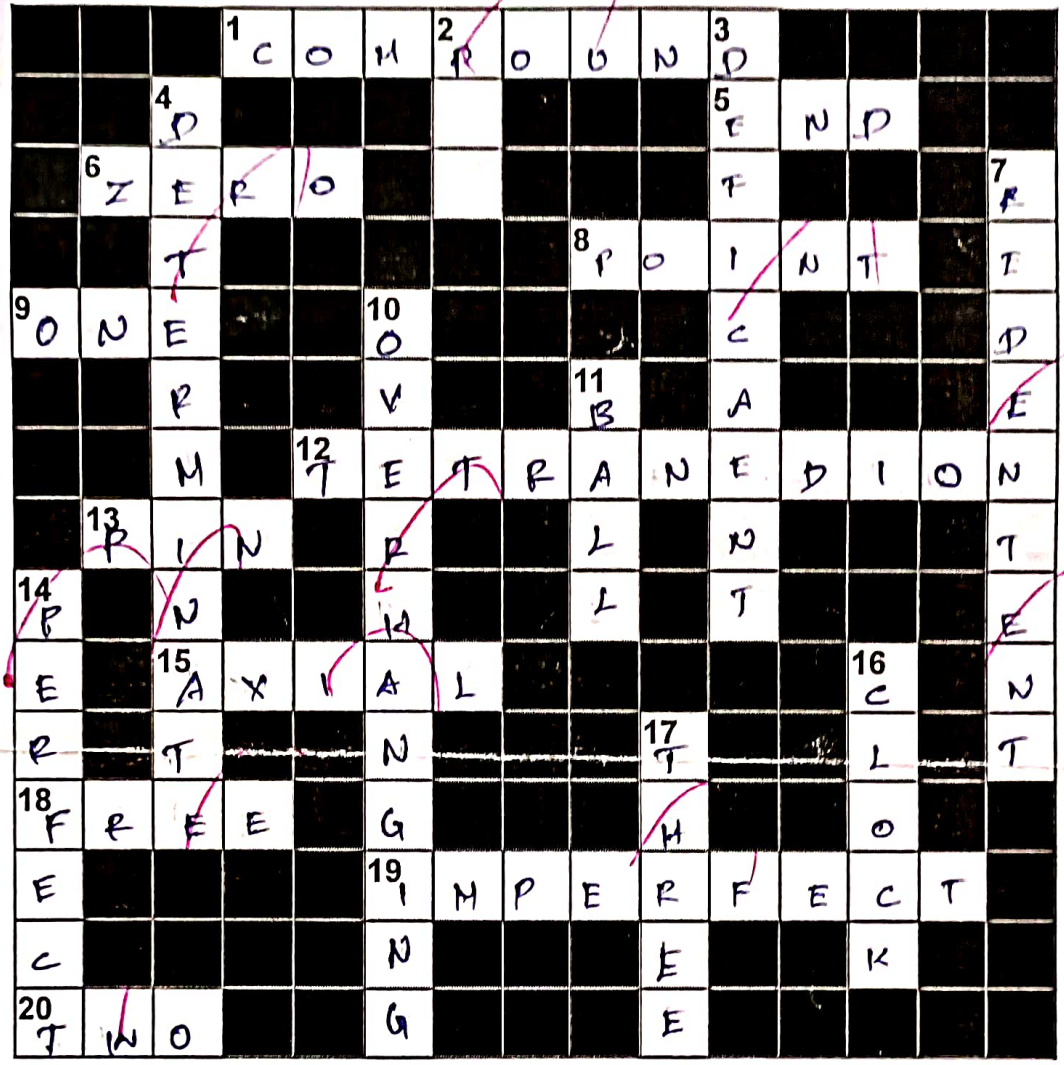
ACADEMIC YEAR 2023-2024 (ODD SEM)

CE3502 - STRUCTURAL ANALYSIS I - PCE ACTIVITY

STUDENT NAME : D. Venkatachalam.

ROLL No : 922121103018

Crossword



Across:

1. A truss formed by joining two or more simple trusses is called _____ Truss
5. Fixed _____ moments are required for solving slope deflection equations
6. Moment at a hinge will be equal to _____
8. Concentrated load is also known as _____ load
9. The degree of freedom of space roller joint is _____
12. _____ is the simplest element of a space truss.
13. Hinge support is also known as _____ support.
15. Truss members carry _____ load
18. In a beam, slope value will be _____ at the free end.
19. If "n" is not equal to 2j-3, then the frame is called as _____ frame.
20. In general _____ equilibrium equations are needed to solve each joint of a truss.

Down:

2. For UDI, loads are measured in load _____ length
3. If n < 2j-3, then the frame is called as _____ frame.
4. If the equilibrium conditions are enough to analyze a structure, then it is said to be statically _____
7. If n > 2j-3, then the frame is called as _____ frame.
10. If a beam extends beyond its support, then it is called as _____ beam.
11. The type of joints used in space truss are _____ and Socket Joint.
14. If n = 2j-3, then the frame is called as _____ frame.
16. _____wise moments are positive.
17. The number of independent equations to be satisfied for static equilibrium of a plane structure is _____

Verified

vijay

KINGS COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

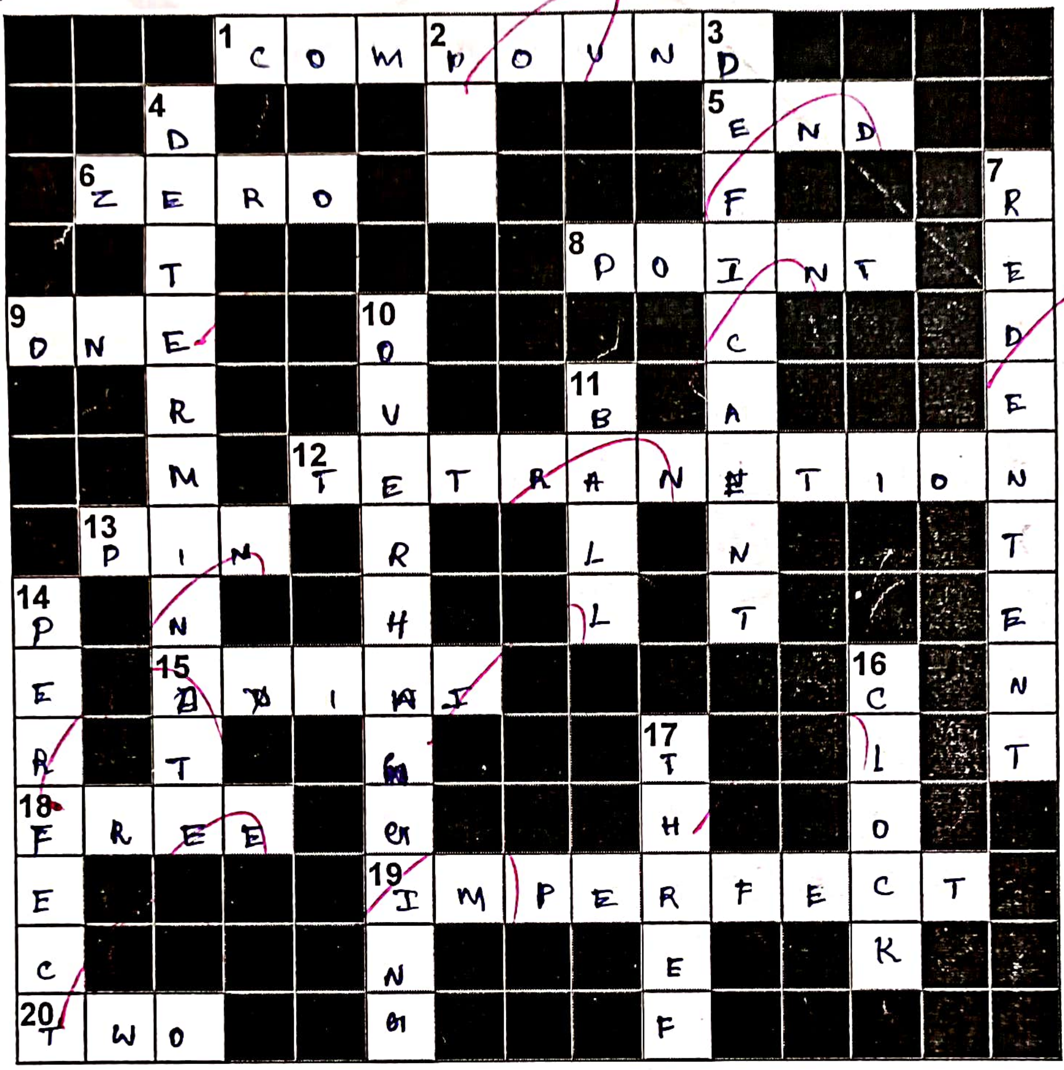
ACADEMIC YEAR 2023-2024 (ODD SEM)

CE3502 - STRUCTURAL ANALYSIS I - PCE ACTIVITY

STUDENT NAME : VIJAY S

ROLL No : 21CE17

Crossword



40

Across:

1 A truss formed by joining two or more simple trusses is called _________ Truss

5 Fixed ______ moments are required for solving slope deflection equations

6 Moment at a hinge will be equal to _____________

8 Concentrated load is also known as ___________ load

9 The degree of freedom of space roller joint is _____

12 ___________ is the simplest element of a space truss.

13 Hinge support is also known as _____ support.

15 Truss members carry ________ load

18 In a beam, slope value will be ____________ at the free end.

19 If "n" is not equal to 2j-3, then the frame is called as ____________ frame.

20 In general ____ equilibrium equations are needed to solve each joint of a truss.

Down:

2 For UDI, loads are measured in load ___________ length

3 If n < 2j-3, then the frame is called as ____________ frame.

4 If the equilibrium conditions are enough to analyze a structure, then it is said to be statically ____________________

7 If n > 2j-3, then the frame is called as ____________ frame.

10 If a beam extends beyond its support, then it is called as __________ beam.

11 The type of joints used in space truss are _______ and Socket Joint.

14 If n = 2j-3, then the frame is called as ____________ frame.

16 ___________wise moments are positive.

17 The number of independent equations to be satisfied for static equilibrium of a plane structure is _________

Name : R. Gayathri

CLASS : 2nd year civil

Roll no : 22CE07

Subject : Fluid mechanics

40/40

08.11.23

FUNDAMENTAL DIMENSIONAL

What is Dimensional Analysis ?

Dimensional analysis is a means of simplifying a physical problem by appealing to dimensional homogeneity to Reduce the number of Relevant variables.

primary Dimensions :-

In fluid mechanics the primary or fundamental dimensions, together with their SI units are

Mass	M	(Kilogram, Kg)
Length	L	(Metre, m)
Time	T	(Second, s)
temperature	n	(Kelvin, K)

Working out Dimensions :-

In the following, [ ] means dimensions of

Example

use the definition

$$\tau = \mu \frac{du}{dy}$$

to determine the dimensions of viscosity.

Solution:

$$\mu = \frac{\tau}{du/dy}$$

$$= \frac{\text{force/area}}{\text{velocity/length}}$$

$$[\mu] = \frac{MLT^{-2}/L^2}{LT^{-1}/L}$$

$$= ML^{-1}T^{-1}$$

Alternative choices for primary Dimensions :-

⇒ The choice of primary dimensions is not unique

⇒ It is not uncommon

⇒ It may sometimes be more convenient

⇒ It is have a $\{FLT\}$ Rather than $\{MLT\}$ System.

problem :-

Find the dimensions of viscosity μ in the {FLT} Rather than {MLT} system.

Solution.

$$\mu = \frac{\tau}{du/dy}$$

$$= \frac{\text{force/area}}{\text{velocity/Length}}$$

$$[\mu] = \frac{F/L^2}{LT^{-1}/L}$$

$$= FL^{-2}T$$

Formal procedure for Dimensional Analysis :-

The principle of Dimensional Homogeneity :-

All additive terms in a physical equation must have the same dimensions.

Example :-

$$S = ut + \frac{1}{2}at^2$$ [All terms have the dimensions of length (L)]

$$\frac{P}{\rho g} + \frac{V^2}{2g} + Z = H$$

Buckingham's pi theorem :-

1) If a problem involves
   n Relevant variables
   m independent dimensions, then it can be reduced to a relationship between n-m non-dimensional parameters $\Pi_1, \ldots \Pi_{n-m}$

physical Modelling :-

If a dimensional analysis indicates that a problem is described by a functional Relationship between non-dimensional parameters $\Pi_1, \Pi_2, \Pi_3 \ldots$ then complete similarity requires that these parameters be the same at both full ("prototype") scale and model scale.

$$(\Pi_1)_m = (\Pi_1)_p$$

$$(\Pi_2)_m = (\Pi_2)_p$$

Incomplete similarity :-

There are three type of Incomplete similarity

⇒ Geometric similarity

⇒ Kinematic similarity

⇒ Dynamic similarity.

Froude - number Scaling :-

velocity :-

$$(Fr)_m = (Fr)_p$$

$$\left(\frac{U}{\sqrt{gL}}\right)_m = \left(\frac{U}{\sqrt{gL}}\right)_p \Rightarrow \frac{U_m}{U_p} = \left(\frac{L_m}{L_p}\right)^{1/2}$$

Quantity of flow :-

$$Q \sim \text{velocity} \times \text{area} \Rightarrow \frac{Q_m}{Q_p} = \left(\frac{L_m}{L_p}\right)^{5/2}$$

Force :-

$$F \sim \text{pessure} \times \text{area} \Rightarrow \frac{F_m}{F_p} = \left(\frac{L_m}{L_p}\right)^{3}$$

Time :-

$$t \sim \text{length} / \text{velocity} \Rightarrow \frac{t_m}{t_p} = \left(\frac{L_m}{L_p}\right)^{1/2}$$

Non - Dimensional Groups in fluid mechanics :-

Reynolds number $Re = \frac{\rho V L}{\mu}$

$$= \frac{\text{Inertial force}}{\text{viscous force}}$$

Froude number $Fr = \frac{U}{\sqrt{gL}}$

$$= \left(\frac{\text{inertial force}}{\text{gravitational force}} \right)^{1/2}$$

Weber number

$$We = \frac{\rho U^2 L}{\sigma}$$

$$= \frac{\text{Inertial force}}{\text{surface tension}}$$

Rossby number

$$R_O = \frac{U}{\Omega L}$$

$$= \frac{\text{intertial force}}{\text{coriolis force.}}$$

Mach number

$$Ma = \frac{U}{c}$$

$$= \left(\frac{\text{intial force}}{\text{compressibility force}} \right)^{1/2}.$$

These groups occur regularly when dimensional analysis is applied to fuid-dynamical problems.

ASSIGNMENT - 1

POSTER PRESENTATION

Name : J. Akalya

Roll NO : 21CE01

Dept : III - year Civil

Sub / Sem : CE3501 / V

Subject : Design of Reinforced Concrete Structural Elements

35/40

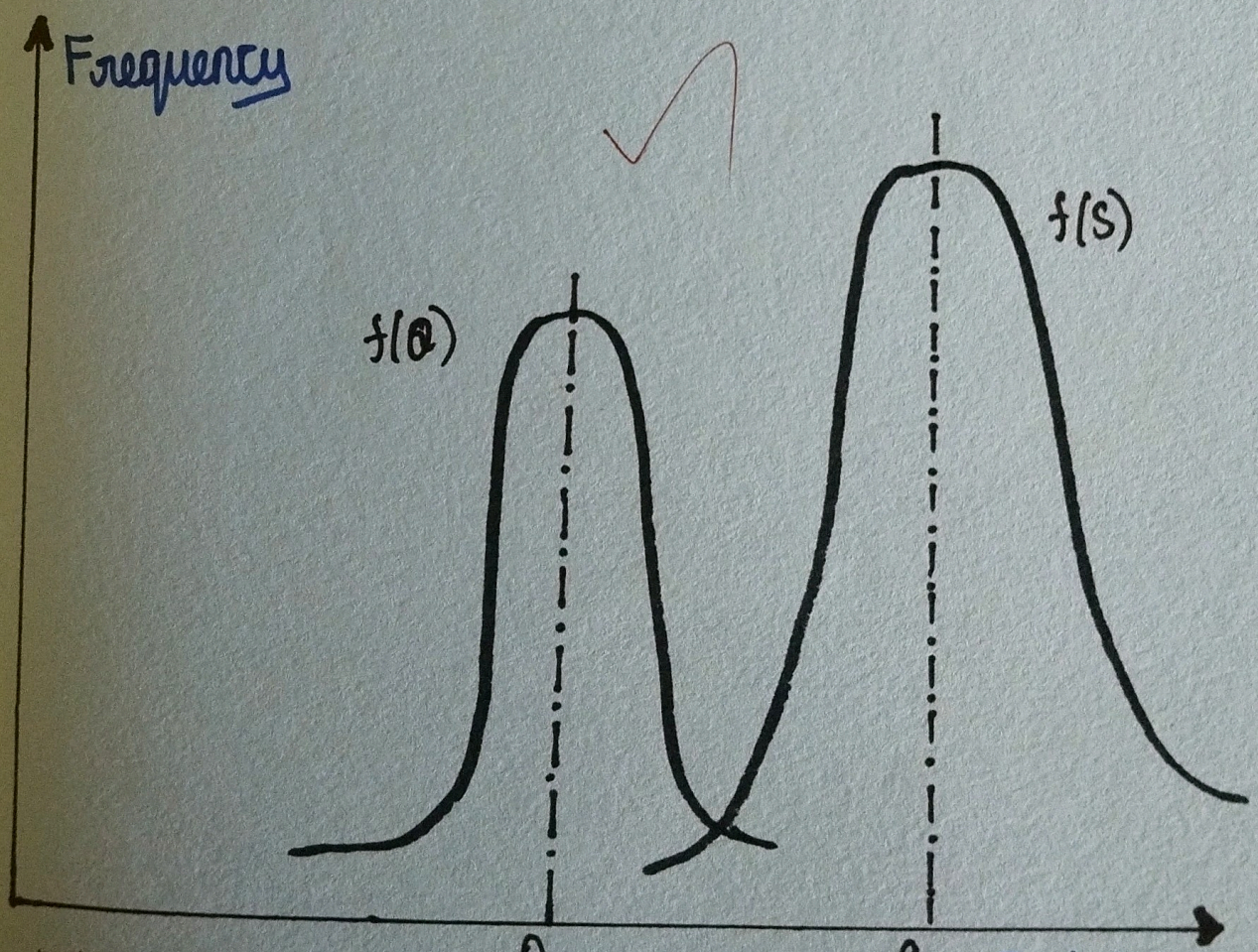
Verified

LIMIT STATE METHOD

Limit State Design:

Limit State : State at which one of the conditions pertaining to the structure has reached a limiting value.

Random Variation:

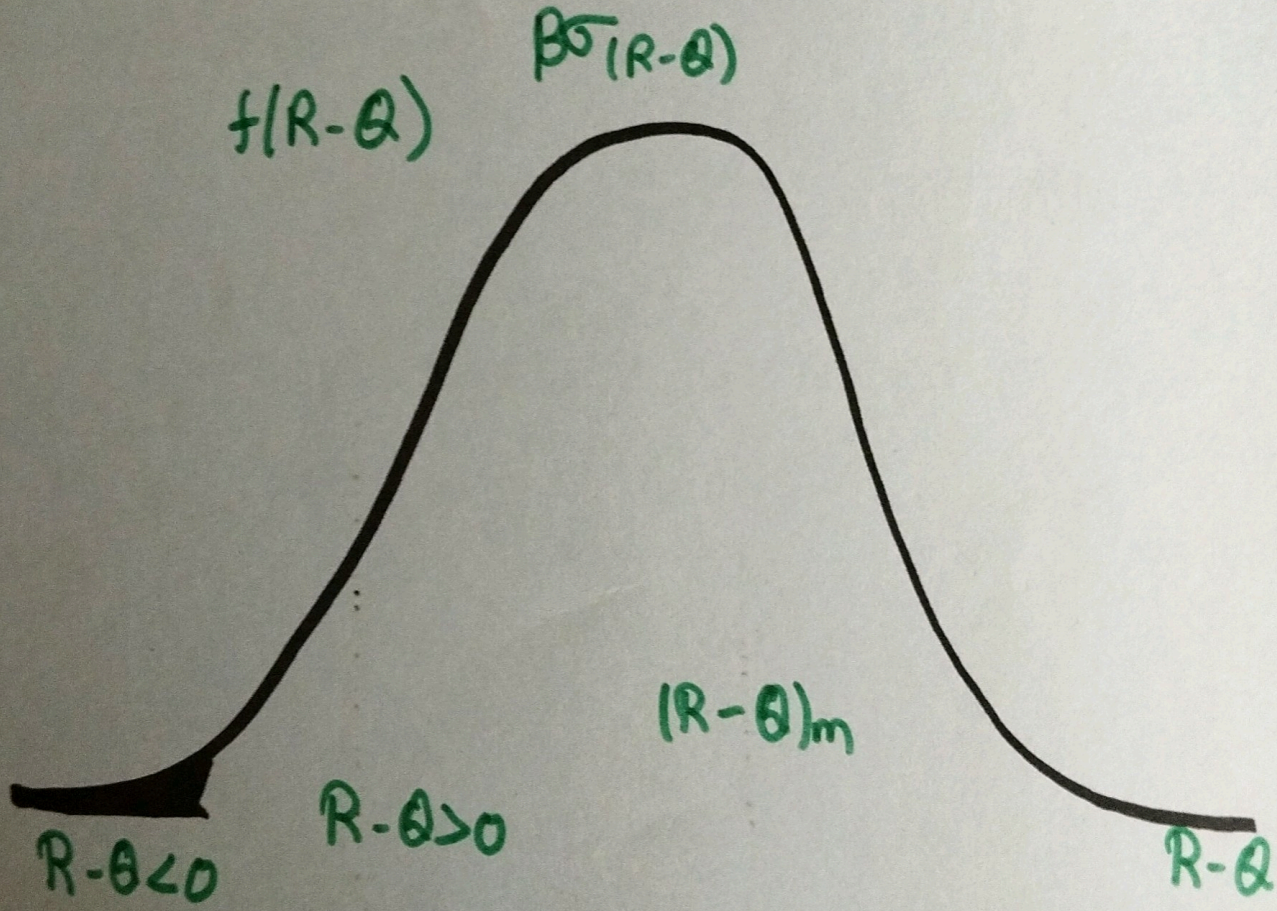


Probability density function for strength and load effect.

Limit states Design

Basis of Limit States Design

$$\beta = \frac{S_m - Q_m}{\sqrt{\sigma_S^2 + \sigma_Q^2}}$$



Probability distribution of the safety marg

Limit States Design:

$$\Sigma(\text{Load} * \text{Load Factor}) \leq \frac{(\text{Resistance})}{(\text{Resistance factor})}$$

$\forall \gamma_m$ takes account;

* Possible deviation of the material in the structure from that assumed in design.
* Possible reduction in the strength of the characteristic value
* manufacturing tolerances.
* Mode of failure (ductile or brittle)

Limit State of Serviceability :

* Deflections are to be checked for the adverse but realistic combination of service lo and their arrangement, by elastic analysis.

* Suitable Provisions in the design sh made for the dynamic effects of live loa Impact loads and vibration / fatigue due to machinery operating loads.

* The durability of steel structures s be ensured by following recommendati of sections.

* Design Provisions to resist fire briefly discussed.

Limit :- Ultimate limit state :

* Structural Collapse of all or part of the structure very low Probability of occurrence and loss of life can occur.

* Loss of equilibrium of a part or all of a structures as a rigid body tipping, sliding of structure.

* Rupture of Critical components causing partial or complete collapse.

* Minor local failure overloads causing adjacent members to failure entire structure collapses.

* Structure integrity is provided by tying the structure together with correct detailing of reinforcement provides alternative load paths in case of localized failure.

Special limit states:

⇒ Damage / failure caused by abnormal condition or loading.

* Extreme earthequakes → damage / collapse
* Floods → damage / collapse
* Effects of fire, explosions, or vehicular collisions.
* Effects of corrosion, deterioration
* Long-term physical or chemical instability

ASSIGNMENT - I

POSTER PRESENTATION

Good.

36/40

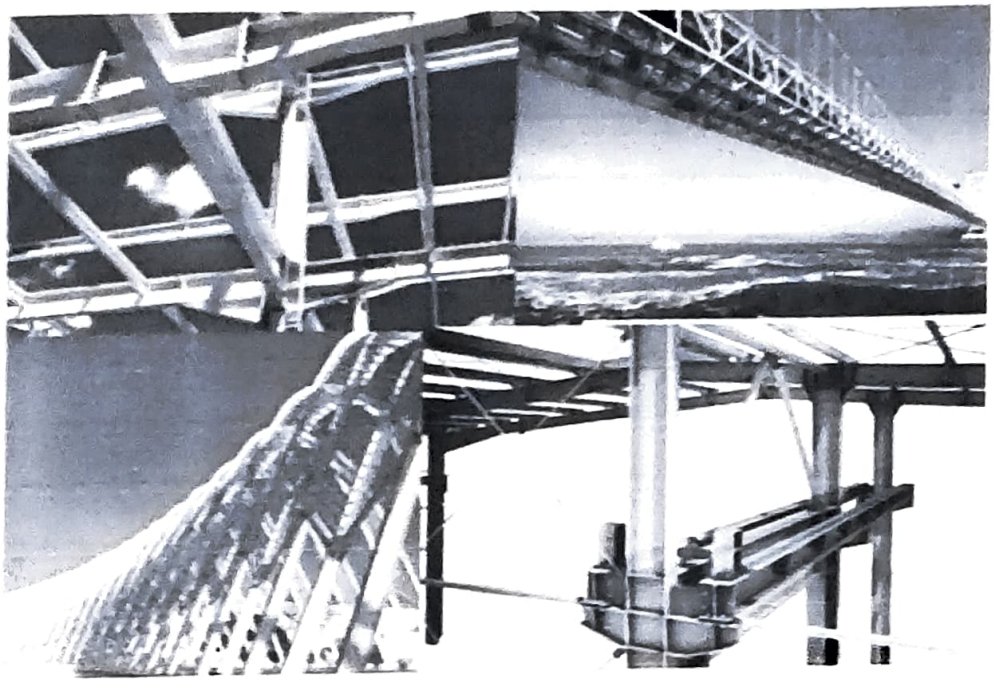
08/03

Name : I. Akalya
Roll.NO : 21CE01
Dept : 3rd - Year Civil
Subject : DSSE
Sub Code : CE3601

PROPERTIES OF STEEL STRUCTURAL

Structural steel differs from concrete in its attributed compressive strength as well as tensile strength.

strength having high strength, stiffness, toughness and ductile Properties, structural steel is one of the most commonly used materials in commercial and industrial building construction.



The Physical Properties of Steel include: high strength, low weight, durability, ductility and corrosive resistance. Steel offers great strength, even though it is light in weight. In fact, its ratio of strength to weight for steel is lower than any other building materials.

FEATURES OF STEEL STRUCTURE

They are lightweight and require less material than other types of structure, making than other types of structures than more cost-effective. They are also quick to assemble, reducing construction time and labor costs. Steel truss structures are also very durable and can withstand harsh environmental conditions, such as high winds and earthquakes. Steel has good toughness, good plasticity, uniform material, high structural reliability, suitable for bearing impact and dynamic load and has good seismic Performance.

TYPES OF STEEL STRUCTURES

The types of steel building structures are the,

* Portal rigid steel frame
* the frame structure
* the truss structure
* the grid structure

CHARACTERISTICS OF STEEL

Strength

Toughness

Ductility

weldability

Durability

ASSIGNMENT-2
MIND MAP

G.V. NAAVINIYAA
III - CIVIL ENGG
CE3601 - DSSE

MINDMAP FOR THE DESIGN OF AN END BEARING

Name : M. Shrinidhi

Roll no : 22CE11

Subject : air & noise pollution & Control.

Topic : Quiz (air & noise pollution)

Assignmen -1

① Purification of flue gases from sulphur-oxides with a view to control atmospheric pollution, is achived.

a) by providing two-stage combustion of fuel

b) by using lime.

Explanation:

The sulfur oxide (SOx) in the flue gas react with lime (or) lime stone to form calcium sulfite (or) calcium sulfate (gypsum).

② There are pollutants which are formed during combustion at high temperature.

a) various oxides of nitrogen.

b) methane & carbon dioxide.

Explanation:

Oxides of nitrogen (NOx), primarily nitrogen dioxide (NO_2) & nitric oxide (NO), are pollutants formed during the combusting of fossil fuels at high temperature, such as in vechicles, power plants, and industrial processes.

(3) The device, which can be used to control gaseous as well as particulate pollutants in the industrial emissions is known as.

a) Spray tower (b) fabric filter.

Explanation:-

Spray tower, wet cyclonic scrubber Venturi scrubber.

(4) Air pollution can be controlled through which of the following technique(s)?

a) Diffusion (b) All of the given options.

Explanation.

5) Trajectory of Contaminat leaving a Smokestack is an example of ___.

a) Timeline (b) pathline.

Explanation:-

A pathline is the actual trajectory that a single particle (or) Contaminat following over time as it moves throught a flow field.

(6) As per noise pollution rules - 2000, the permissible limit of noise (in dB) during night time of a residential area is given as:.

a) 65 (b) 45

Explanation:-

The ambient environment as well as the health & well-being of humans.

(7) As per noise pollution Rules 2000 of India, the day time noise limit for a residential Zone expressed in dB(A) Leq is

(a) 55 b) 65

Explanation:-

Area Code	Area/zone	Limits in dB Leq.	
		day time	night time.
A	Industrial	75	70.

(8) "Green muffler" is related to:

a) Soil pollution (b) noise pollution.

Explanation.

Green muffler is a technique of reducing noise pollution by planting 4-6 rows of plants.

(9) From among the different pollutants listed Cause air pollutant, Identify the Secondary Pollutant.

a) Sulphuric acid (H_2SO_4).

b) Sulphur dioxide (SO_2).

Explanation:-

Pollutants that are emitted directly from either natural events or from human activities are called primary pollutants.

(10) Volcano etc and human activities can be emission from vechicles, industrial wastes. about 90% of global air pollution is constituted by five primary pollutants. These are.

a) Carbon monoxide, Particulate matter, Nitrogen oxides, Hydrocarbons, Sulphur dioxide.

Explanation:-

These are directy emitted from the sources in the atmosphere in a harmful form.

(11) According to IS4954:1968, the usual noise level of the industries is in the order of:

(1) 130 to 165 decibels (2) 60 to 95 decibles.

Explanation:

Air traffic & Jet take -off, at about 300m -100-110.

(12) Among the following air pollutants, identify the ones responsible for the greenhouse effect.

a) 1, 2, 4 b) 3, 4, 5

Explation:

Carbon dioxide entres the atmosphere through burning fossil fuels, Solid cycle.

(13) The plume behavior which occurs in the super adiabatic condition with light to moderate wind speed in the presence of large scale thermal eddies are known as.

a) Plume b) Looping plume.

Explaination:

The unstable and need higher stacks.

(14) Which of the following particulate pollution Control devices CANNOT be used for a particle Size less than 50 micron?

a) Gravitational Settling chambers.
b) Spray tower.

Explanation:

Wet scrubbers including Spray tower, Venturi scrubber >10μm, 80-99%.

$$d = C \cdot \sqrt{\frac{18M \cdot 2Vh \cdot H}{g \cdot L \cdot P_p}}$$

(15) As per Central pollution Control board (CPCB) Air Quality Index for Satisfactory Condition is in the range of:

a) 301 to 400 b) 51 to 100

Explanation:

It is a table Developed by EIA.

(16) A 30 dB Increase in noise pollution level represents:

a) 1000-fold increase in Sound intensity

Explanation:

The measure the intensity or Level of Sound.

(17) Identify the health effects related to Pollution.

a) Speech interference
b) Hearing Loss
c) Insomnia

a) A, B and E only (b) A, B, C and E

Explanation :-

noise pollution can have various health effects on individuals.

(18) "Green Muffler" is related to:

a) Soil pollution (b) Noise pollution.

Explanation:

Green muffler is a technique of reducing noise pollution by planting 4-6 rows of plants.

(19) Noise pollution is measured in.

a) ohm (b) Decibel.

Explanation:-

Logarithmic unit used to measure Sound level:

(20) Noise Levels (db) are referenced to the human hearing threshold at a frequency of

a) 100HZ (b) 1HZ.

Explanation: The higher the decibel level, the louder the noise.

(21) which gas is mainly produced due to incomplete burning of wood?

(a) Co b) SO_2.

Explanation:- Co is the colorless, odorless, toxic gas produced due to incomplete burning of wood.

(22) which of the following is involved in Production of carboxy haemoglobin?

(a) Co b) No3

Explanation:-

Co + Blood --> Carboxy haemoglobin (pink color).

(23) Which of the following is a liquid form of aerosol?

a) Mist b) Smoke.

Explanation: mist is a liquid form of aerosol, whereas, fume, dust and smoke and a solid form of aerosol.

(24) X ray films are a source of which of the following gas?

a) SO_2 b) NO_2.

Explanation: NO_2 is produced from X ray film. It causes irritation to eyes & cause respiratory disease.

(25) The maximum size of fly ash is ____.

a) 1μm b) 1000μm

Explanation:- Fly ash is a finely divided particle Produced from the combustion of coal. Its maximum size is 1000μm.

Name : S. Jayasri

Roll Number : 23CE08

Department : 2nd year Civil

Subject : Water Supply and Waste Water Engineering

Subject Code : CE3303

Assignment : 1

Activity : Case study Presentation.

Topic : Residue Management

10/10

RESIDUALS OF INDUSTRIAL WASTEWATER TREATMENT

Residuals :-

* Wastewater treatment plant produces a wide variety of waste products while treating water.

* These residuals may be organic and inorganic compounds in liquid, solid, and gaseous forms.

* It depends on the source of raw water, its characteristics and the type of treatment processes.

Major Residuals from Wastewater Treatment Plant :-

SLUDGE :-

* Sedimentation, Coagulation, Filter backwashing operations.

Concentrate :-

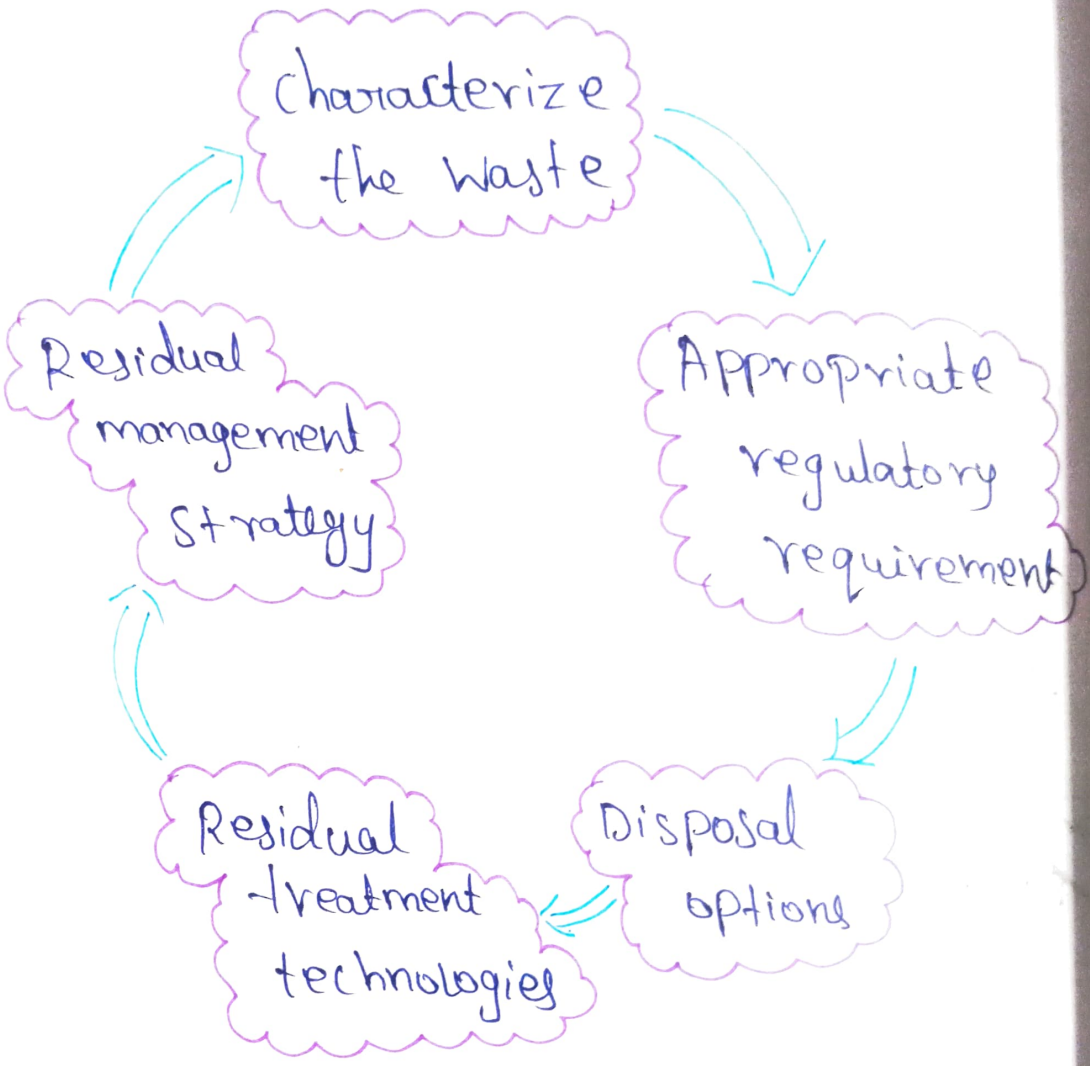
* Membrance reject water and spent backwash.

* Ion exchange resins, spent granular activated carbon (GAC), and spent filter media.

Air emission :-

* From aeration tank, VOC's other gesous pollutant like methane, ammonia and hydrogen sulphide in the air surrounding the waste treatment.

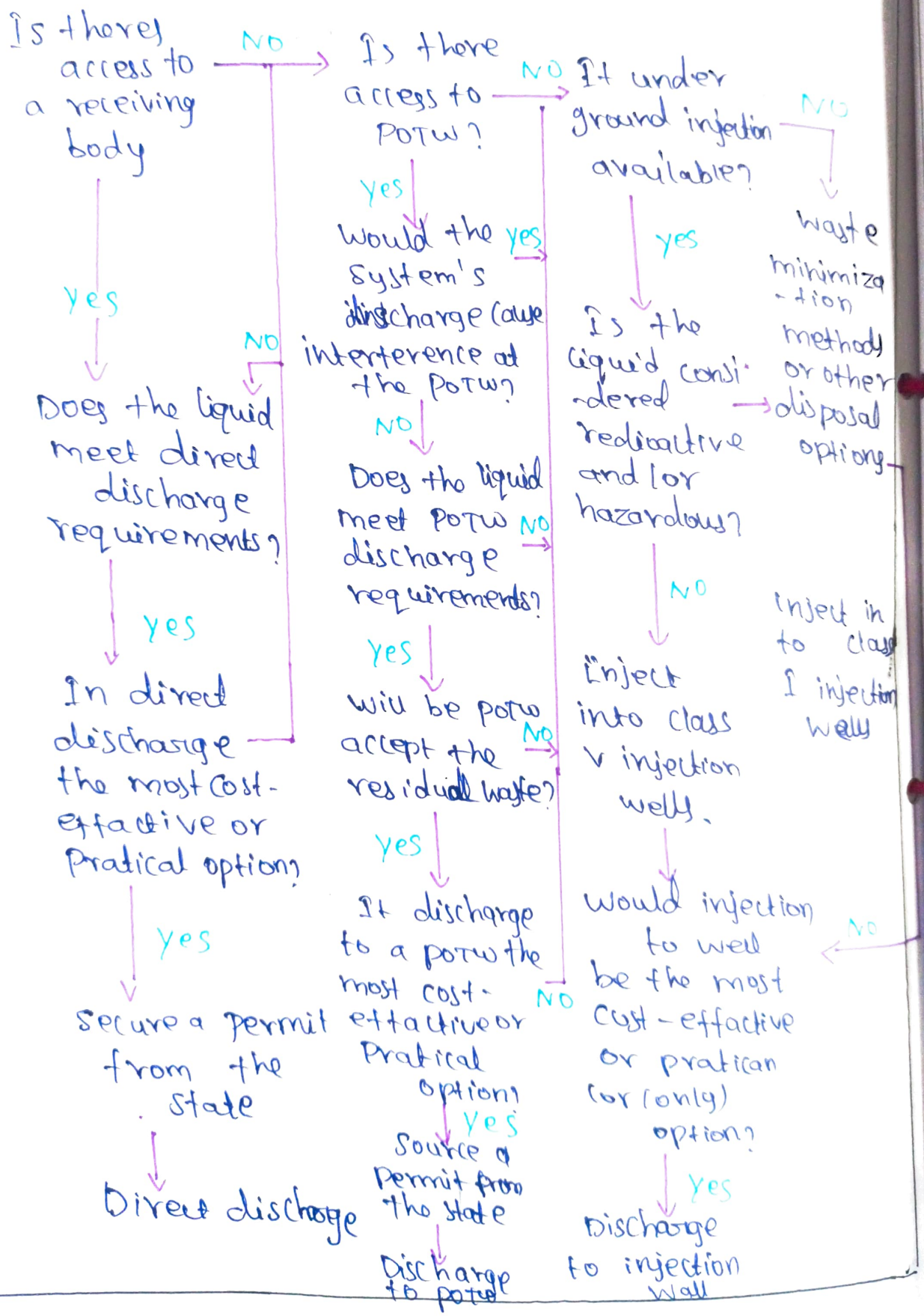
Residual managment Plan :-



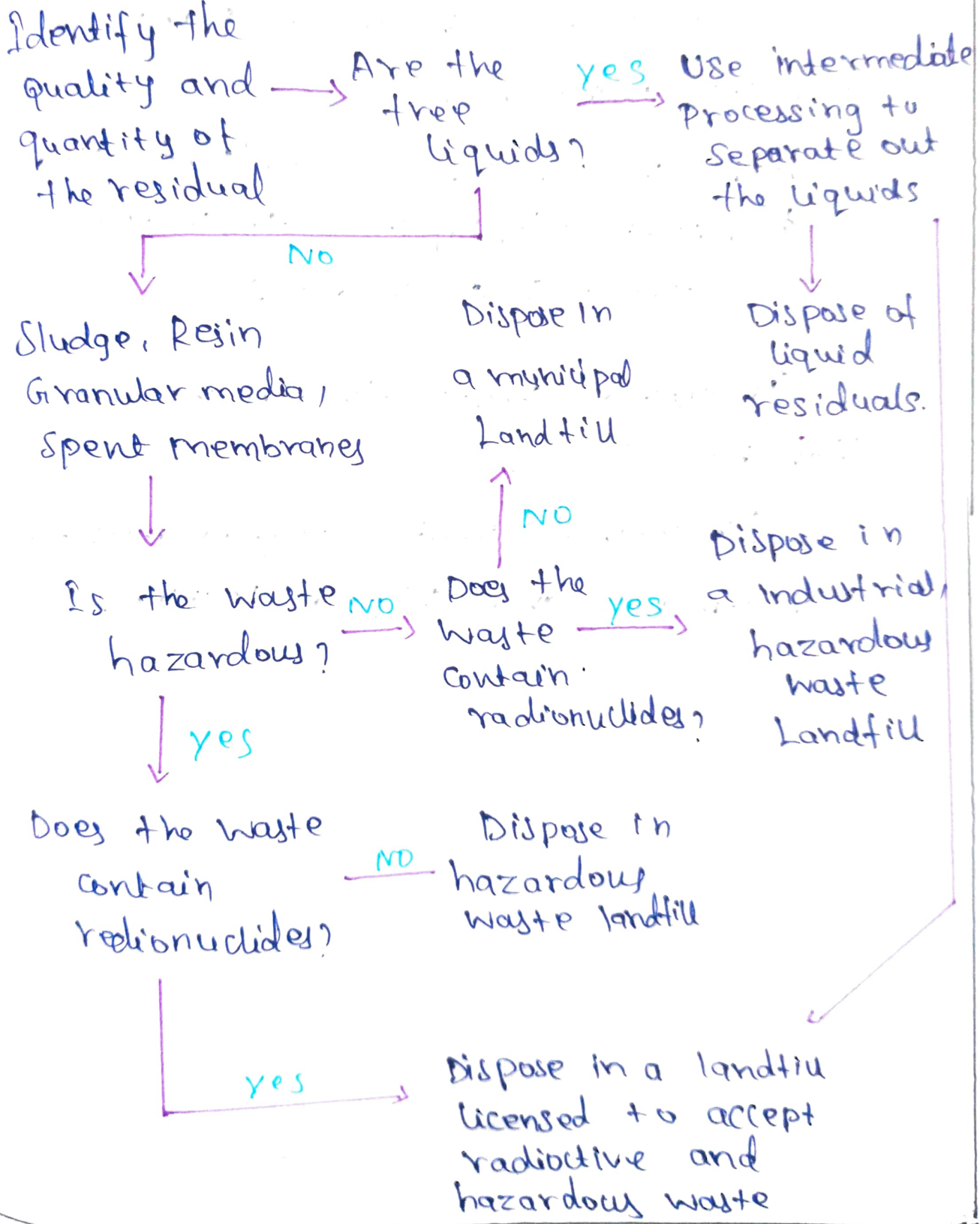
Disposal option Depends on :-

* Waste Characteristics
  - (i) Liquid or Solid
  - (ii) Type and Concentration of Contaminants
  - (iii) Classification of waste

Liquid Residual Disposal :-



Solids Residual Disposal :-



Reference :-

* Waste Wate Treatment plant Rejidual management

http:// www.nesc.wvu.edu/pdf/dw/publications/ontap/2009 tb/water treatment DWFSOM49.pdf

* Industrial Waste treatment Handbook.

* Industrial Waste management, Treatment and Disposal Manual.

ASSIGNMENT-1

A13404 - HYDROLOGY AND WATER RESOURCES ENGG

QUIZ...

A. SURUTHI
IV - YEAR
CIVIL ENGG
821121103303

★ TYPES OF RAIN GAUGES

40/40

Types of rain gauges

1) Which of the following is the most commonly used type of rain gauge

a) Weighing rain gauge
b) Standard rain gauge
c) Tipping bucket rain gauge
d) Optical rain gauge

2) The standard rain gauge is also known as the

a) optical rain gauge
b) Non-recording rain gauge
c) Tipping bucket rain gauge
d) Weighing rain gauge

3) The tipping bucket rain gauge records rainfall in terms of

a) The number of bucket tips
b) The weight of the collected water
c) The volume of water collected
d) The optical reflections

4) Which type of rain gauge uses a float to measure rainfall.

a) Tipping bucket rain gauge
b) Standard rain gauge

c) Weighing rain gauge d) optical rain gauge

5) Which rain gauge type is known for providing automatic data collection.

a) Standard rain gauge b) Tipping bucket rain gauge

c) Symons rain gauge d) Weighing rain gauge

6) A non-recording rain gauge typically.

a) Requires manual measurement b) Records rainfall electronic

c) Measures rainfall in terms of tips d) Uses sensors to detect rain

7) Which rain gauge is best suited for remote weather stations due to this self-emptying mechanism.

a) Standard rain gauge b) Tipping bucket rain gauge

c) Weighing rain gauge d) Symons rain gauge

8) The symons rain gauge is a type of.

a) Tipping bucket rain gauge b) optical rain gauge.

c) Non-recording rain gauge d) Weighing rain gauge.

a) Which of the following rain gauges can be used in high-altitude or snowy regions?

a) optical rain gauge b) Weighing rain gauge

c) tipping bucket rain gauge d) optical rain gauge

10) Which type of rain gauge works by weighing the collected water over time.

a) tipping bucket rain gauge b) Weighing rain gauge

c) Standard rain gauge d) optical rain gauge

11) In a tipping bucket rain gauge, each bucket tip represents

a) 0.1 mm of rain b) A fixed amount of rainfall

c) varies by design d) 1 liter of water

12) Which type of rain gauge is less accurate during intense rainfall due to rapid tipping.

a) tipping bucket rain gauges b) Weighing rain gauge

c) optical rain gauge d) Non-recording rain gauge

13) The optical rain gauge measures rainfall using

a) A tipping bucket mechanism b) Weighing the rainwater

c) Light beam interruption d) A graduated cylinder

14) Which rain gauge requires calibration for precise measurements

a) Non-recording rain gauge b) Tipping bucket rain gauge

c) Tipping bucket rain gauge d) Graduated rain gauge

15) The most accurate method for measuring rainfall continuously and

a) Standard rain gauge b) Weighing rain gauge

c) Tipping bucket rain gauge d) optical rain gauge

16) For measuring both solid and liquid precipitation, which rain gauge is ideal.

a) optical rain gauge b) Tipping bucket rain gauge

c) Weighing rain gauge d) Standard rain gauge

17) Which type of rain gauge is often used in agricultural research stations for high-precision measurements

a) optical rain gauge b) Standard rain gauge

c) Weighing rain gauge d) Tipping bucket rain gauge

18) What is the main disadvantage of using a standard non-recording rain gauge

a) Requires manual observation b) Inaccuracy

c) Limited to urban use d) costly maintenance

19) Which rain gauge type is most susceptible to wind interference.

a) Weighing rain gauge b) Standard rain gauge

c) Tipping bucket rain gauge d) optical rain gauge

20) The graduated cylinder of a standard rain gauges is typically how deep.

a) 10 cm b) 20 cm

c) 15 cm d) 25 cm

Assignment - II

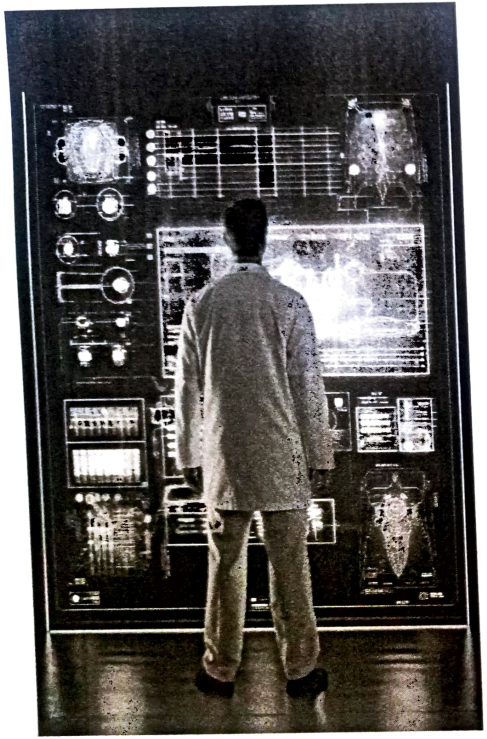
Y. Jerald Ruban Raj

II - year civil

Highway and Railway Engineering

understanding the Functionality of Tracking circuits

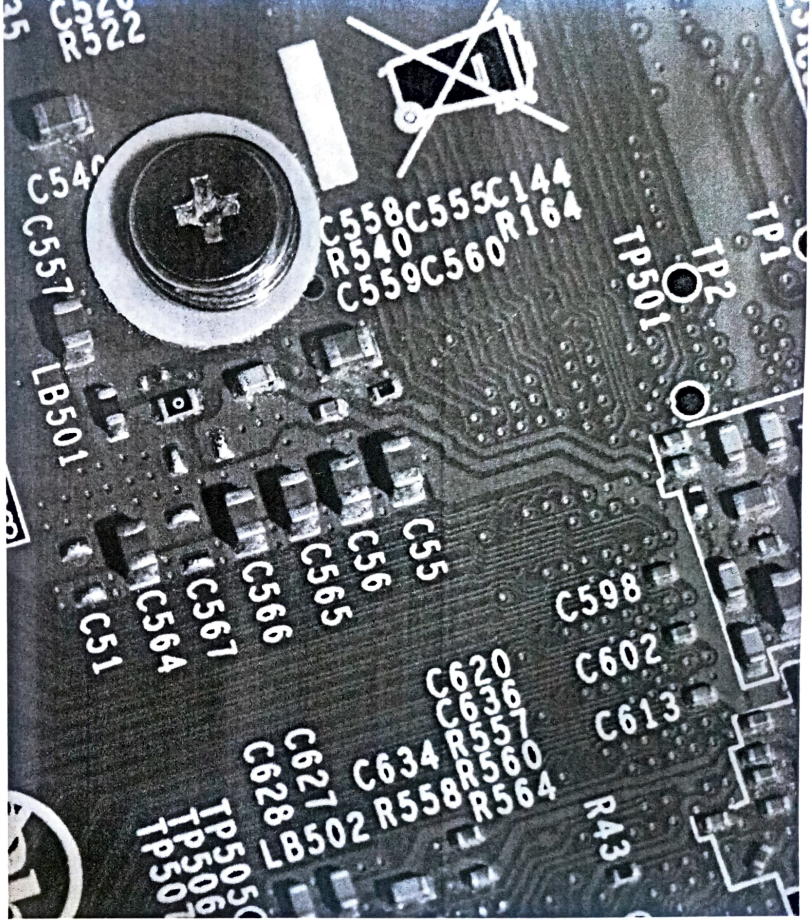
40/40

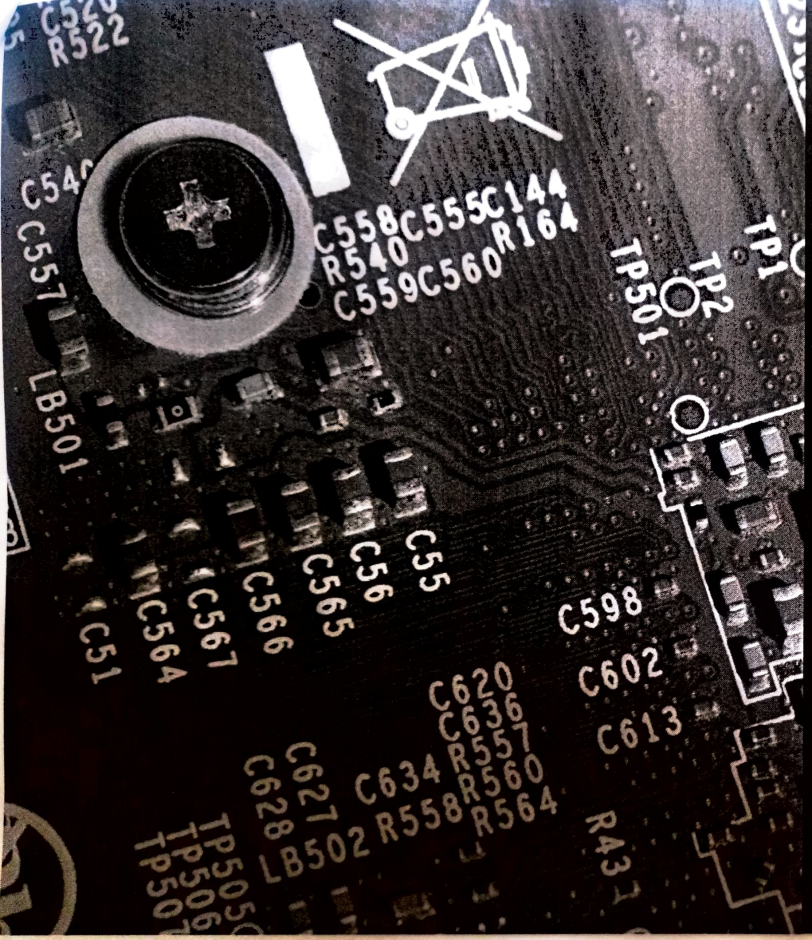


Understanding the Functionality of Tracking Circuits

Introduction

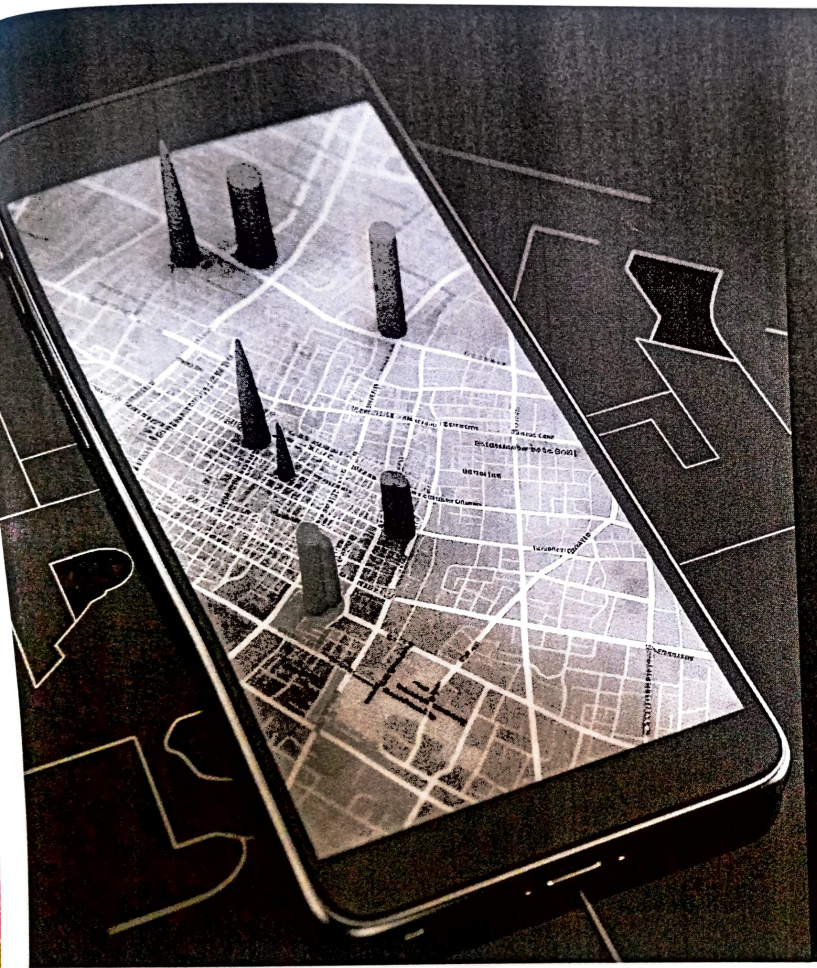
This presentation aims to **explore** the functionality of tracking circuits. We will delve into the **fundamental** principles and applications of tracking circuits in various industries. By the end, you will have a comprehensive understanding of their **importance** and operation.





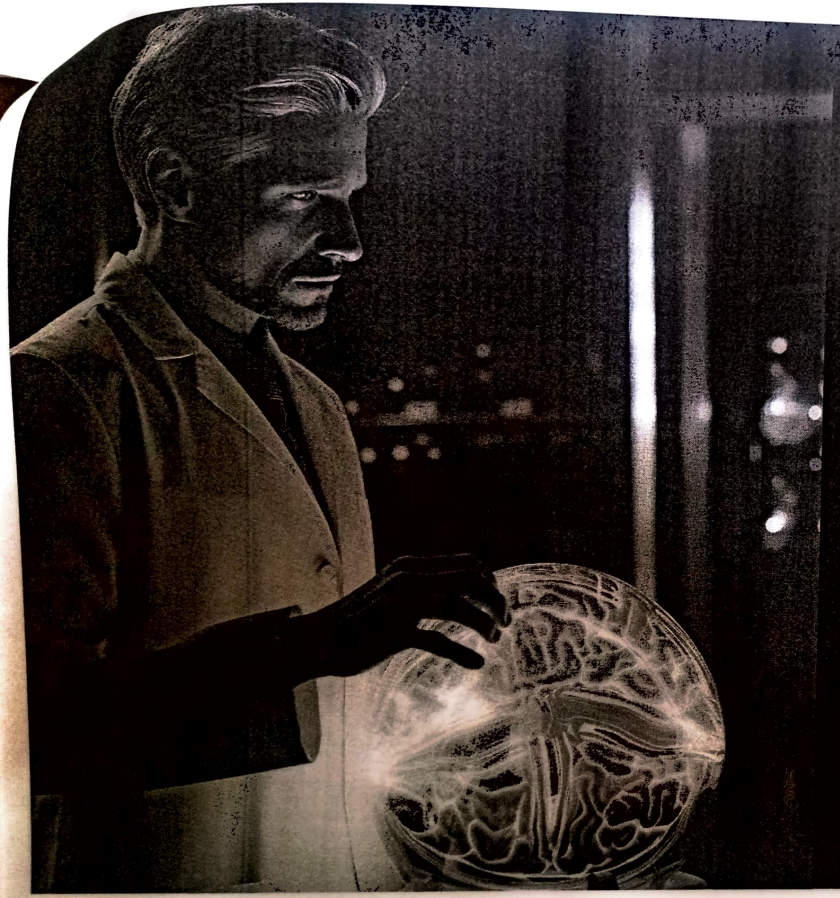
Fundamentals of Tracking Circuits

Tracking circuits are **essential** components in electronic systems. They are designed to **monitor** and control the movement of objects or individuals. By utilizing sensors and feedback mechanisms, tracking circuits provide **real-time** data for analysis and decision-making.



Types of Tracking Circuits

There are various types of tracking circuits, including **GPS-based** systems, **RFID** technology, and **motion** sensors. Each type offers unique advantages and is tailored to specific tracking requirements. Understanding the differences is crucial for effective **implementation**.



Applications in Industries

Tracking circuits are widely used in industries such as **logistics**, **transportation**, and **healthcare**. They facilitate **inventory management**, vehicle tracking, and patient monitoring. The versatility of tracking circuits contributes to **efficiency** and safety in various sectors.

Conclusion

In conclusion, tracking circuits play a pivotal role in modern technology. Their **functionality** and versatility enable seamless tracking and monitoring across various domains. As technology continues to advance, tracking circuits will evolve to meet the **demands** of a dynamic and interconnected world.

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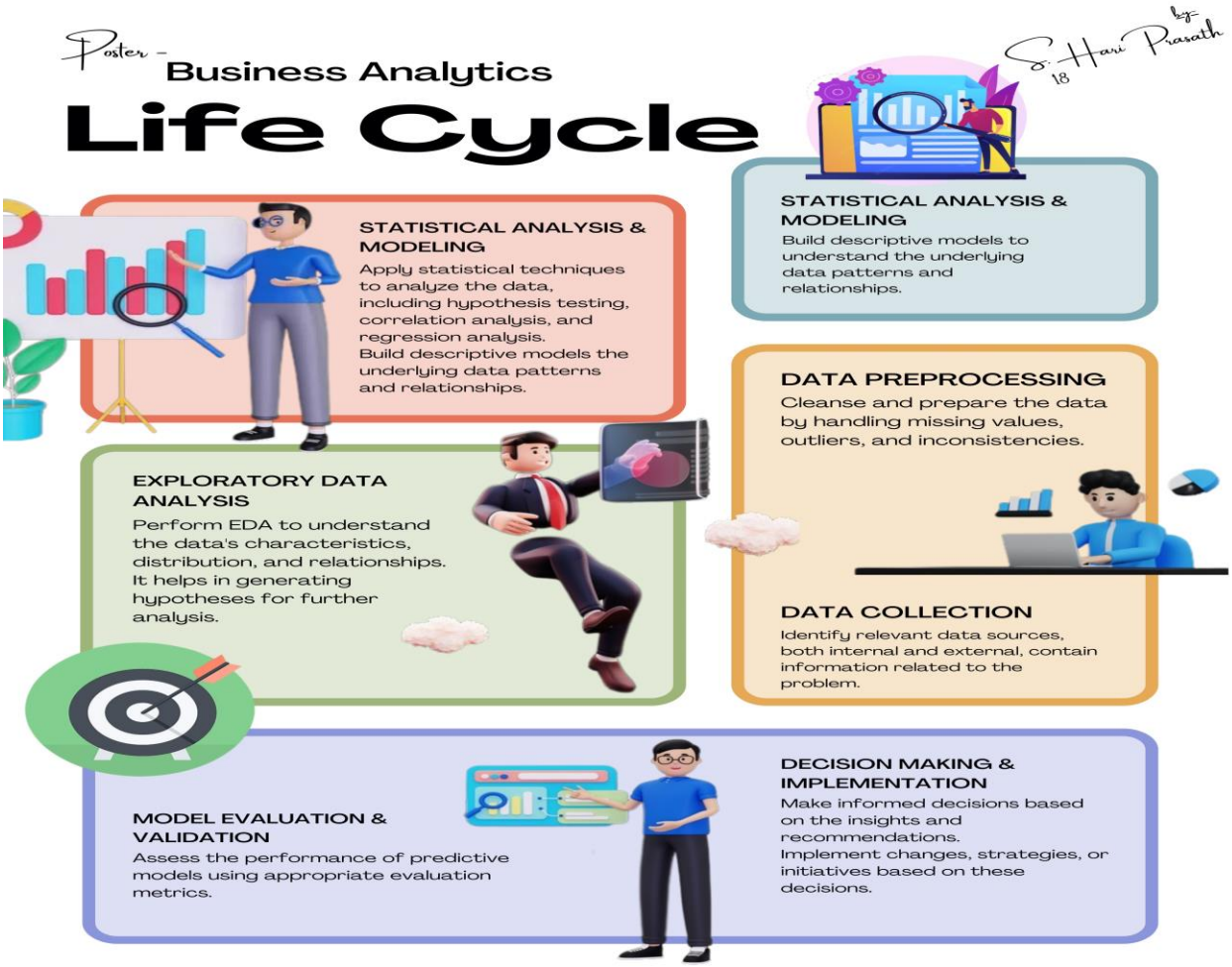
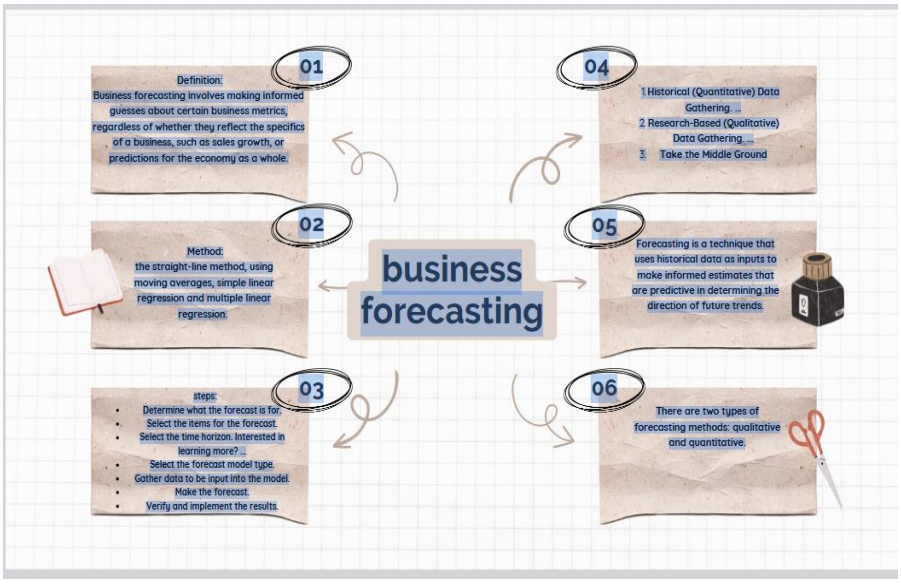
Department of Computer Science and Engineering
Academic year 2023-2024 (ODD)
PCE Samples

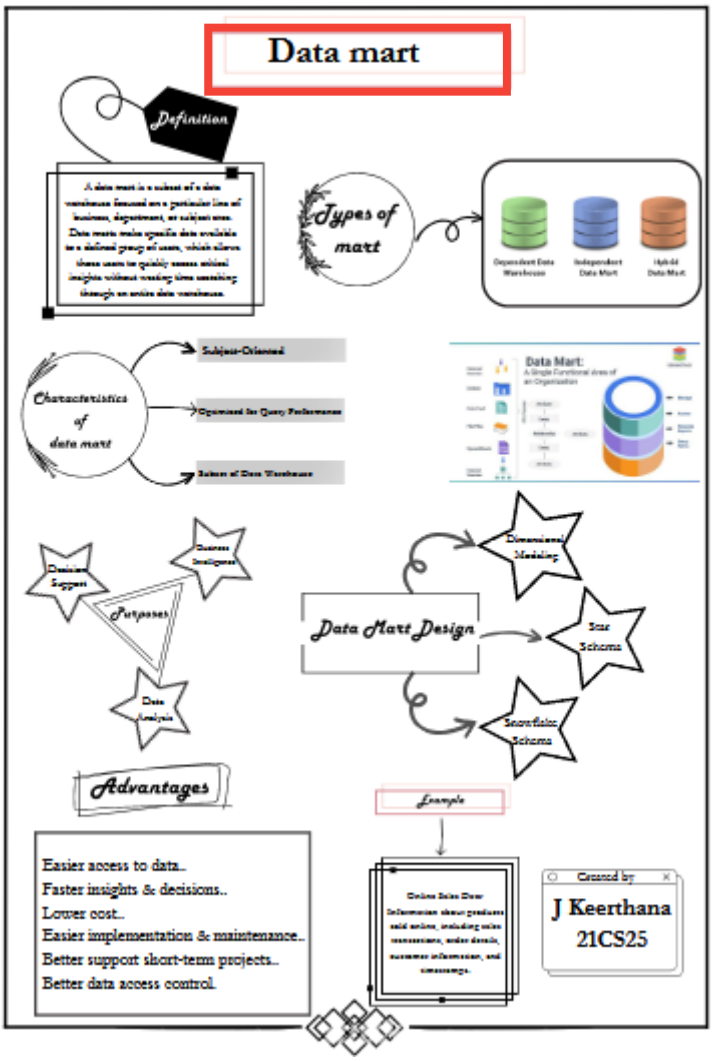
SL.NO	Course Name	PCE Activity
1	Business Analytics	➢ Poster presentation ➢ Data Mart ➢ Quiz Participation Tool:Quizalize ➢ Business Analytics – Report ➢ Mind map
2	Green Computing	➢ Cue Cards ➢ Case Study Presentation ➢ Flash Card
3	Object Oriented Software Engineering	➢ Certification Course ➢ Industrial Visit Report
4	Artificial Intelligence And Machine Learning	➢ Poster Presentation ➢ Mind map

STUDENT SUBMISSIONS

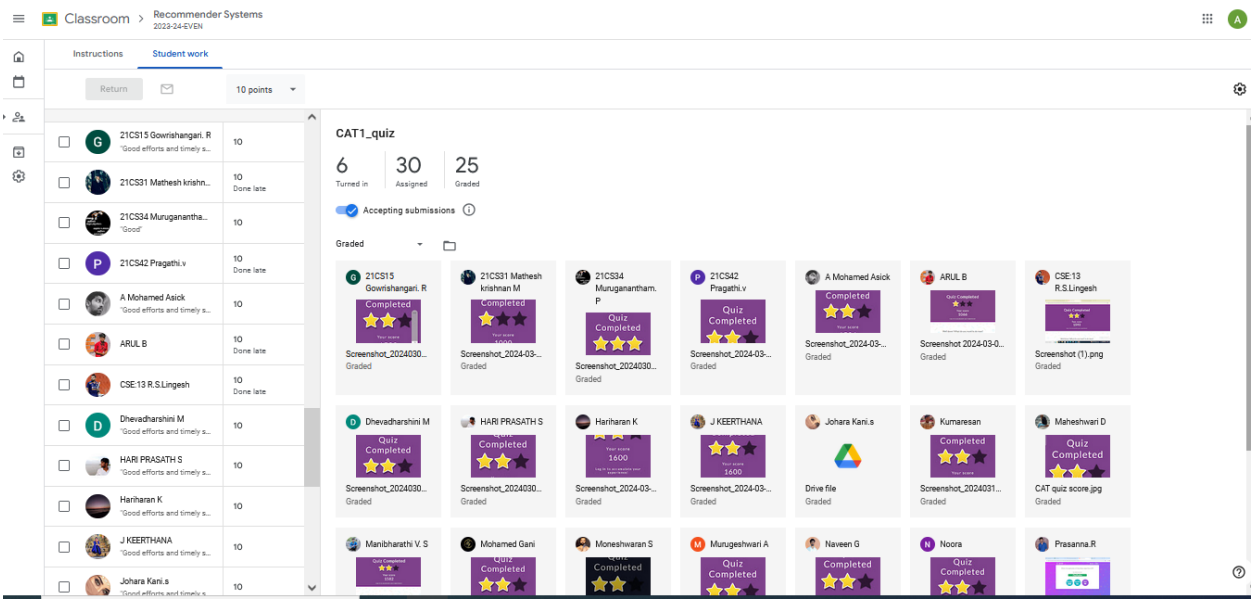
POSTER DESIGN

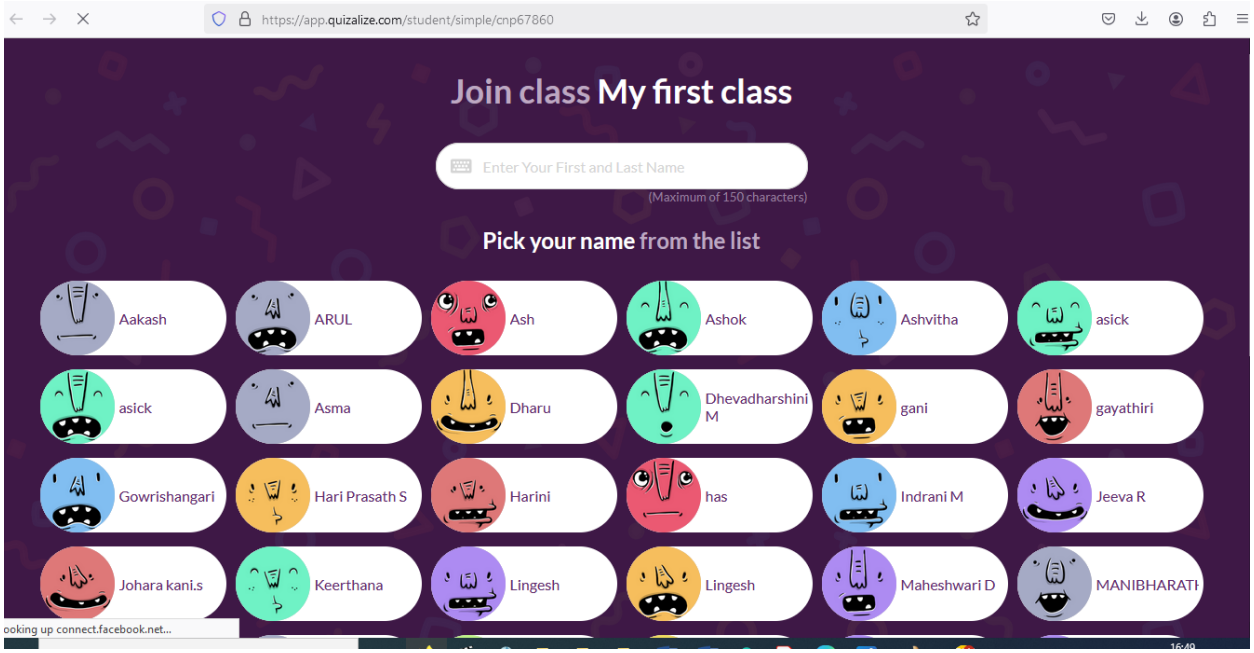





Data mart
Definition
Types of mart
Characteristics of data mart
Subject-Oriented
Data Mart:
Purposes
Data Mart Design
Dimensional Modeling
Star Schema
Snowflake Schema
Advantages
Example
Easier access to data..
Faster insights & decisions..
Lower cost..
Easier implementation & maintenance..
Better support short-term projects..
Better data access control.
Created by
J Keerthana
21CS25

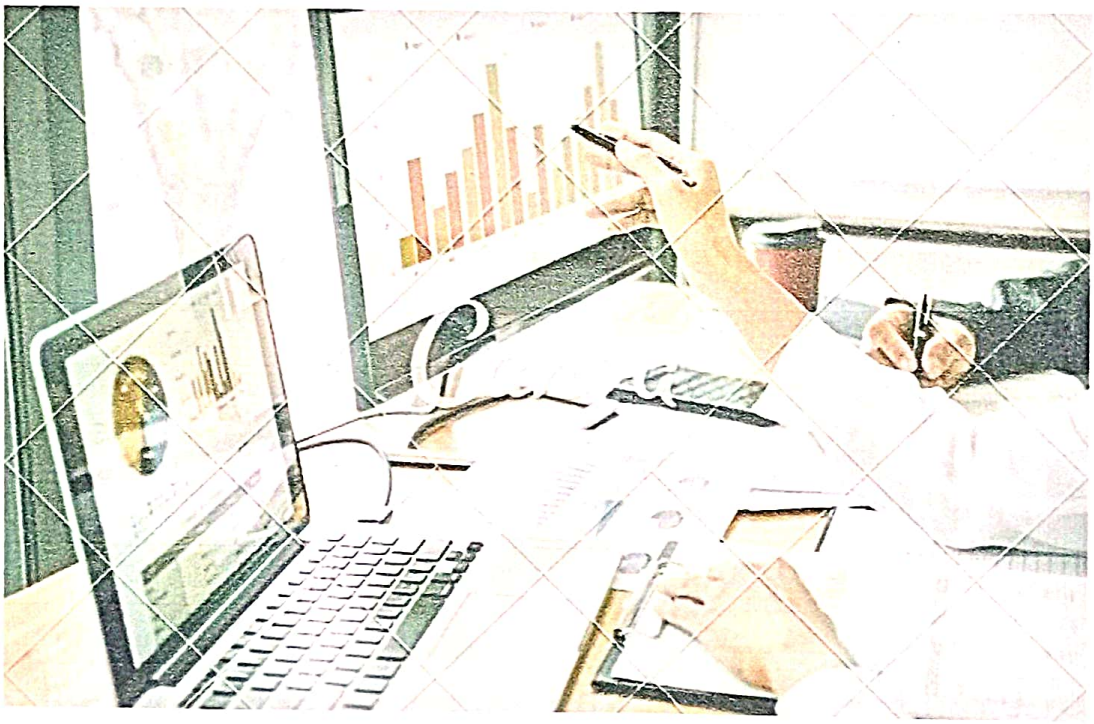
Quiz participation – Tool : Quizalize





BUSINESS ANALYTICS

REPORT



PRESENTED BY:

P.J.SOWMIYA

21CS53

III YEAR-CSE

40/40

Introduction

In its 2014 Magic Quadrant report on business intelligence and analytics platforms, Gartner Research Group1 predicts that advanced analytics platforms, such as those supporting data-driven decision making, will be one of the fastest growing market segments between now and 2017. The payoff for executing on a data-driven management strategy can be huge. A study by MIT/Sloan Management Review and IBM Institute of Business Value2 found that companies which replaced intuition and experience with analytics-driven insight noted that they substantially outperformed their peers. These market makers and shakers used analytics widely and often -- to guide day-to-day decisions and plan for the future. In fact, they used analysis five times more often than the lower performers. So what exactly is data analytics, and how do you tap into it to improve business processes within your organization? Data analysis involves gathering and examining all the key raw bits of information streaming in and around your organization in order to validate and optimize the effectiveness and efficiency of its processes. This includes sales data, marketing data from search, social and mobile sources, human resource and operational data, and more.

Harnessing Analytics

Four Key Factors Business analytics is greatly enhanced through the use of data visualization, which helps transform raw data into useful information that sheds light on how you're doing against core business objectives. By gaining visibility into hidden patterns, unknown correlations and other useful insights, your team is powered up to make intelligent and forward-looking

decisions. But how do you harness analytics to see the stories hidden inside your data? By bringing all the pieces together, and processing them to surface relevant information needed by information consumers in an easy to understand, action-oriented way. Let's take a look at four key factors involved in bringing insight to your employees.

1. Defining Your Business Objectives

   Many business challenges can be tackled with business analytics, but if you're not crystal clear on what you're trying to achieve, or try to boil the ocean by doing too much all at once, you'll likely drown in poor communication and lack of buy in. Begin with your corporate goals, and create a list of related questions your business needs answers to. Target the biggest problems or opportunities, and focus on areas over which you have control. For example, if one of your corporate goals is to grow profit by twenty percent annually, a related question might be "How can we reduce expenses by five percent?" Another could be "Which customer segment offers the best growth opportunity?" Be careful not to get caught in the "solution" trap of thinking about what data is readily available to answer the questions. You can focus on producing reports only to find out that they don't address the real business issues, which might be low customer retention or poor customer support. The objectives selected must be easy to explain, measurable and time based, so you know if you're making progress towards them or not.

2. Getting Buy In Getting stakeholder alignment on business challenges and related objectives is critical. Given the diverse

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Vendor Capabilities 12

Product Feature Summary 18

Product Features 20

Emotional Footprint Summary 26

Emotional Footprint 28

How to Use the Report

Info-Tech's Category Reports provide a comprehensive evaluation of popular products in the Business Intelligence market. This buyer's guide is designed to help prospective purchasers make better decisions by leveraging the experiences of real users.

The data in this report is collected from real end users, meticulously verified for veracity, exhaustively analyzed, and visualized in easy to understand charts and graphs. Each product is compared and contrasted with all other vendors in their category to create a holistic, unbiased view of the product landscape.

Use this report to determine which product is right for your organization. For highly detailed reports on individual products, see Info-Tech's Product Scorecard.

Software Directory

BUSINESS INTELLIGENCE SOFTWARE

Business Intelligence Software

- 1010data Analytical Platform
- 5000fish Inc Yurbi
- Acorn Performance Analyzer
- ActivePivot In-Memory Analytical Platform
- Adaptive Insights Adaptive Suite
- Algorithmic Digital Solutions
- Alteryx
- APOS
- Arcadia Data
- Arcplan Enterprise
- Ascend BI
- Asset Answers
- Attunity Visibility (formerly AppTivent)
- Balanced Insight
- Birst BI Platform
- Bispoke
- Bissantz DeltaMaster
- Bitam Artus
- BMC TrueSight
- BOARD
- CALUMO
- CAMMS Power Data
- Centrifuge Analytics
- Coldwater Technology B-Metrics
- Collectivei
- Column Technologies BI
- comScore Digital Analytix Enterprise
- Corvil
- Cubeware C8 Platform
- Datapine
- Decision Management Suite
- Dell BI
- Deltek wInsight Analytics
- Domo
- Dundas BI
- Dunnhumby PriceStrat

Software Directory

BUSINESS INTELLIGENCE SOFTWARE

Business Intelligence Software

- ElegantJ BI
- Enertia
- ExtraHop Platform
- Geckoboard
- Host Analytics EPM suite
- IBM i2 Analyst's Notebook
- Infonea
- IronRock Solutions
- Jedox
- KnowledgeTree
- Logi Analytics
- Magnitude BI Solutions
- Eloqua Insight
- Entrinsik Informer
- Factual Enterprise
- GoodData
- HP Business Intelligence Solutions
- IBM Watson Analytics
- Information Builders WebFOCUS
- Jack Henry Business Intelligence & Financial Performance
- Jinfonet Software JReport
- Lavastorm
- Looker BI
- MammothDB
- Encore Prophix
- E-WorkBook
- Fulcrum Analytics
- Heap Analytics
- IBM Cognos Platform
- InetSoft Style Intelligence
- Inovalon INDICES
- JDA Business Intelligence
- KNIME Analytics Platform
- Leadspace
- Lumina Analytica
- Master Merchant System Overture

Software Directory

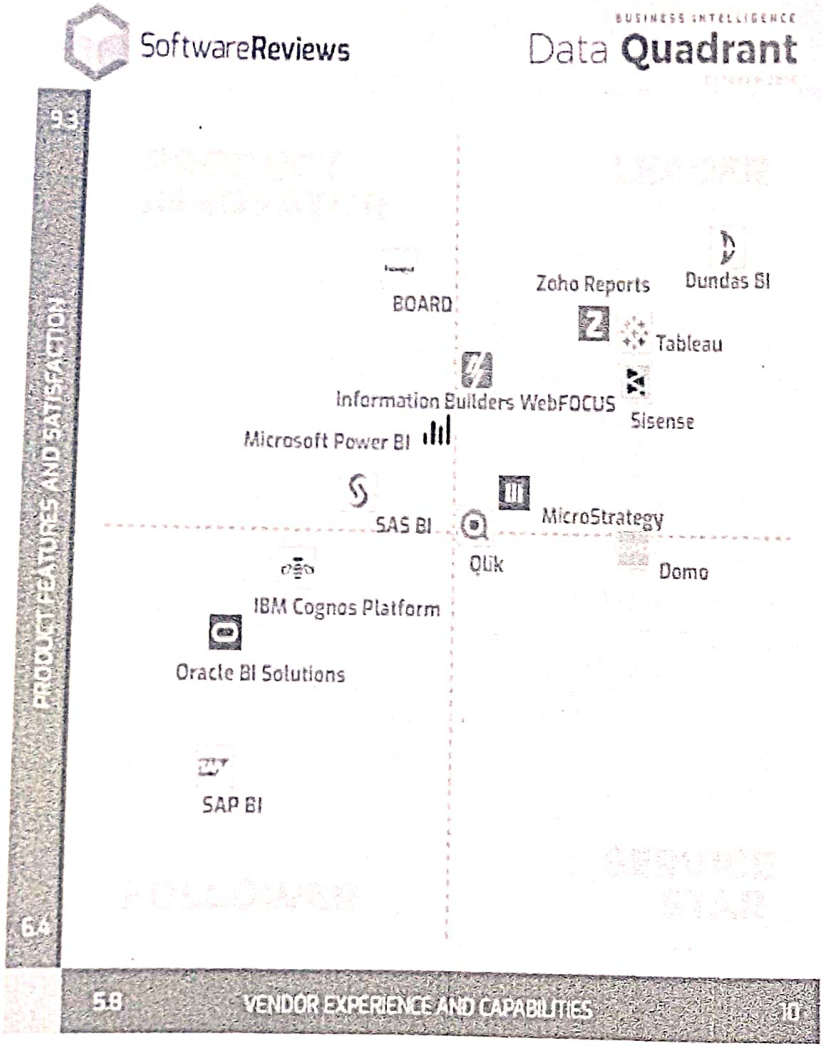
BUSINESS INTELLIGENCE SOFTWARE

Business Intelligence Software

- McKesson Performance Analytics
- MITS Distributor Analytics
- On Demand Analytics SIFT
- Optimizer+
- PARIS BI Solutions
- Polyvista Business Intelligence
- Push Intelligence Platform
- ReachForce
- Saasabi
- Salient Collaborative Intelligence Suite (CIS)
- Silvon Stratum Analytics
- Steelwedge S&OP Insight
- Microsoft Power BI
- Movio Media
- Oniqua Analytics Solution (OAS)
- Oracle BI Solutions
- Pentaho
- Profitbase Suite
- Pyramid Analytics BI Office
- RJMetrics
- Salesforce Einstein Analytics
- SAP BI
- Sisense
- SurveyGizmo
- MicroStrategy
- NGS-IQ
- OpenText Analytics
- Panorama Necto
- Planalytics Weatherize
- Prognoz Platform
- Qlik
- Robust Designs CUBOT
- sales-i
- SAS BI
- SpagoBI
- Sweetspot

SOFTWARE REVIEWS

Data Quadrant



INFO-TECH
SoftwareReviews

BUSINESS INTELLIGENCE

The Complete Software Experience

Product Features and Satisfaction

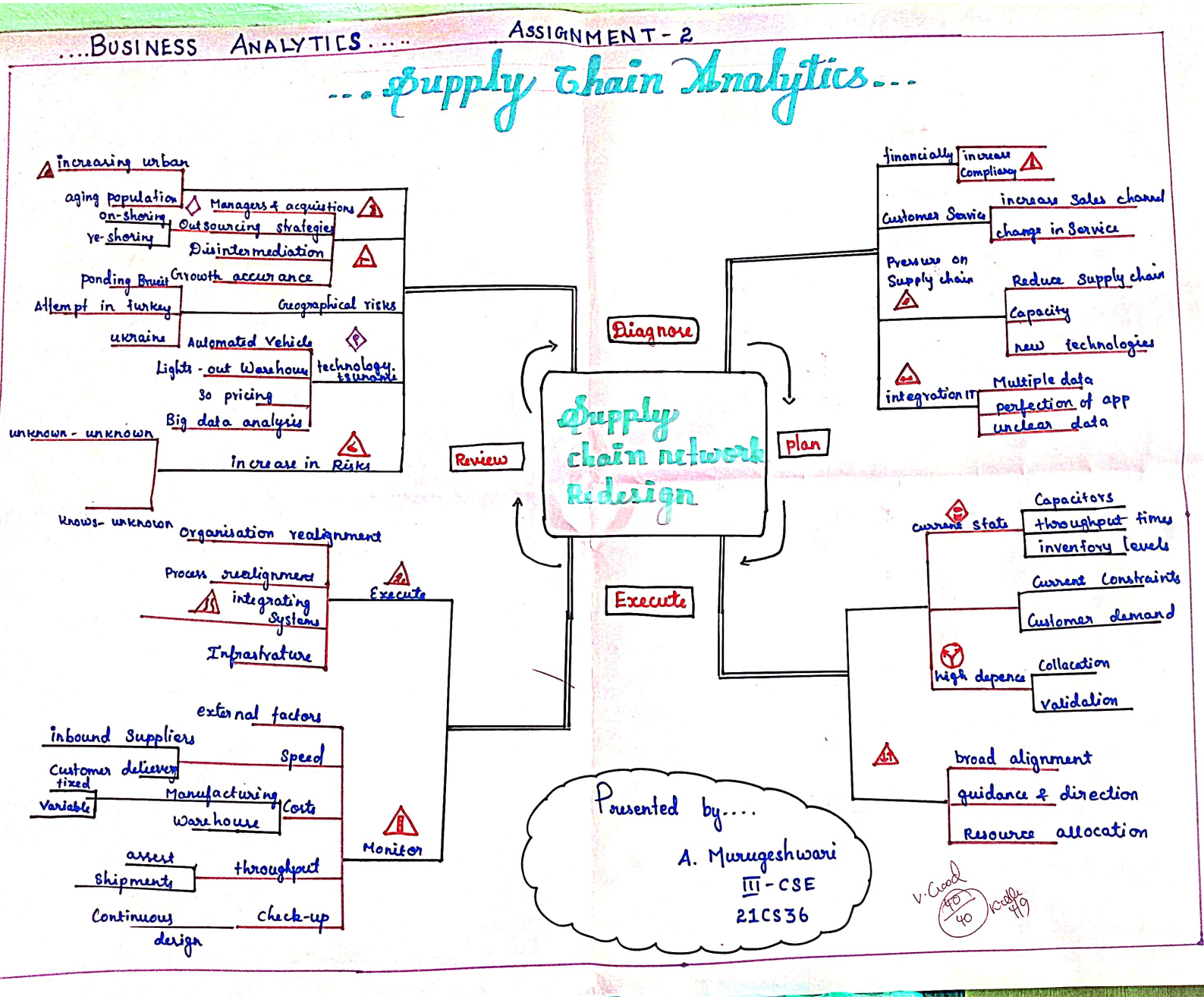
Vendor Experience and Capabilities

Note:

Category Overview

RANK	VENDOR	COMPOSITE SCORE	NET EMOTIONAL FOOTPRINT	NET EMOTIONAL FOOTPRINT DISTRIBUTION	VENDOR CAPABILITIES	PRODUCT FEATURES	LIKELIHOOD TO RECOMMEND	NUMBER OF REVIEWS
	Dundas BI	8.6/10	+86	2% NEGATIVE 88% POSITIVE	81%	77%	86%	36
	Tableau	8.1/10	+76	4% NEGATIVE 80% POSITIVE	78%	77%	80%	150
	Zoho Reports	8.1/10	+77	4% NEGATIVE 81% POSITIVE	76%	76%	82%	33
	Sisense	8.1/10	+78	3% NEGATIVE 81% POSITIVE	76%	75%	81%	32
	Domo	7.9/10	+82	3% NEGATIVE 85% POSITIVE	73%	74%	71%	43
	Information Builders WebFOCUS	7.7/10	+75	6% NEGATIVE 81% POSITIVE	74%	72%	83%	30
	BOARD	7.6/10	+66	7% NEGATIVE 73% POSITIVE	75%	78%	83%	43
8	Microsoft Power BI	7.5/10	+68	9% NEGATIVE 77% POSITIVE	76%	73%	79%	211
8	Qlik	7.5/10	+76	3% NEGATIVE 79% POSITIVE	76%	71%	76%	69
8	MicroStrategy	7.5/10	+76	4% NEGATIVE 80% POSITIVE	74%	73%	75%	44
AVERAGE SCORES		7.5/10	+69		74%	73%	77%	60

Mind Map


...BUSINESS ANALYTICS....
ASSIGNMENT-2
...Supply Chain Analytics...
Diagnose
plan
Execute
Review
Supply chain network Redesign
increasing urban
aging population
on-shoring
re-shoring
Managers & acquisitions
Outsourcing strategies
Disintermediation
Growth accurance
ponding Brexit
Attempt in turkey
ukraine
Geographical risks
Automated Vehicle
Lights-out Warehouse
technology trends
3D printing
Big data analysis
unknown-unknown
Increase in Risks
knows-unknown
Organisation realignment
Process realignment
integrating Systems
Infrastructure
Execute
external factors
Inbound Suppliers
Speed
Customer delievery
tixed
Variable
Manufacturing
Warehouse
Costs
Monitor
assest
Shipments
throughput
Continuous design
check-up
financially
increase Compliacy
Customer Service
increase Sales channel
change in Service
Pressure on Supply chain
Reduce Supply chain
Capacity
new technologies
integration IT
Multiple data
perfection of app
unclear data
current state
Capacitors
throughput times
inventory levels
Current Constraints
Customer demand
high depence
Collacation
Validation
broad alignment
guidance & direction
Resource allocation
Presented by....
A. Murugeshwari
III-CSE
21CS36
V.Good
40/40
Kudos 49

Certification Course

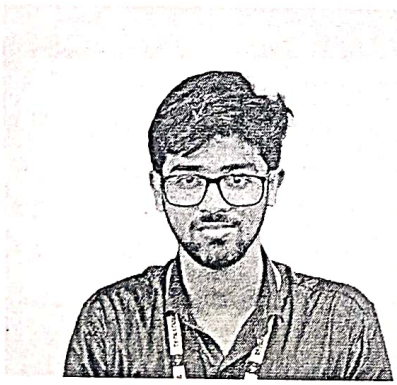
Industrial Visit Report

Visit: [22.05.2024]

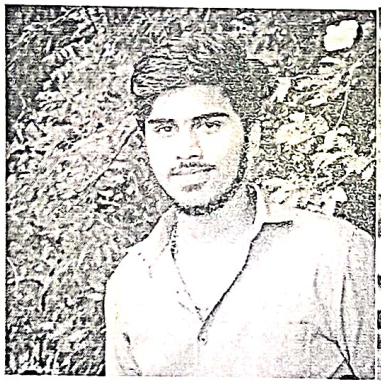
Company: InternIQ

Domain: Testing

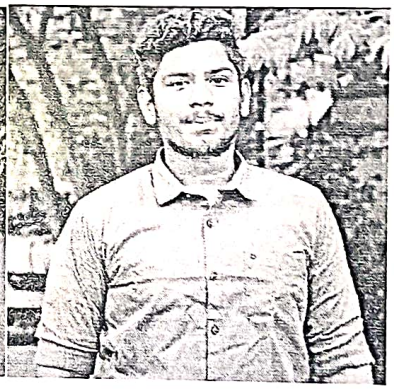
Participants:



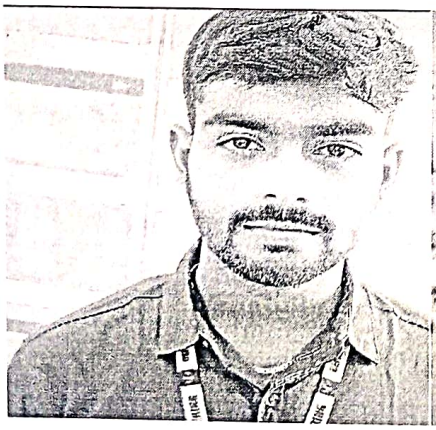
MOHAMED ASICK A



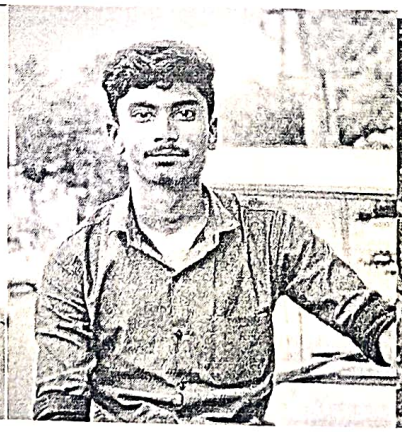
JEEVA R



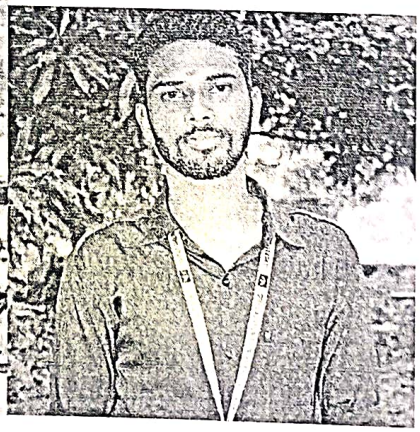
JEEVESH P S



PRAKASH M



KISHORE B



HARIHARAN S

AAKASH S **JANARTHANAN P**

Introduction

On [22.05.2024], a group of candidates visited InternIQ for a one-day industrial visit focused on the Testing domain. This visit aimed to provide participants with practical insights into the company's testing processes, methodologies, and tools, enhancing their understanding of the industry.

Objectives

- To understand the testing lifecycle and methodologies used at InternIQ.
- To gain hands-on experience with testing tools and techniques.
- To observe real-world application of testing processes.
- To interact with industry professionals and clarify queries related to the testing domain.

Schedule

- 09:00 AM - 09:30 AM: Welcome and Introduction
- 09:30 AM - 11:00 AM: Presentation on Testing Lifecycle and Methodologies
- 11:00 AM - 12:30 PM: Demonstration of Testing Tools and Techniques
- 12:30 PM - 01:30 PM: Lunch Break
- 01:30 PM - 03:00 PM: Hands-on Session with Testing Tools

- 03:00 PM - 04:30 PM: Q&A Session with Testing Professionals
- 04:30 PM - 05:00 PM: Feedback and Closing Remarks

Highlights

1. Presentation on Testing Lifecycle and Methodologies:

The visit began with an informative presentation by [Presenter's Name], who provided an overview of the testing lifecycle at InternIQ. The presentation covered various methodologies such as Agile, Waterfall, and DevOps, and emphasized the importance of each stage in the testing process.

2. Demonstration of Testing Tools and Techniques:

Participants were given a live demonstration of various testing tools used at InternIQ, including automated testing frameworks and manual testing procedures. The demonstration highlighted how these tools help in identifying and resolving issues efficiently.

3. Hands-on Session:

The hands-on session was a key part of the visit, allowing participants to work directly with the testing tools. Under the guidance of experienced professionals, they executed test cases, identified bugs, and understood the process of documenting and reporting defects.

4. Q&A Session:

The interactive Q&A session provided an opportunity for participants to engage with InternIQ's testing team. The professionals addressed various queries related to career paths in testing, emerging trends, and best practices in the industry.

5. Feedback and Closing Remarks:

The visit concluded with a feedback session where participants shared their experiences and suggestions. The closing remarks were delivered by [Closing Speaker's Name], who thanked the participants for their enthusiasm and active participation.

Conclusion

The industrial visit to InternIQ's Testing department was a highly educational and enriching experience for the participants. It provided them with a comprehensive understanding of the testing processes and equipped them with practical skills that will be beneficial in their future careers. The participants expressed their gratitude for the opportunity and appreciated the efforts of the InternIQ team in making the visit a success.

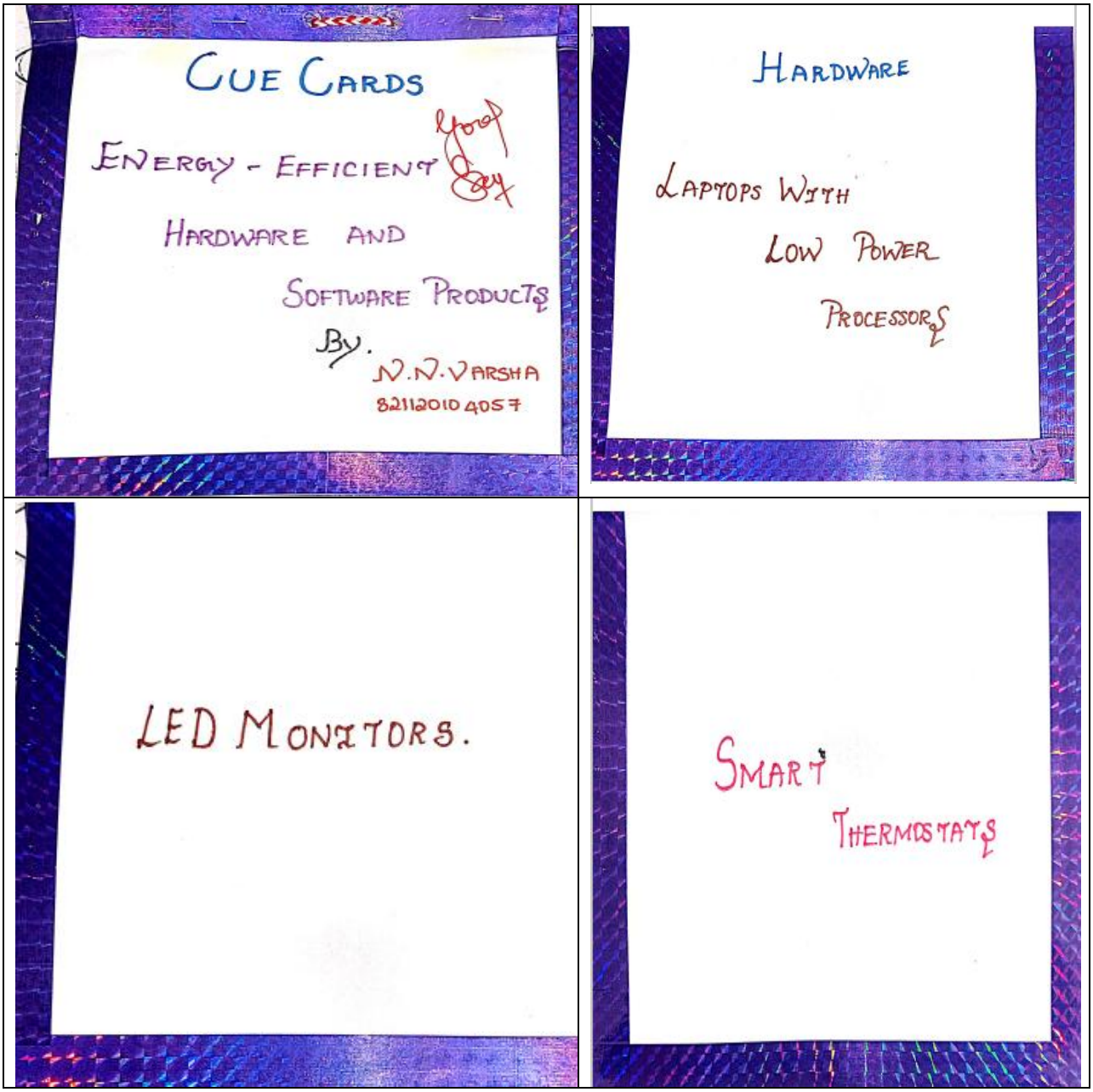
InternIQ

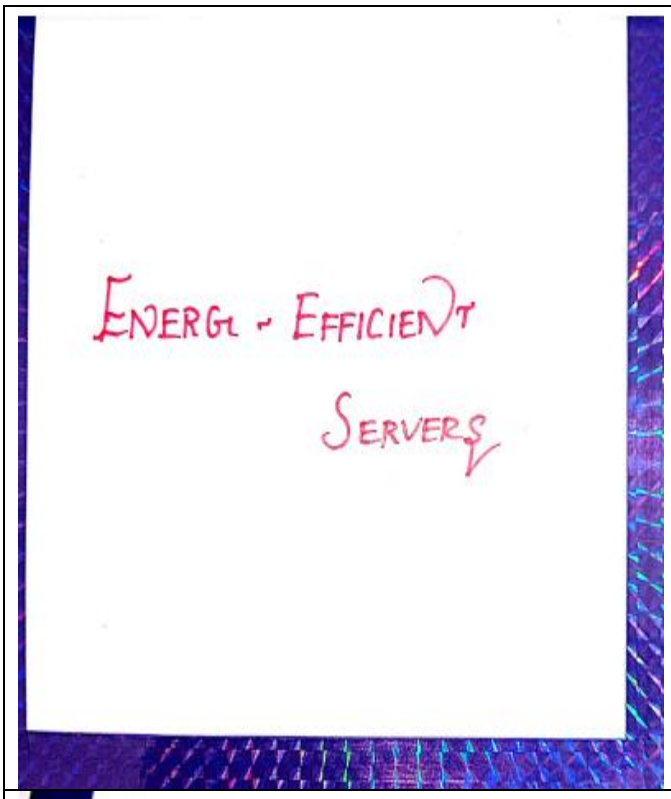
Empowering Future Innovators

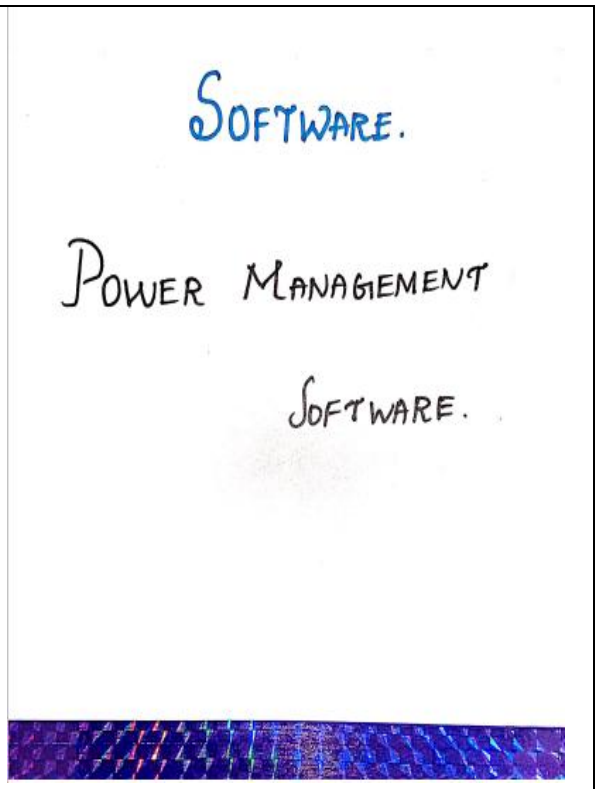
Location: Thanjavur,Tamil Nadu

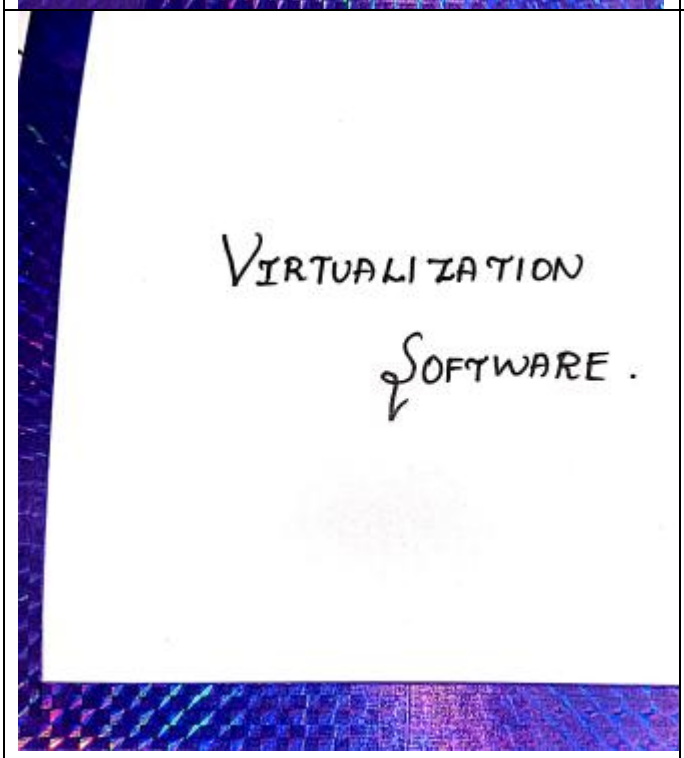
CO-FOUNDER

CUE CARDS


CUE CARDS
ENERGY - EFFICIENT
HARDWARE AND
SOFTWARE PRODUCTS
By.
N.N.VARSHA
821201040057
HARDWARE
LAPTOPS WITH
LOW POWER
PROCESSORS
LED MONITORS.
SMART
THERMOSTATS


ENERGY - EFFICIENT
SERVERS


SOFTWARE.
POWER MANAGEMENT
SOFTWARE.

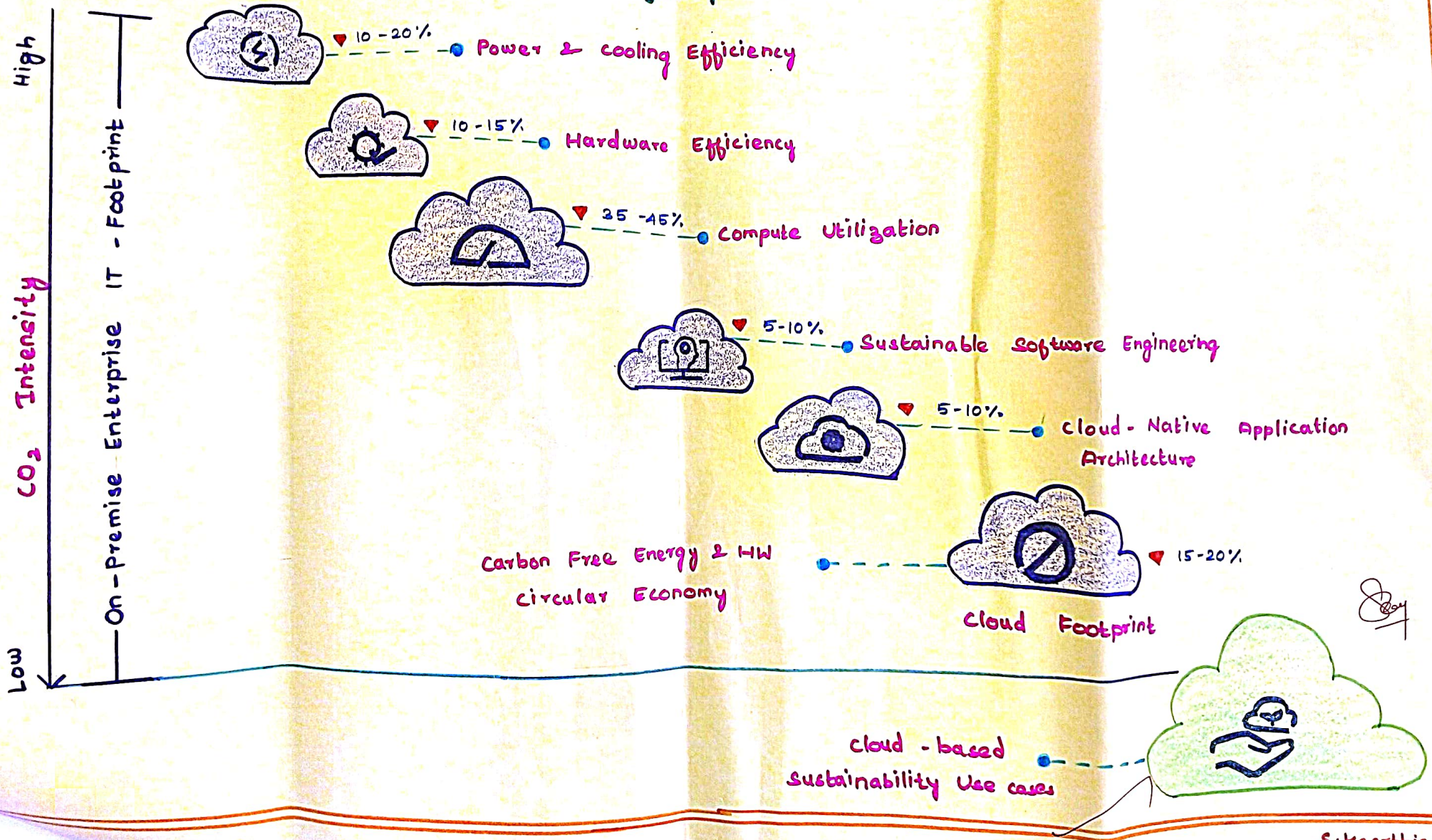

VIRTUALIZATION
SOFTWARE.


CLOUD COMPUTING
SERVICES

Case Study

Case Study Presentation

Environmental impact of the current computing practices and how to reduce their carbon footprint



S. Keerthiga

8BillionTrees.com

Your Annual Carbon Footprint Is 11.27 Tons.

This section shows how your carbon pollution compares with the average global citizen's (5.29 tons).

Why do Americans have such high levels of carbon pollution?

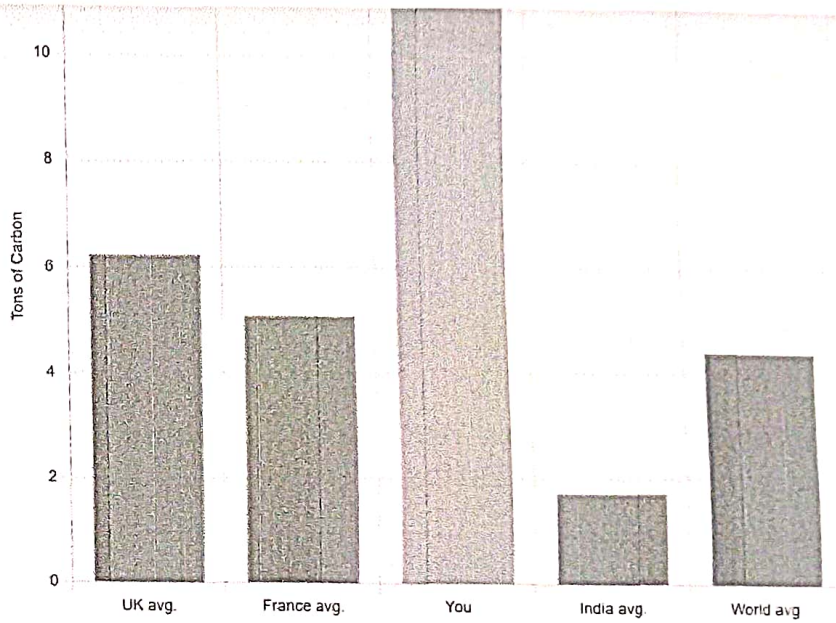
Modern technology and infrastructure leads to extremely-high levels of consumption. And with this consumption comes a large footprint.

Making matters worse, the average carbon footprint for American households is well within the top 1% of carbon polluters.

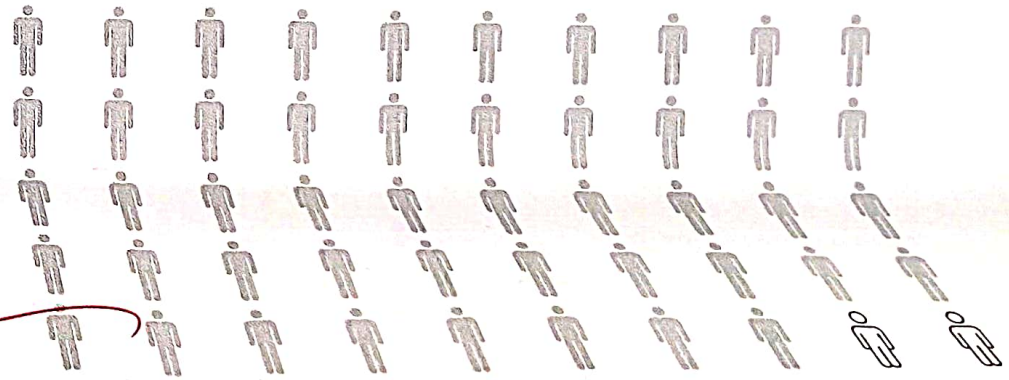
Everyone has a part to play in the climate change solution, but those with a massive footprint have even more of a reason to act.

3/29/24, 10:03 AM 8 Billion Trees: Carbon Offset Projects & Ecological Footprint Calculators - Report

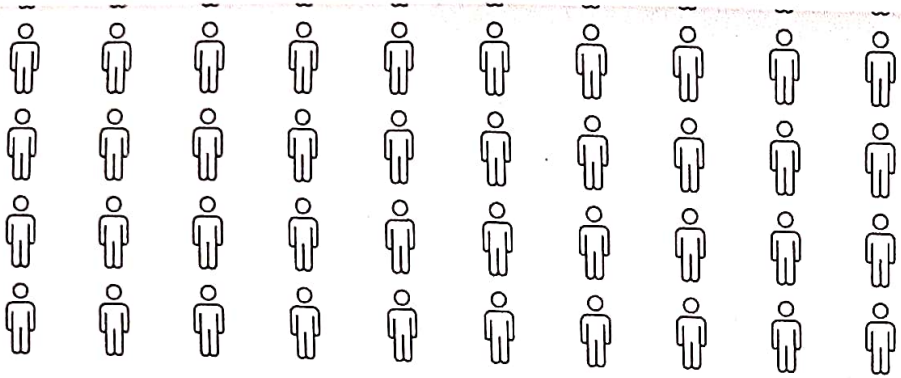
8BillionTrees.com



Your carbon emissions place you in the top 48% of the world.



https://8billiontrees.com/carbon-calculator/report/?carbon=580e



If Everyone Lived Like You We Would Need 2.3 Earths

How Many Trees You Would Have To Plant Each Year To Offset Your Carbon Footprint...

120

To do this you would have to:

1. Acquire government approval to gain protected status for devastated areas
2. Sign contractually-binding agreements with local officials to obtain permission to start planting trees
3. Begin collecting seeds from native tree species in the area to ensure animals and wildlife are not harmed by planting the wrong species

4. to plant, analyzing science reports from many sources to form a forest modeling report
5. Travel to the planting sites to create project boundaries and negotiate with any nearby landowners to ensure the trees are not harmed
6. Assemble the requires tools and machinery for planting and coordinate the logistics to make sure everything is prepared for planting
7. Travel with hundreds of planters through dense vegetation, dirt roads, and even boats to the remote planting sites
8. Begin preparing the land, removing debris, and conducting a wildlife survey to honor animal habitats throughout the planting exercise
9. Plant the trees, often in temperatures exceeding 90 degrees in the humid Amazon Rainforest
10. Monitor the perimeters of the planting sites and employ a full-time monitoring team to check on the trees every month
11. Conduct post-planting analysis and submit the required documentation to governments and monitoring organizations to ensure the planting is successfully healing the planet and saving endangered wildlife
12.

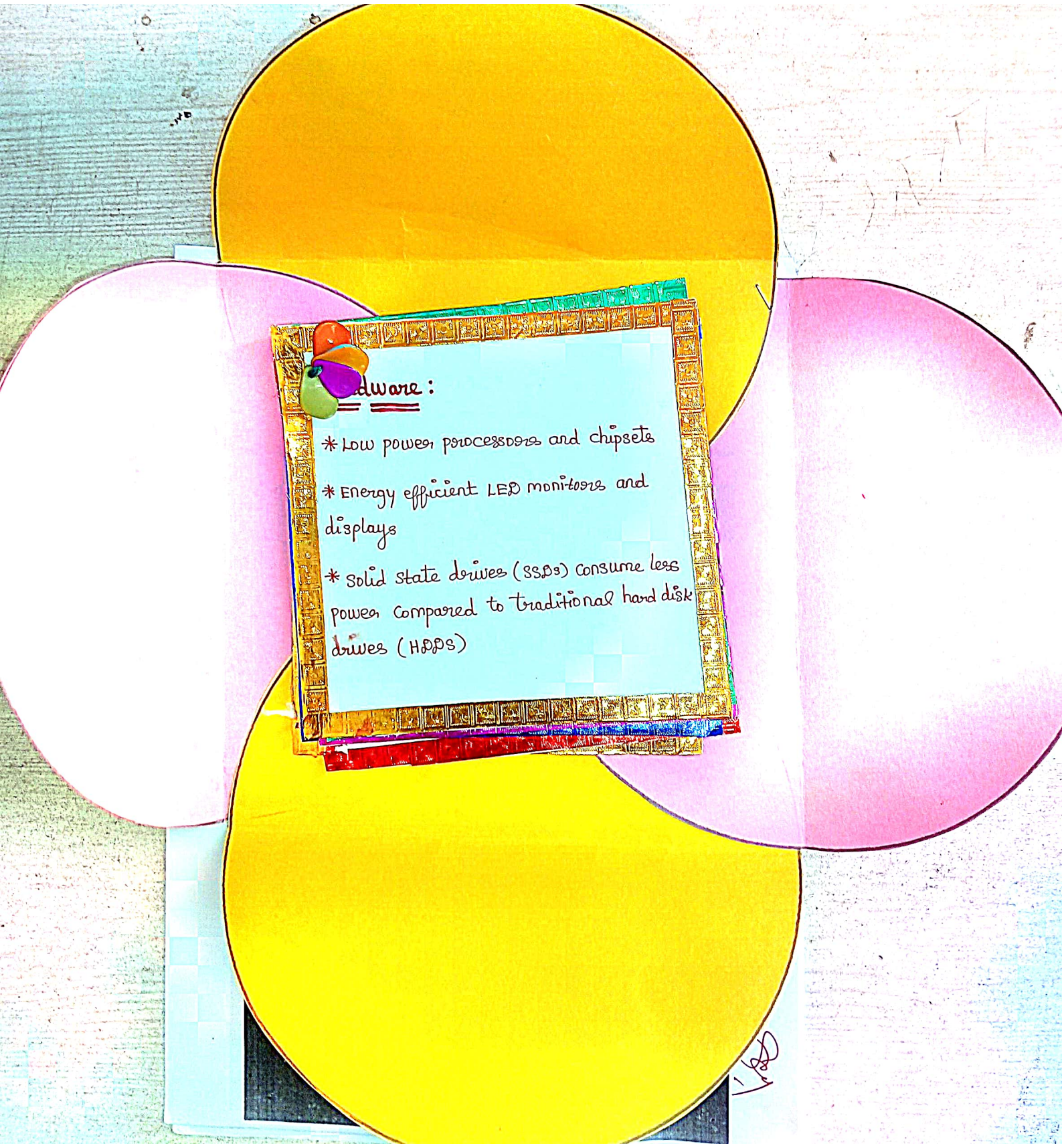
Many people simply don't have the time or ability to do this. That's where 8 Billion Trees comes in: we plant your trees in your name to erase your carbon pollution and negative impact on the planet.

Planting Trees Helps Heal The Planet And Save Animal Wildlife

Animal wildlife are often the true victims of consumption-driven deforestation. When Americans and those in other western countries use energy, buy products, or use services like healthcare and transportation—those resources have to come from somewhere.

And sadly, the Amazon has been a key target. Native forests are being destroyed at record rates to make room for palm oil and livestock farms. Over half of the world's tropical forests have been destroyed since 1970 due to mass deforestation and

Flash Card


dware:
* Low power processors and chipsets
* Energy efficient LED monitors and displays
* Solid state drives (SSDs) consume less power compared to traditional hard disk drives (HDDs)

Refrigerators : Energy Star rated refrigerators are designed to consume less energy while maintaining optimal Cooling performance. They often feature likes improved insulation, more efficient Compressors.

Washing machines : Energy Star - certified Washing machines are designed to use less water and energy per cycle Compared to conventional models.

Air conditioners : It is more energy efficient than standard models helping to reduce electricity bills while maintaining comfortable indoor temperatures.

Televisions : It is designed to consume less energy than conventional models without scarificing picture quality.

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Affiliated to Anna University, Chennai.

ACCREDITED WITH GRADE B++ NAAC

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR

2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2023-2024

SUBJECT: BEEE **ACTIVITY: CLUECARDS**

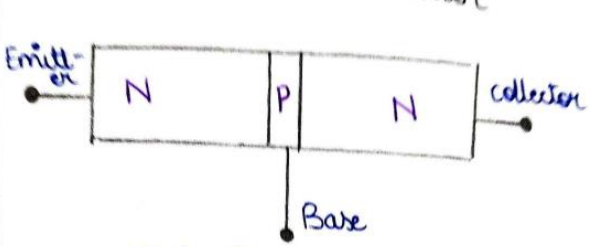
ASSIGNMENT

L. Saai Kirthiga
23CSB15
BEEE
~ Clue Cards

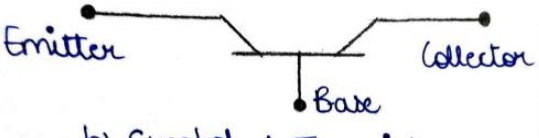
40
12/4/24

CONSTRUCTION AND WORKING OF BJT

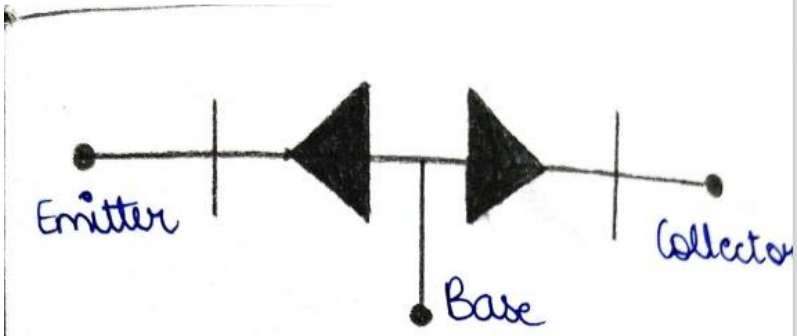
Bipolar Junction Transistor



a) Construction of Transistor.



b) Symbol of Transistor



c) Equivalent Circuit of Transistor.

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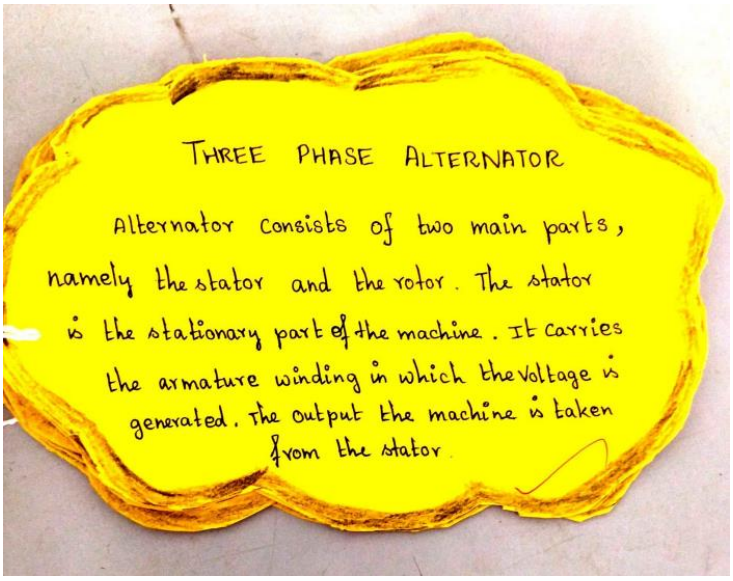
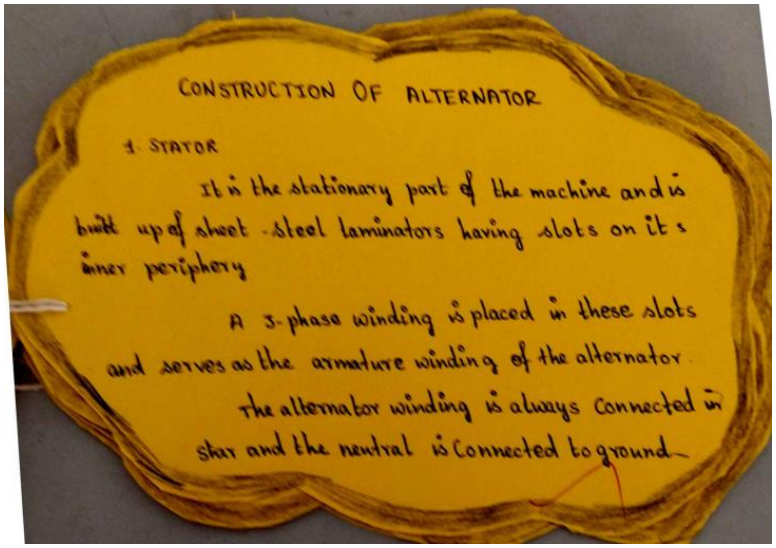
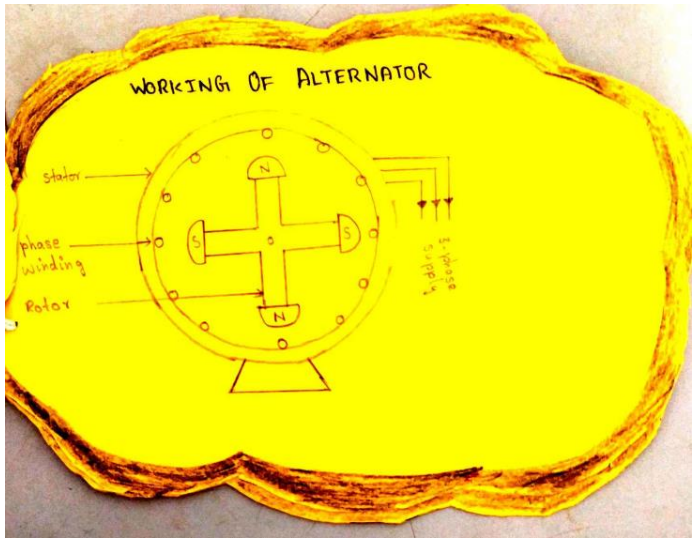
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2023-2024

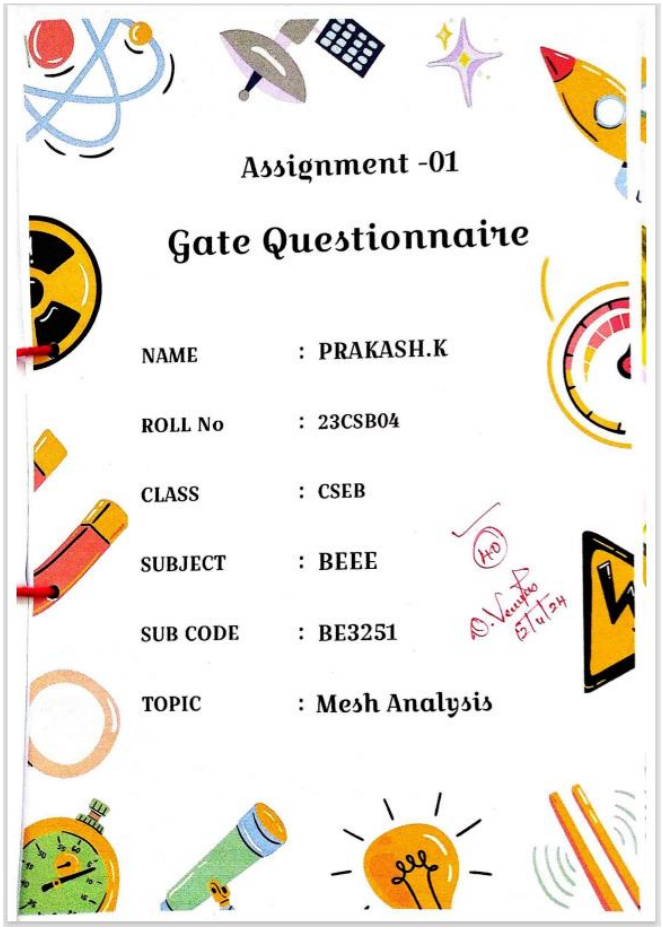
SUBJECT: BEEE **ACTIVITY: CLUECARDS**







SUBJECT: BEEE **ACTIVITY: GATE QUESTIONAIRE**



Assignment -01

Gate Questionnaire

NAME : PRAKASH.K

ROLL No : 23CSB04

CLASS : CSEB

SUBJECT : BEEE

SUB CODE : BE3251

TOPIC : Mesh Analysis

GATE QUESTIONS

Mesh Analysis

1. What is mesh analysis?
   - Answer: Technique
2. What law governs mesh analysis?
   - Answer: Kirchhoff's
   - Options: Ohm's, Newton's, Kirchhoff's
3. How many mesh currents are typically defined in a circuit?
   - Answer: Multiple
   - Options: One, Multiple, None
4. What do you solve for in mesh analysis?
   - Answer: Mesh currents
   - Options: Voltage, Current, Mesh currents
5. How many mesh equations are typically formed for a circuit with 'n' meshes?
   - Answer: 'n'
   - Options: 'n+1', 'n', '2n'
6. Which analysis technique is complementary to mesh analysis?
   - Answer: Nodal
   - Options: Mesh, Nodal, Supermesh
7. What law is applied to each mesh in mesh analysis?
   - Answer: Kirchhoff's voltage law
   - Options: Ohm's law, Kirchhoff's voltage law, Faraday's law
8. How are dependent sources handled in mesh analysis?
   - Answer: Through substitution
   - Options: Ignored, Through substitution, Eliminated

9. What type of sources are included in mesh analysis?
   - Answer: Independent
   - Options: Independent, Dependent, Both
10. What is the primary advantage of mesh analysis?
    - Answer: Fewer equations
    - Options: Faster computation, Fewer equations, More accurate
11. What is the primary focus of mesh analysis?
    - Answer: Current flow.

12. What term describes a closed loop in a circuit?
    - Answer: Mesh.

13. In mesh analysis, what law is used to write equations for each mesh?
    - Answer: Kirchhoff's Voltage Law (KVL).

14. How many equations are typically written for each mesh in mesh analysis?

    - Answer: One equation per mesh.

15. What is the fundamental unit of analysis in mesh analysis?
    - Answer: Mesh.

16. What do you call a loop in a circuit that contains no other loops within it?

    - Answer: Simple mesh.

17. What method is used to solve simultaneous equations in mesh analysis?
    - Answer: Linear algebra or matrix manipulation.

18. In mesh analysis, what term describes the sum of voltage drops around a closed loop?
    - Answer: Loop voltage.

19. How are currents represented in mesh analysis equations?
    - Answer: Using mesh currents.

20. What principle is applied to conserve energy in mesh analysis?
    - Answer: Conservation of energy, governed by Kirchhoff's Laws.

EVEN SEMESTER — ASSIGNMENT-II

NAME : K. VIJAY KUMAR

CLASS/SEC : CSE/B/I

SUBJECT/CODE: BEEE/BE3251

ROLL NO : 23CS851

DATE : 10.06.2024

TOPIC : CONCEPT MAPPING ON SCR

40

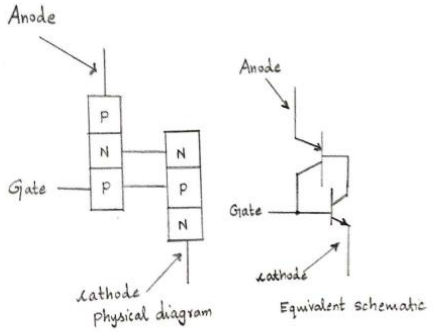
K. Vijay Kumar 10/6/24.

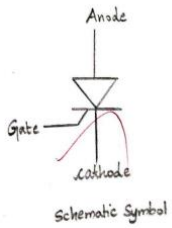
SILICON (OR) SEMICONDUCTOR CONTROLLED RECTIFIER

Silicon Controlled Rectifier (SCR)

- Silicon controlled Rectifiers (SCRs) are Semiconductor devices known for managing high voltage and current
- SCRs have three terminals : an anode, cathode, and gate, with the gate controlling current flow.
- they operate in various modes like forward blocking, forward conduction, and reverse blocking.
- SCRs are utilized in power control, motor speed regulati battery charging, Inverters, and lighting.
- Despite their advantages, care is required to manage volta transients, gate control, and heat generation.

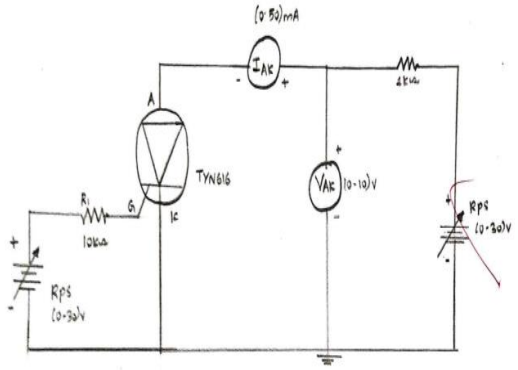
BASIC DIAGRAM IN SCR





Schematic Symbol

CHARACTERISTICS



Silicon-controlled Rectifier (SCR) characteristics

Forward characteristics - When the anode is made positive with respect to the cathode, then the curve between V and I is called as forward characteristics of the SCR.

Design a Battery charger System Using Scr

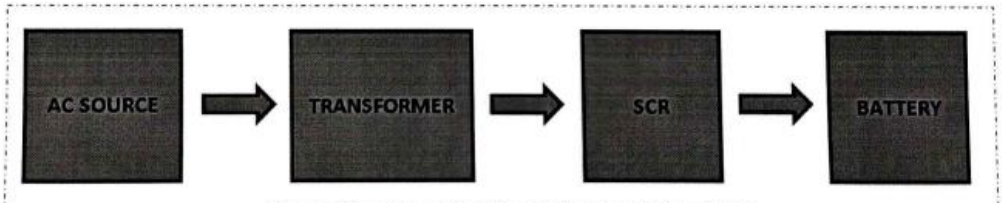
On Mini Project

Name : Subalakshmi E
class : CSE - B - 2nd sem
Roll no : 23CSB33
Subject : BEEE - BE3251

Assignment - 2

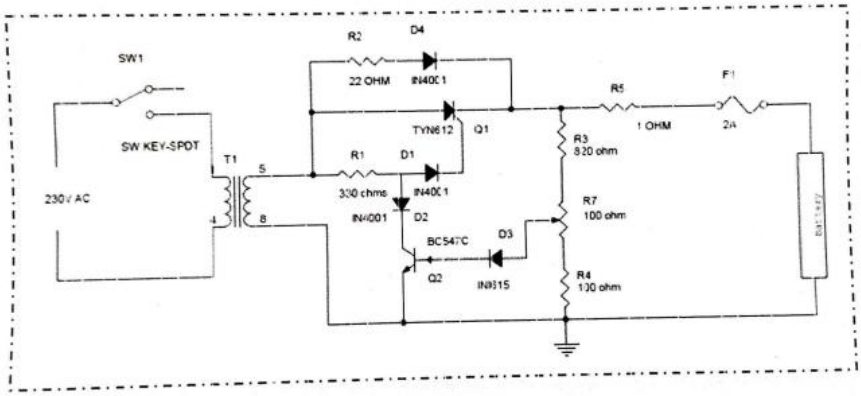
Battery Charger Circuit Using SCR

- The battery is charged with small amount of AC voltage or DC voltage. So if you want to charge your battery with AC source then should follow these steps, we need first limit the large AC voltage, need to filter the AC voltage to remove the noise, regulate and get the constant voltage and then give the resulting voltage to the battery for charging. Once charging is completed the circuit should automatically turned off.



Block Diagram of Battery Charger Using SCR

Circuit Diagram of Battery Charger Using SCR



Circuit Diagram Explanation

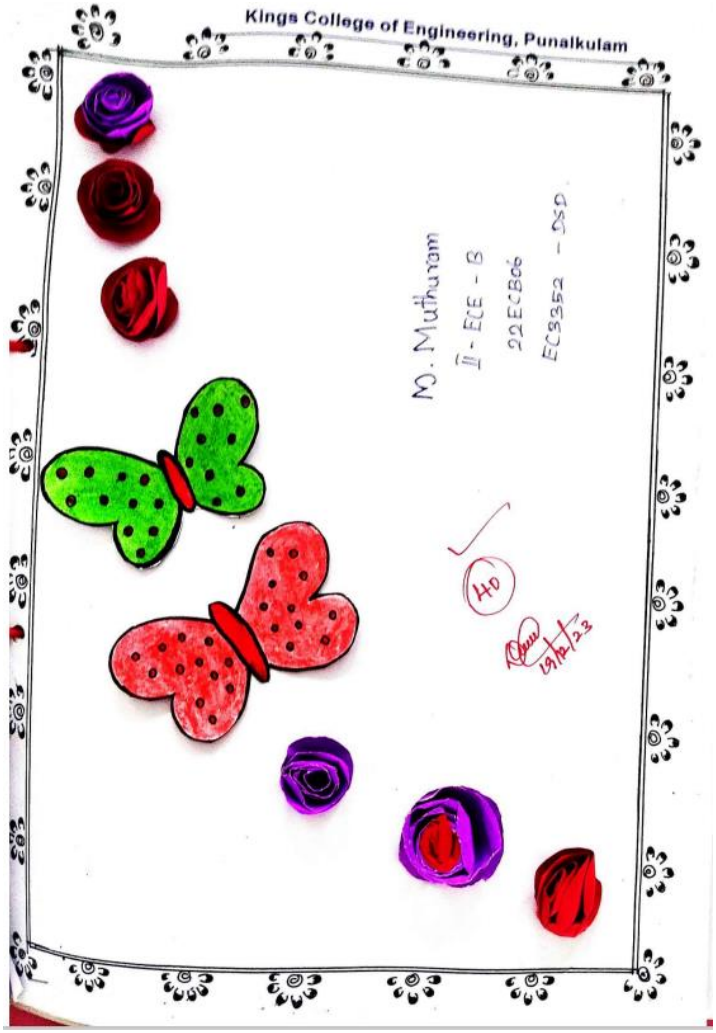
- The AC main voltage is given to the step down transformer the voltage should be down to 20V approx. the step down voltage is given to the SCR for rectification and SCR rectifies AC main voltage. This rectified voltage is used to charge battery.
- When the battery connecter to the charging circuit, the battery will not be dead completely and it will get discharged this will give the forward bias voltage to the transistor through the diode D2 and resistor R7 which will get turned on. When the transistor is turned on the SCR will get off.
- When the battery voltage is dropped the forward bias will be decreased and transistor gets turned off. When the transistor is turned off automatically the diode D1 and resistor R3 will get the current to the gate of the SCR, this will triggers the SCR and gets conduct. SCR will rectifies the AC input voltage and give to the battery through Resistor R6.
- This will charge the battery when the voltage drop in the battery decreases the forward bias current also gets increased to the transistor when the battery is completely charged the Transistor Q1 will be again turned on and turned off the SCR.

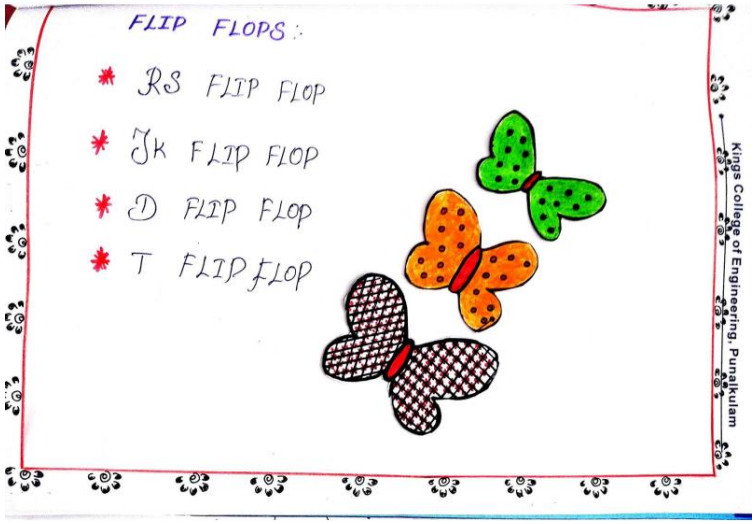
KINGS COLLEGE OF ENGINEERING
Recognised under 2(f) & 12(B) of UGC
Approved by AICTE, New Delhi.
Affiliated to Anna University, Chennai.

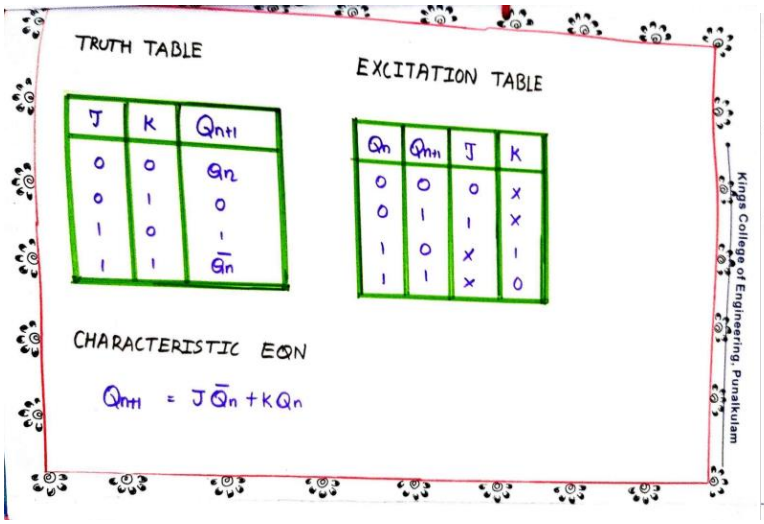
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2023-2024

SUBJECT: DIGITAL SYSTEM DESIGN **ACTIVITY: CLUECARDS**



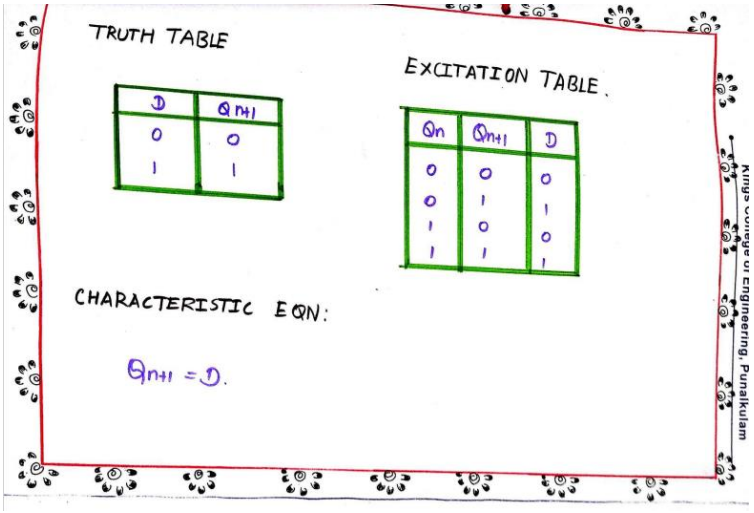




J	K	Q_{n+1}
0	0	Q_n
0	1	0
1	0	1
1	1	$\bar{Q}_n$

Q_n	Q_{n+1}	J	K
0	0	0	x
0	1	1	x
1	0	x	1
1	1	x	0

$Q_{n+1} = J\bar{Q}_n + KQ_n$



D	Q_{n+1}
0	0
1	1

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

$Q_{n+1} = D$.

CAT-II ASSIGNMENT

EC3352 - Digital System Design

Topic :- State Minimization

Evaluation: Think Break Excercise

DAY:- 15/12/23

DATE:- FRIDAY

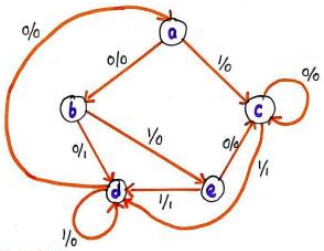
By:-

S.Vishwaatharshan

(22ECE039)

Think Break Excercise in STATE MINIMIZATION.

1) Apply state reduction for the following state diagram and draw the reduced state diagram.



Step 1: State table :-

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
a	b	c	0	0
b	d	e	1	0
c	c	d	0	1
d	a	d	0	0
e	c	d	0	1

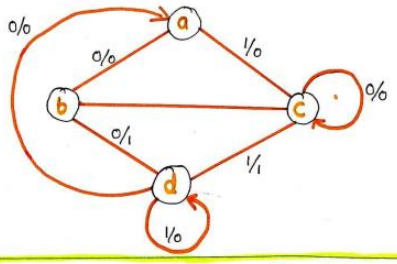
Here the states c and e have same next state and output. So both are equal. Now we can eliminate the last state e. and e=c. So wherever e is present it should be replaced as c.

Step 2: Reduced State Table :-

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
a	b	c	0	0
b	d	c	1	0
c	c	d	0	1
d	a	d	0	0

So it is a minimized state table.

Step 3: Reduced State Diagram :-

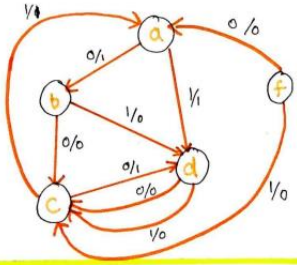


2) Apply state reduction for the following state diagram and draw the reduced state as a diagram.

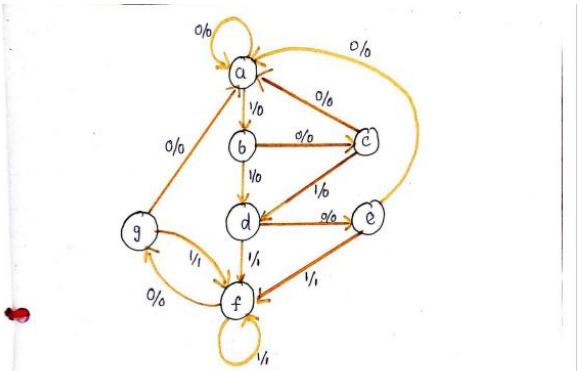
Present State	Next State		Output	
	X=0	X=0	X=0	X=1
a	b	d	1	1
b	c	d	0	0
c	d	a	1	1
d	c	c	0	0
f	a	c	0	0

So it is a minimized state table.

Step 3: Reduced State diagram



3) Apply state reduction for the following state diagram and draw the reduced state diagram



Step 1: State table

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f	0	1

* Here state e and g have same next state and output so both are equal. Now we can eliminate the last state g and g=e so wherever g is present it should be replaced as 'e'.

Present State	Next State		Output	
	x=0	x=1	x=0	x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	(5) d	0	1
e	a	(f) d	0	1
f	e	f	0	1

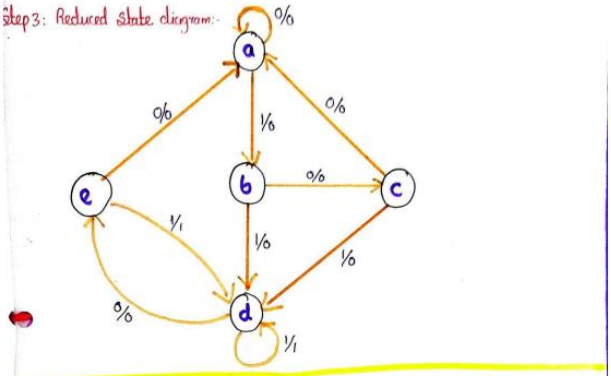
Here d and f state have same next state and output so both are equal. Now we can eliminate the last state f and f=d so wherever f is present it should be replaced as 'd'.

Step 2: Reduced state table:-

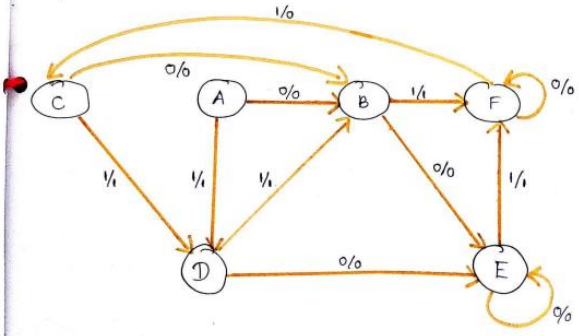
Present State	Next State		Output	
	x=0	x=1	x=0	x=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	d	0	1
e	a	d	0	1

So it is a minimized state table.

Step 3: Reduced state diagram:-



4) Apply state reduction for the following state diagram and draw the reduced state diagram.



Step 1: State table :-

Present State	Next State		Output	
	x=0	x=1	x=0	x=1
A	B	D	0	1
B	E	F	0	1
C	B	D	0	1
D	E	B	0	1
E	E	F	0	1
F	F	C	0	1

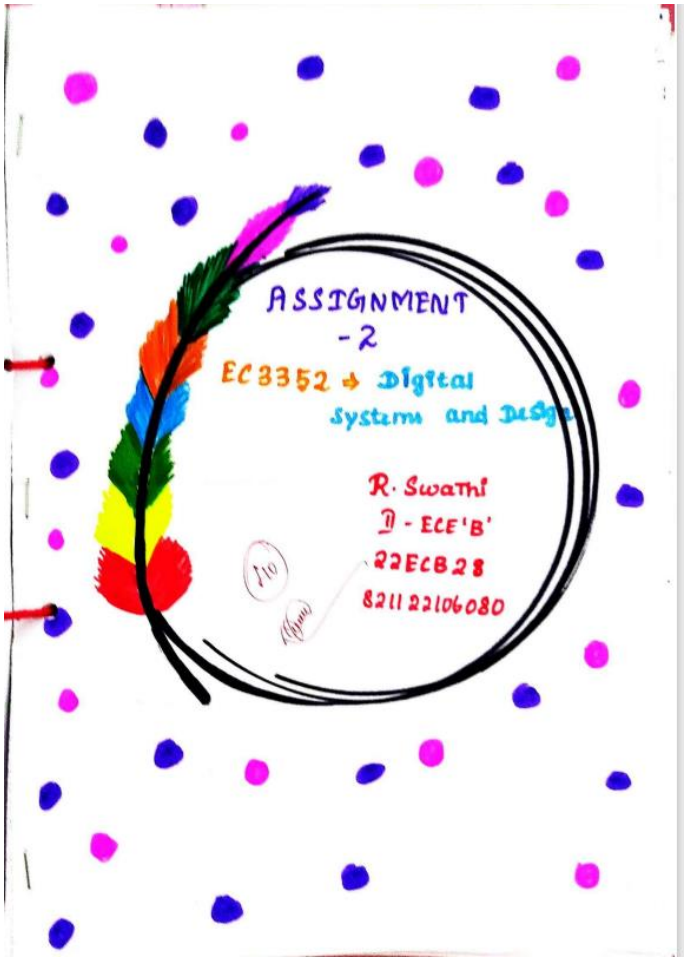
Here state A and C have same next state and output so both are equal. Now we can eliminate the last state C and C=A C is it should be replaced as 'A'. B and E it is eliminate the last state E and E=B E is it should be replaced as 'B'.

Step 2: Reduced state table:-

Present State	Next State		Output	
	x=0	x=1	x=0	x=1
A	B	D	0	1
B	B	F	0	1
D	B	B	0	1
F	F	A	0	0

So it is a minimized state table.

Step 3: Reduced state diagram:-



ASYNCHRONOUS SEQUENTIAL CIRCUIT

GATE QUESTIONAIRE

(1) consider the following asynchronous sequential circuit with two inputs A and B and one output Q. The transition table is given below

A	B	Q	Q^+
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

What is the next state Expression for Q^+ in terms of A, B and Q ?

a) $Q^+ = A \oplus B \oplus Q$

b) $Q^+ = A.B + \overline{A}.\overline{B}.Q$

c) $A.B\ Q^+ = A.B.\overline{Q} + \overline{A}.B.Q$

d) $Q^+ = A + B + Q$

(2) Design a 3 bit - Binary up-counter using T-fl what is the correct state transition table entry f state Q = 3 ?

a) Q = 3, T = 0

b) Q = 3, T = 1

c) Q = 3, T = X

d) Q = 3, T = Q

ANS : C

(3) consider a 2-input, 1-output synchronous sequentia circuit with the following Excitation table.

x	y	z
0	0	1
0	1	0
1	0	1
1	1	1

what is the next-state Expression for 'Z' in term x, y and z ?

a) $Z^+ = x.y.z$.

b) $Z^+ = \overline{x}.\overline{y}.z$.

c) $Z^+ = x + y + z$.

d) $Z^+ = x \oplus y \oplus z$.

ANS : A.

(4) Implement a 2 to 1 multiplexer using JK-flipflop. Wh correct connection for the Select line to achieve multiplexing functionality ?

a) connect Select line to both J and K inputs of Both flip flops.

b) connect Select line to J input of one flip-flop and K input to the other flip flop.

c) connect Select line to clock input of Both flip flops

d) connect Select line to the toggle inputs of Both flip-flops.

ANS : B

(5) Design a 4 bit Synchronous down-counter using D flip flop. How many flip flops are needed for this counter ?

a) 2

b) 3

c) 4

d) 5

ANS : C

(6) consider an asynchronous sequential circuit with two inputs A and B and one output x. The output is high only when A has been 1 for two consecutive clock cycles. what type of circuit is this ?

a) 1-bit memory cell.

b) up-counter

c) Down - counter

d) 2-Bit shift register

ANS : A

6) Create a 3-Bit Binary adder-subtractor circuit T-flip flops. What is the correct connection for T-inputs to active subtraction ?

a) $T_i = X_i \cdot Y_i$

b) $T_i = X_i + Y_i$

c) $T_i = \bar{X}_i \cdot Y_i$

d) $T_i = \bar{X}_i + \bar{Y}_i$

ANS : C

7) Design an input 2, 1-output asynchronous sequential circuit that acts as a 1-Bit memory cell with a clear input. What is the purpose of the clear input ?

a) Sets the output to 1.

b) Resets the memory cell.

c) Enables clock input

d) Toggles the memory cell.

ANS : B

8) Consider an asynchronous sequential circuit with 3 inputs P, Q and R and output S. The excitation table is given below :

P	Q	R	S
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

What is the next-state expression for S^+ in terms of P, Q, R and S ?

a) $S^+ = P \cdot Q + P \cdot R \cdot S$

b) $S^+ = P \oplus Q \oplus R \oplus S$

c) $S^+ = P \cdot Q + R \cdot S$

d) $S^+ = \bar{P} \cdot Q + \bar{R} \cdot S$

ANS : A

9) Design a 2-Bit Binary comparator using JK flip flop what is the correct output when A = 10 and B = 01 ?

a) $A > B$

b) $A < B$

c) $A = B$

d) Invalid input.

ANS : B

10) Implement a 4-Bit register using D-flip flops what is correct output after three clock cycles with the input sequence 1010 ?

PCE ACTIVITY

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Mini Project</td></tr>
<tr><td> 
</td><td> 
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<tr><td>Technical Seminar</td><td>Power Point Presentation</td></tr>
<tr><td> 
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<tr><td colspan="2">Technical Seminar</td></tr>
</table>

Technical Seminar

Crossword Puzzle

NAME : VIGARTHAN .M

ROLL No : 23CSB48

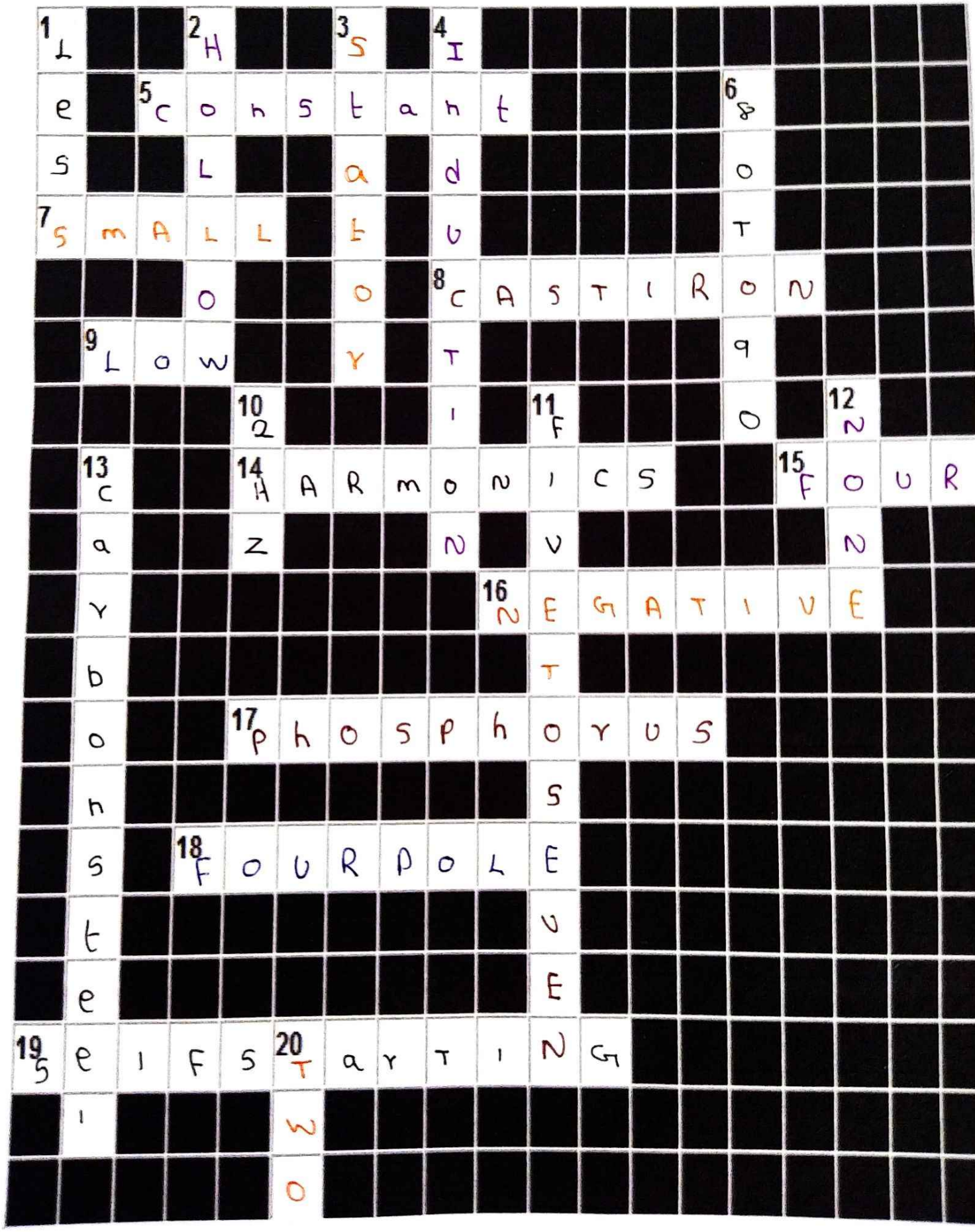
CLASS : CSEB

SUBJECT : BEEE

SUB CODE : BE3251

TOPIC : INDUCTION MOTOR

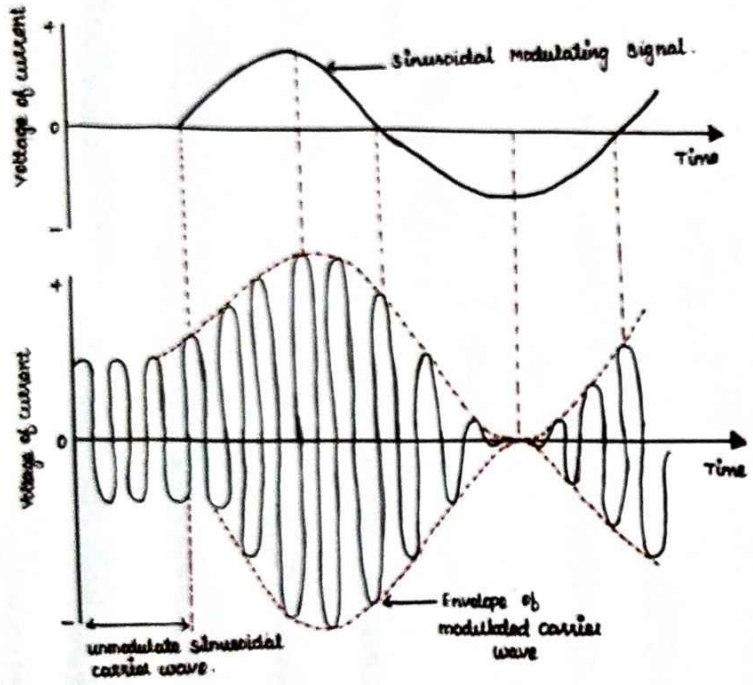
PCE ACTIVITY- CROSS WORD PUZZLE ON INDUCTION MOTOR

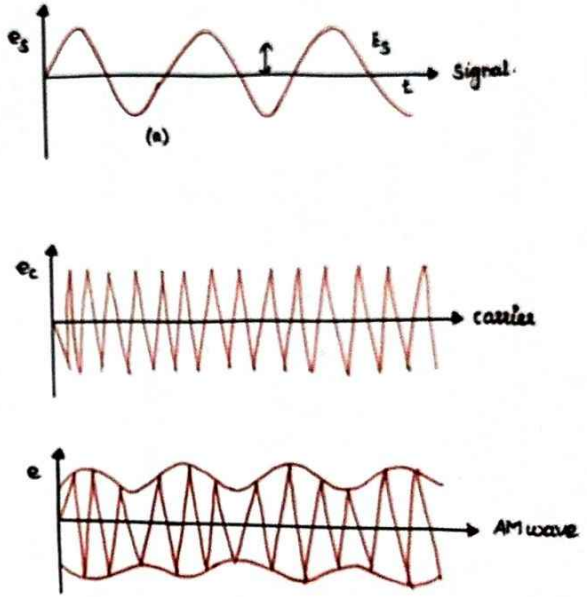


CLUES

Across:	
5	No load test of 3-phase induction motor used to determine ..... loss.
7	The good power factor of an induction motor can be achieved if the average flux density in the air gap is .....
8	The frame of an induction motor is usually made of .....
9	The starting torque of a squirrel-cage induction motor is .....
14	The crawling in the induction motor is caused by ..... developed in the motor.
15	A three-phase, 50 Hz induction motor has a full load speed of 1440 rpm. The full load slip will be .....%
16	In induction generator operation the slip is always.....
17	Slip ring of an induction motor is usually made up of ..... Bronze
18	A 50 Hz, 3-phase induction motor has a full load speed of 1440 r.p.m. The number of poles in the motor is.....
19	An induction Motor is ..... with low torque
Down:	
1	In an induction motor, no-load the slip is generally ..... than 1%
2	The shaft of an induction motor must be of .....
3	A double squirrel-cage induction motor has Two parallel windings in .....
4	The term 'cogging' is associated with ..... Motor
6	The efficiency of an induction motor can be expected to be nearly ...%
10	A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor e.m.f. will be
11	It is advisable to avoid line-starting of induction motor and use starter because Motor takes five to seven times its full load current .....
12	The number of slip rings on a squirrel cage induction motor is usually .....
13	The shaft of an induction motor is made of .....
20	Induction Motor Construction Is Classified Into .....Types

PRINCIPLE OF AMPLITUDE MODULATION SYSTEM





Changing the amplitude of the carrier signal in accordance with the modulating signal /or message signal.

Modulating signal $V_m(t) = V_m \sin \omega_m t$

carrier signal $V_c(t) = V_c \sin \omega_c t$

NAME : A Abinaya.
ROLL NO: 22ECA01
REG NO : 821122106001
SUB CODE : EC3491
SUBJECT : Communication system
TITTLE : Principle of amplitude modulation system

ASSIGNMENT - II

Interprocess Communication Mechanism.

Introduction :

* Interprocess communication (IPC) is a Process that allows different Processes of a computer system to share information.

* IPC lets different Programs run in Parallel, share data, and communicate with each other.

Working :

* IPC occurs when an application Send a message to an operating system Process. The operation System Sends the message to a designated IPC mechanism. IPC mechanisms can be found in the kernel or the user Space of an operating System.

→ Message Passing
→ Shared memory
→ Pipes
→ Signal

Message Passing:

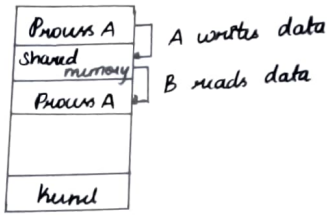
* Another important way inter-process communication occurs with other Process is via message passing. When two or more Process Participate in inter-Process communication, each Process Sends messages to the others via kernel. A communication link is required between the two Processes for Successful message exchange.

Shared memory:

* Shared memory is a memory shared between all processes by two or more process established using Shared memory.

→ It is a way of Passing data between process

→ Shared memory is much faster and more reliable than three methods.



Pipes :

* Pipes are a type of data channel commonly used for one-way communication between two process. Because this is a half duplex technique, the Primary Process communicates with the Secondary Process.

write → Pipe → Read.

* Like in the diagram that one Process will Send a message to the Pipe. The message will be retrieved, and another Process will write it to the Standard output.

Signal

* The Signal is a facility that allows Processes to communicate with each other. A Signal is a way of telling a Processes.

Advantages:

* Data can be shared between different Programs at the Same time.

* Interprocess communication helps Send messages efficiently between Processes.

Disadvantages:

* The Program cannot write to Similar locations.

* It is slower than a direct function call

Conclusion.

* Interprocess communication with its advantages and disadvantages. and importantly different approaches to IPC.

Submitted by,

V. HARINILAKSHMI

II - ECE

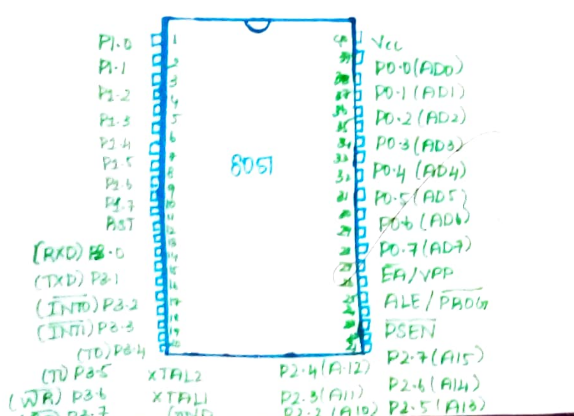
8051 - ARCHITECTURE

Introduction:

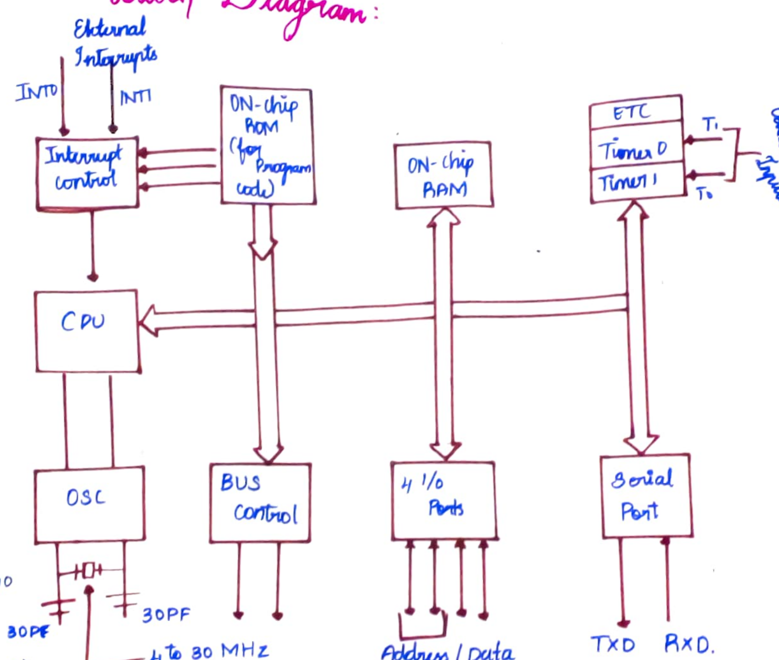
- The 8051 microcontroller is a Harvard architecture 8-bit micro-controller. It has a RISC architecture. The 8051 microcontroller architecture consists of the following major components.
  - INTERRUPT CONTROL:
  - CENTRAL PROCESSING UNIT (CPU)
  - OSCILLATOR
  - BUS CONTROL
  - 4K BYTE ROM
  - 128 - BYTE RAM
  - INPUT / OUTPUT PORTS
  - TIMERS AND COUNTERS
  - SERIAL COMMUNICATION INTERFACE (SCI)

8051 Pin Diagram:

- The 8051 microcontroller has a total of 40 Pins arranged in four groups, namely Port 0, Port 1, Port 2, and Port 3. Here's a brief explanation of each group



Block Diagram:



Application:

- It is commonly used in embedded systems, such as in home appliances, security system, and industrial automation system.
- This is used in automotive applications, such as in engine control units, airbag control units, anti-lock braking sys.
- It is used in medical devices, such as heart rate monitors, blood Pressure monitors and insulin Pumps.

Advantages:

- It is a cheaper option, which makes it a Popular choice for low-cost applications.
- Designed to consume very low Power for application
- 8051 Microcontroller Architecture is known for its high reliability.
- It is easy to Program, has a simple instruction set, and has easy-to-use development tools.
- It can be used in a wide variety of application

Disadvantages:

- It has limited Processing Power compared to microcontrollers.
- Memory is limited for application it requires a lot of data storage.
- Memory is limited for application it requires a lot of data Storage
- It highly requires advanced Peripherals such as USB or Ethernet connectivity.
- The instruction Set make it challenging to Program and optimize code.

M. Growstika
21EC10
III yr ECE

40/40

DISCRETE TIME FOURIER TRANSFORM

Definition of DTFT

The DTFT is used for the analysis of nonperiodic signals. Let us consider the discrete time signal $x(n)$. Its DTFT is denoted as $X(\Omega)$. If it is DTFT is denoted

DTFT: $X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n}$

Existence of DTFT

$$\sum_{n=-\infty}^{\infty} |x(n)| < \infty$$

$$\sum_{n=-\infty}^{\infty} |x(n)|^2 < \infty$$

Properties of DTFT

$X(\Omega)$ is periodic with period 2π

$$X(\Omega + 2\pi k) = X(\Omega)$$

Proof: By definition of DTFT

$$X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n}$$

Let $\Omega = \Omega + 2\pi k$ in above equation

$$x(\Omega + 2\pi k) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n} = X(\Omega)$$

Linearity

$z(n) = ax(n) + by(n) \xleftrightarrow{DTFT} Z(\Omega) = aX(\Omega) + bY(\Omega)$

Time shift

$x(n) \xleftrightarrow{DTFT} X(\Omega)$

$Y(n) = x(n - n_0) \xleftrightarrow{DTFT} Y(\Omega) = e^{-j\Omega n_0} X(\Omega)$

Frequency shift

This property states that,

if $x(n) \xleftrightarrow{DTFT} X(\Omega)$

$Y(n) = e^{j\Omega_0 n} x(n) \xleftrightarrow{DTFT} Y(\Omega) = X(\Omega - \Omega_0)$

Scaling

$Y(n) = x(pn) \xleftrightarrow{DTFT} Y(\Omega) = X\left(\frac{\Omega}{p}\right)$

Convolution

$Z(n) = x(n) * y(n)$

$\xleftrightarrow{DTFT} Z(\Omega) = X(\Omega) Y(\Omega)$

Multiplication in Time Domain

$z(n) = x(n) y(n) \xleftrightarrow{DTFT} Z(\Omega) = \frac{1}{2\pi} [X(\Omega) \text{ & } Y(\Omega)]$

Parseval's Theorem

$$E = \frac{1}{2\pi} \int_{-\pi}^{\pi} |X(\Omega)|^2 d\Omega$$

1) Obtain parallel form realization of the system is given by $y(n) - 3y(n-1) + 2y(n-2) = x(n)$

The given S/m is

$$y(n) - 3y(n-1) + 2y(n-2) = x(n)$$

Taking Z transform

$$Y(z) - 3z^{-1}Y(z) + 2z^{-2}Y(z) = X(z)$$

$$Y(z)\left[1 - 3z^{-1} + 2z^{-2}\right] = X(z)$$

$$H(z) = \frac{Y(z)}{X(z)} = \frac{1}{1 - 3z^{-1} + 2z^{-2}} = \frac{z^2}{z^2 - 3z + 2}$$

$$H(z) = \frac{z^2}{(z-1)(z-2)}$$

$$H(z) = \frac{A}{z-1} + \frac{B}{z-2} \quad \text{---} \quad (1)$$

$$A = (z-1) \times \left.\frac{z^2}{(z-1)(z-2)}\right|_{z=1}$$

$$= \frac{1}{-1}$$

$$A = -1$$

$$B = (z-2) \times \frac{z^2}{(z-1)(z-2)}\Bigg|_{z=2}$$

$$= \frac{4}{1}$$

$$B = 4$$

A & B values in ①

$$H(z) = \frac{-1}{z-1} + \frac{A}{z-2}$$

$$= \frac{z^{-1}}{1-z^{-1}} + \frac{Az^{-1}}{1-2z^{-1}}$$

$$H(z) = H_1(z) + H_2(z)$$

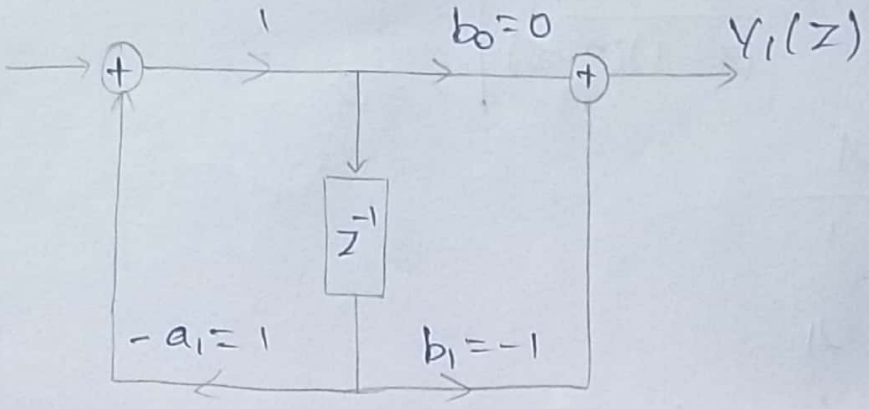
$$H_1(z) = \frac{-z^{-1}}{1-z^{-1}}$$

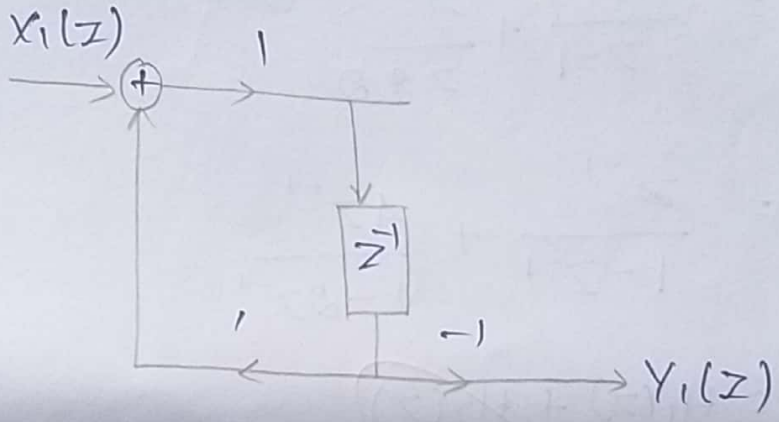
$$\because H(z) = \frac{b_0 + b_1 z^{-1} + \cdots}{1 + a_1 z^{-1} + \cdots}$$

Compare $H_1(z)$ with Std $H(z)$ eqn,

$$b_0 = 0 \quad b_1 = -1 \quad a_1 = -1$$

① ⇒ $$H_1(z) = \frac{-z^{-1}}{1-z^{-1}}$$



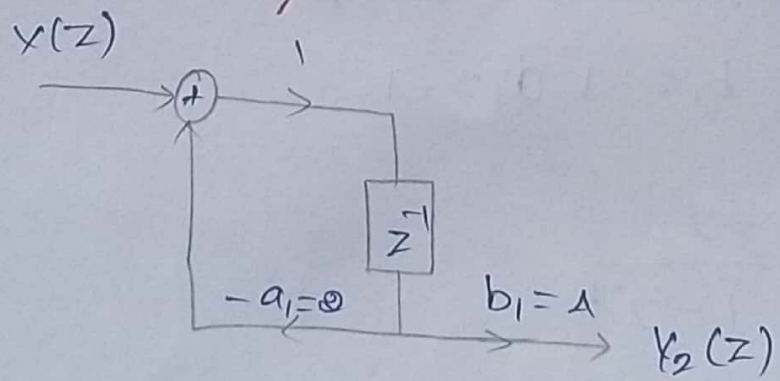


$$H_2(z) = \frac{4z^{-1}}{1 - 2z^{-1}}$$

Comparing with Std $H(z)$ equ, get

$b_0 = 0 \quad b_1 = 4$

$a_1 = -2$



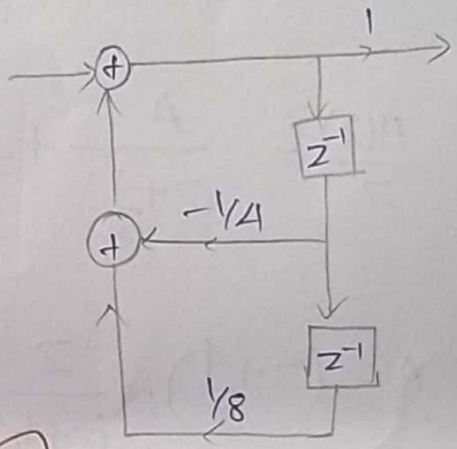
2) Draw the Direct Form, cascade form and Parallel form of the following System function :-

$$H(z) = \frac{1}{\left(1+\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)}$$

Direct form realization :-

$$H(z) = \frac{1}{\left(1+\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)}$$

$$= \frac{1}{1+\frac{1}{4}z^{-1}-\frac{1}{8}z^{-2}}$$



It is the Diret form.

cascade form realization is,

$$H(z) = \underbrace{\frac{1}{1+\frac{1}{2}z^{-1}}}_{H_1(z)} \cdot \underbrace{\frac{1}{1-\frac{1}{4}z^{-1}}}_{H_2(z)}$$

$$= H_1(z) \cdot H_2(z)$$

Parallel for realization,

$$H(z) = \frac{1}{\left(1+\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{4}z^{-1}\right)} = \frac{z^2}{\left(z+\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}$$

$$\frac{H(z)}{z} = \frac{z}{\left(z+\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}$$

$$\frac{H(z)}{z} = \frac{A}{z+\frac{1}{2}} + \frac{B}{z-\frac{1}{4}}$$

$$A = \left(z+\frac{1}{2}\right)\cdot \frac{z}{\left(z+\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}\Bigg|_{z=-\frac{1}{2}}$$

$$= \frac{-\frac{1}{2}}{-\frac{1}{2}-\frac{1}{4}}$$

$$= \frac{+\frac{1}{2}}{\frac{3}{4}} = \frac{1}{2}\times\frac{4}{3}$$

$$= \frac{2}{3}$$

$$A = \frac{2}{3}$$

$$B = \left(z-\frac{1}{4}\right)\frac{z}{\left(z+\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}\Bigg|_{z=\frac{1}{4}}$$

$$B = \frac{1/4}{1/4 + 1/2} = \frac{1/4}{3/4} = 1/4 \times 4/3$$

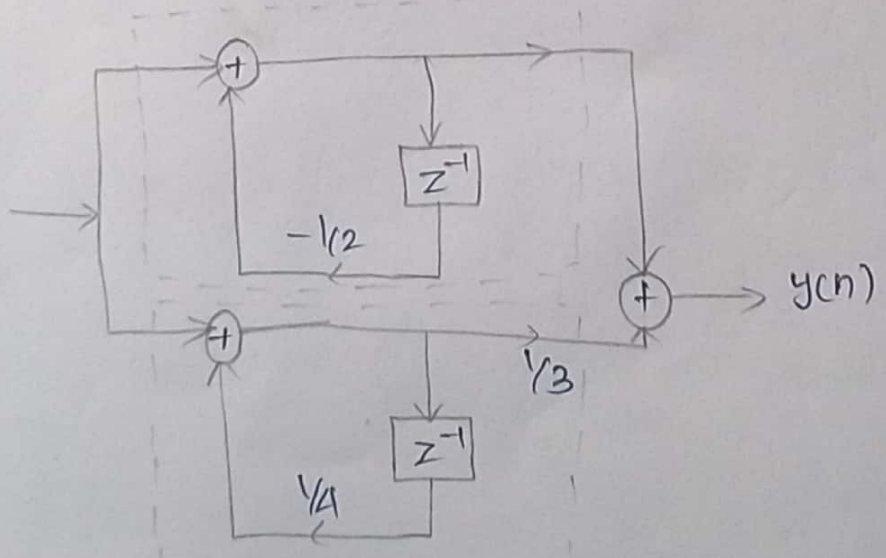
$$B = 1/3$$

$$\frac{H(z)}{z} = \frac{2/3}{z + 1/2} + \frac{1/3}{z - 1/4}$$

$$H(z) = \underbrace{\frac{2/3}{1 + 1/2\, z^{-1}}}_{H_1(z)} + \underbrace{\frac{1/3}{1 - 1/4\, z^{-1}}}_{H_2(z)}$$

$$= H_1(z) + H_2(z).$$

$H(z)$ is sum of the $H_1(z)$ and $H_2(z)$. They can realized in parallel by putting values.



3) Obtain the causal linear shift invarient filter with system function. $H(z) = \frac{1+0.875z^{-1}}{(1+0.8z^{-1}+0.9z^{-2})(1-0.7z^{-1})}$

$$H(z) = \frac{1+0.875z^{-1}}{(1+0.8z^{-1}+0.9z^{-2})(1-0.7z^{-1})}$$

$$= \frac{1+0.875z^{-1}}{1-0.5z^{-1}+0.76z^{-2}-0.63z^{-3}}.$$

Parallel form structure:-

$$H(z) = \frac{1+0.875z^{-1}}{(1+0.8z^{-1}+0.9z^{-2})(1-0.7z^{-1})}$$

$$= \frac{z^3+0.875z^2}{(z^2+0.8z+0.9)(z-0.7)}$$

$$\frac{H(z)}{z} = \frac{z^2+0.875z}{(z+0.1-j0.943)(z+0.1j0.943)(z-0.7)}$$

$$= \frac{0.139-j0.476}{z+0.1-j0.943} + \frac{0.139+j0.476}{z+0.1+j0.943} + \frac{0.72}{z-0.7}$$

$$= \frac{0.278z+0.923}{z^2+0.8z+0.9} + \frac{0.72}{z-0.7}$$

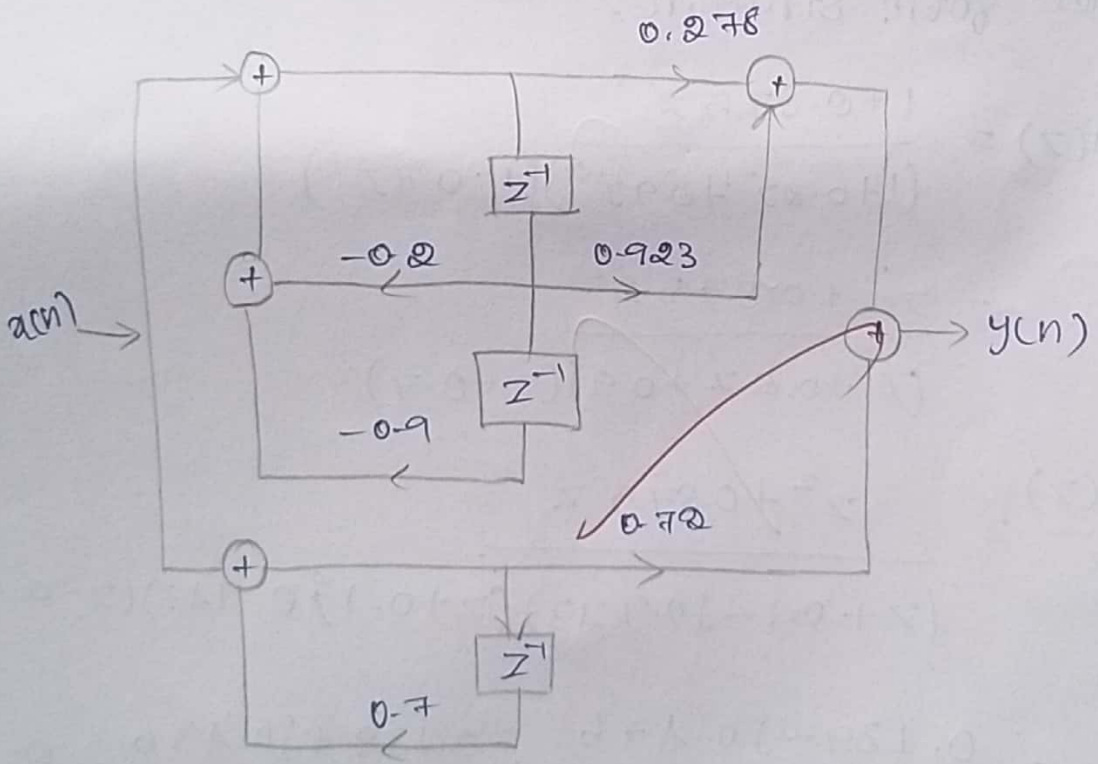
$$H(z) = \frac{0.278 + 0.923 z^{-1}}{1 + 0.2z + 0.9z^{-1}} + \frac{0.72}{1 - 0.7z^{-1}}$$

$$= H_1(z) + H_2(z)$$

$$H_1(z) = \frac{0.278 + 0.923 z^{-1}}{1 + 0.2z^{-1} + 0.9z^{-2}}$$

$$H_2(z) = \frac{0.72}{1 - 0.7z^{-1}}$$

It is parallel form of realization structure.



1. The frequency response and the main lobe width for rectangular window are

1. $\frac{\sin wN/2}{\sin w/2}$ and $\frac{4\pi}{N}$

2. $\frac{\sin wN/2}{w/2}$ and $\frac{\pi}{N}$

3. $\frac{\sin w/2}{\sin wN/2}$ and $\frac{2\pi}{N}$

4. $\frac{\sin wN/4}{\sin w/2}$ and $\frac{8\pi}{N}$.

Ans : 1) $\frac{\sin wN/2}{\sin w/2}$ and $\frac{4\pi}{N}$.

2. $H(e^{jw})$ is the frequency response of a discrete time LTI system and $H_1(e^{jw})$ is the frequency response of its inverse function Then.

1) $H(e^{jw})H_1(e^{jw}) = 1$
2) $H(e^{jw})H_1(e^{jw}) = \delta w$
3) $H(e^{jw}) * H_1(e^{jw}) = 1$
4) $H(e^{jw}) * H_1(e^{jw}) = \delta w$.

Ans : 1) $H(e^{jw})H_1(e^{jw}) = 1$.

3. consider the signals $x[n] = 2^{n+1}\, u[-n+2]$ and $y[n] = 2^{-n+2}\, u(n+1)$, where $u[n]$ is the unit step sequence. Let $X(e^{jw})$ and $Y(e^{jw})$ be the

discrete time Fourier transform of $x[n]$ and $y[n]$ respectively. The value of the integral $\frac{1}{2\pi}\int_{0}^{2\pi} x(e^{j\omega})\, y(e^{-j\omega})\, d\omega$ is,

Ans : 7.9 - 8.1

4. In inverse DTFT, the limits of the integral is defined between $-\pi$ to π because of the property

1) Time invariance
2) periodicity
3) Multiplication
4) Implication.

Ans : 2) periodicity.

5. What is the discrete-time Fourier transform (DTFT) of the sequence given.
$x[n] = a^n u[n], a$

1) $\frac{1}{1-\alpha e^{-j\omega}}$
2) $\frac{1}{1-\alpha e^{j\omega}}$
3) $\frac{\alpha}{1-\alpha e^{-j\omega}}$
4) $\frac{\alpha}{1+\alpha e^{j\omega}}$

Ans : 1) $\frac{1}{1-\alpha e^{-j\omega}}$

Let $x(n) = \left(\frac{1}{2}\right)^n u(n)$, $y(n) = x^2(n]$ and $Y(e^{j\omega})$ to be the Fourier transform of $y(n)$ then $y(e^{j0})$

1) 1.1 – 1.7
2) 1.5 – 1.9
3) 1.2 – 1.4
4) 5.2 – 6.1

Ans : 3) 1.2 – 1.4

7. Let $x[n]$ be a discrete time sequence given by $x[n] = \{1, 2, 3, 0, -3, -2, -1\}$, where $x[0]$ is 1. The value of $X(e^{j\pi})$ is:

1) 1
2) 0
3) 6
4) 1/7

Ans : 2) 0.

8. discrete time signal $x[n] = \{1, 2, 3, 0, -3, -2, -1\}$ is having a discrete-time Fourier transform $X(e^{j\Omega})$. The value of $\int_{-\pi}^{\pi} |X(e^{j\Omega})|^2 \, d\Omega$ is:

1) 28
2) 28π
3) 56π
4) 14.

Ans : 3) 56π

9. The z-transform of a discrete signal $x[n]$ is $X[z] = \dfrac{4z}{(z-\frac{1}{5})(z-\frac{2}{3})(z-3)}$ with ROC = R. which one of the following statements is true?

1) Discrete-time Fourier transform of $x[n]$ converges if R is $|z| > 3$.

2) Discrete-time Fourier transform of $x[n]$ converges if R is $\frac{2}{3} < |z| < 3$.

3) Discrete-time Fourier transform of $x[n]$ converges if R is such that $x[n]$ is a left-sided sequence

4) Discrete-time Fourier transform of $x[n]$ converges if R is such that $x[n]$ is a right.

Ans: 2) Discrete-time Fourier transform of $x[n]$ converges if R is $\frac{2}{3} < |z| < 3$.

10. The z transform of e^{-t} sampled at 10 Hz will be

1) $\frac{z}{z-10}$ 2) $\frac{z}{z-0.1}$

3) $\frac{z}{z-0.9}$ 4) $\frac{z}{z-1.1}$

Ans: 3) $\frac{z}{z-0.9}$

1. consider the transfer fn $H_c(s) = \frac{1}{(s+1)(s+3)}$ Bilinear transformation with a sampling period of 0.1 s is employed to obtain the discrete time transfer fn $H_d(z)$. Then $H_d(z)$ is.

1) $\frac{(1+z^{-1})^2}{(19-21z^{-1})(23-17z^{-1})}$ 2) $\frac{(1-z^{-1})^2}{(21-19z^{-1})(17-23z^{-1})}$

3) $\frac{(1+z^{-1})^2}{(21-19z^{-1})(23-17z^{-1})}$ 4) $\frac{(1+z^{-1})^2}{(21-A2^{-1})(17-B3z^{-1})}$

Ans: 3) $\frac{(1+2^{-1})^2}{(21-19Z^{-1})(23-17Z^{-1})}$

2. If the dis-time sequence $x(n), n \geq 0$ is defined to be $u(n)$, then the z transform $x(z)$ is

1) $\frac{1}{z-1}$ 2) $\frac{z}{z+1}$

3) $\frac{1}{z+1}$ 4) $\frac{z}{z-1}$

Ans: 4) $\frac{z}{z-1}$

3. Find the z transform of $(n+1)^2$

1) $\frac{z^2(z+1)}{(z-1)^3}$ 2) $\frac{(2z+1)}{(z-1)^3}$

3) $\frac{(2+z)}{(z-1)^2}$ 4) $\frac{(3z+2)}{z-1}$

Ans: 1) $\frac{z^2(z+1)}{(z-1)^3}$

4. The z-transform of a signal is given by $X(z) = \frac{1}{4}\frac{z^{-1}(1-z^{-4})}{(1-z^{-1})^2}$, its final value is,

1) 1/4 2) zero

3) 1 4) infinity.

Ans: 3) 1

5. Consider a signal $x[n] = \left(\frac{1}{2}\right)^n 1[n]$, where $1[n]=0$? t n o is $\frac{z^{-k}}{1-\frac{1}{2}z^{-1}}$ with region of convergence being

1) $|z| < 2$
2) $|z| > 2$
3) $|z| < \frac{1}{2}$
4) $|z| > 1/2$

Ans : 4) $|z| > \frac{1}{2}$

6. The causal signal with z-transform $z^2(z-a)^2$ is. ($u[n]$ is the unit step signal)

1) $(n+1)\,a^n u[n]$
2) $a^{2n} u[n]$
3) $n^{-1} a^n u[n]$
4) $n^2 a^n u[n]$

Ans : 1) $(n+1)\,a^n u[n]$

DISCRETE TIME FOURIER TRANSFORM

Definition of DTFT

The DTFT is used for the analysis of nonperiodic signals. Let us consider the discrete time signal $x(n)$. Its DTFT is denoted as $X(\Omega)$. If it is DTFT is denoted

DTFT: $X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n}$

Existence of DTFT

$$\sum_{n=-\infty}^{\infty} |x(n)| < \infty$$

$$\sum_{n=-\infty}^{\infty} |x(n)|^2 < \infty$$

Properties of DTFT

$X(\Omega)$ is periodic with period 2π

$$X(\Omega + 2\pi k) = X(\Omega)$$

Proof: By definition of DTFT

$$X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n}$$

Let $\Omega = \Omega + 2\pi k$ in above equation

$$x(\Omega + 2\pi k) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n} = X(\Omega)$$

Linearity

$z(n) = ax(n) + by(n) \xleftrightarrow{DTFT} Z(\Omega) = aX(\Omega) + bY(\Omega)$

Time shift

$x(n) \xleftrightarrow{DTFT} X(\Omega)$

$Y(n) = x(n - n_0) \xleftrightarrow{DTFT} Y(\Omega) = e^{-j\Omega n_0} X(\Omega)$

Frequency shift

This property states that,

if $x(n) \xleftrightarrow{DTFT} X(\Omega)$

$Y(n) = e^{j\Omega_0 n} x(n) \xleftrightarrow{DTFT} Y(\Omega) = X(\Omega - \Omega_0)$

Scaling

$Y(n) = x(pn) \xleftrightarrow{DTFT} Y(\Omega) = X\left(\frac{\Omega}{p}\right)$

Convolution

$Z(n) = x(n) * y(n)$

$\xleftrightarrow{DTFT} Z(\Omega) = X(\Omega) Y(\Omega)$

Multiplication in Time Domain

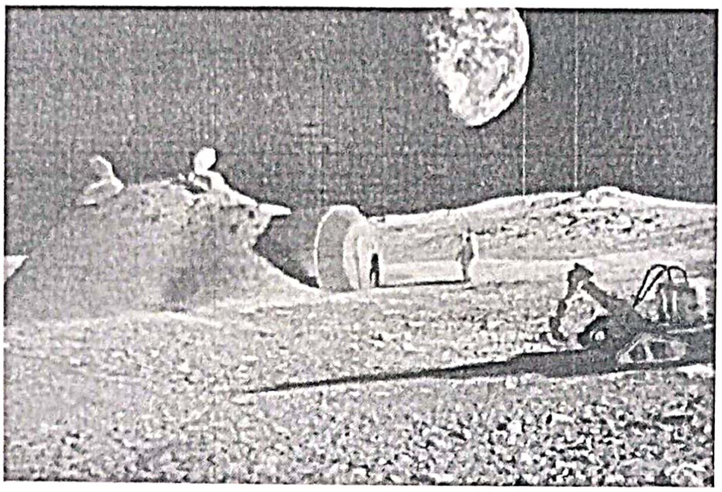
$z(n) = x(n) y(n) \xleftrightarrow{DTFT} Z(\Omega) = \frac{1}{2\pi} [X(\Omega) \text{ & } Y(\Omega)]$

Parseval's Theorem

$$E = \frac{1}{2\pi} \int_{-\pi}^{\pi} |X(\Omega)|^2 d\Omega$$

Activity-4: APH

MOON SPACE MISSION



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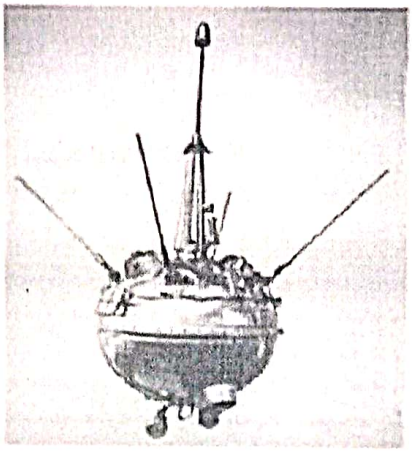
K.Newton 12/03/2024

Mission sent to Moon

- Luna 1
- First Mission on Moon by USSR
- Jan 2nd, 1959
- Impact Moon
- Missed the Moon

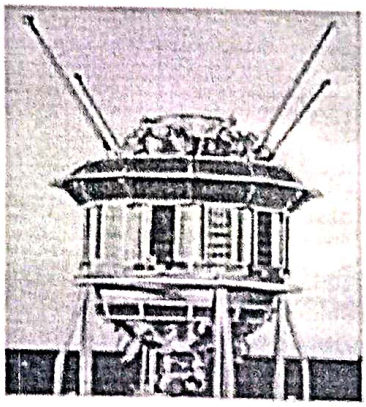
LUNA 2

- Luna 2
- Second Mission on Moon by USSR
- Sept12th, 1959
- Impact Moon
- Worlds First Lunar Impact



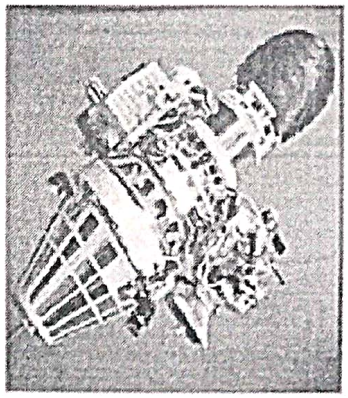
LUNA 3

- Luna 3
- Third Mission on Moon by USSR
- Oct 4th , 1959
- Fly By around Moon
- First Photo of Moon's Far Side



LUNA 5

- Luna 5
- Third Mission on Moon by USSR
- May 9th, 1965
- Moon Landing
- Crashed into the Moon

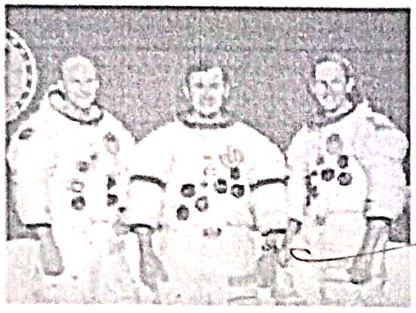


Apollo Missions

- Apollo 1-10 Pre landing tests
- Apollo 11, 12, 14, 15, 16, 17 Landing
- Apollo 13 Fault

Apollo 16

Apollo 16 was the fifth manned mission to land on the Moon and the first to land in the highlands area

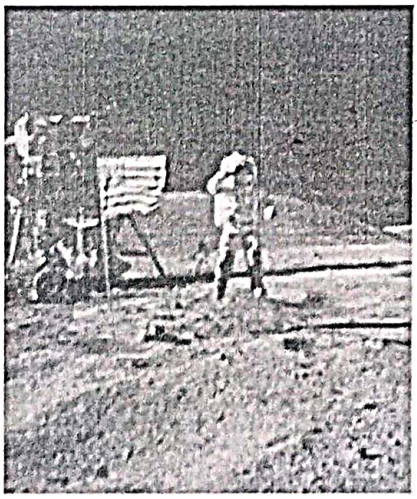


The crew was (l-r)

T. Kenneth Mattingly Jr. (Command Module Pilot)

John W. Young (Commander)

Charles M. Duke Jr. (Lunar Module Pilot)



The mission was launched on April 16, 1972 and lasted 11 days and 2 hours

5 days and 6 hours was spent orbiting the Moon

2 days and 23 hours was spent on the surface of the Moon

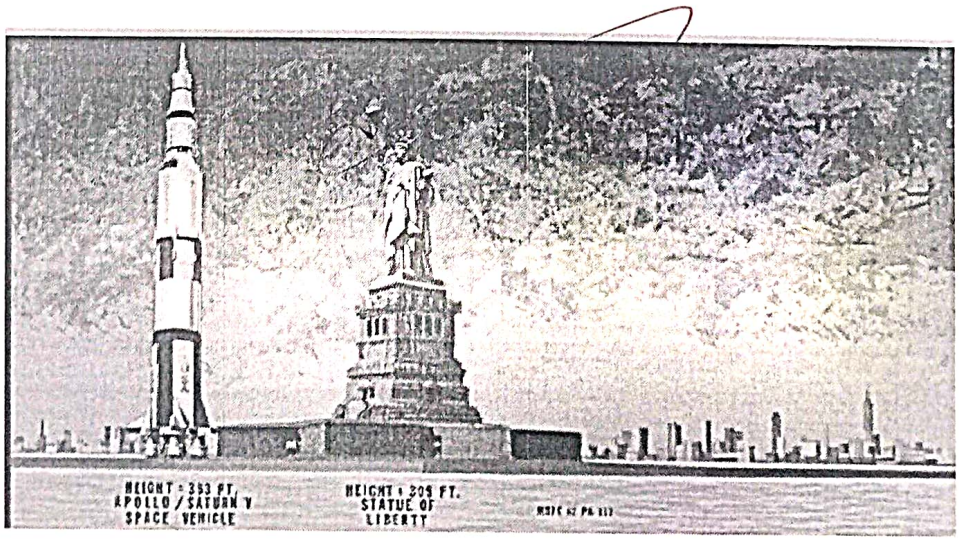
Apollo 16

Apollo Program

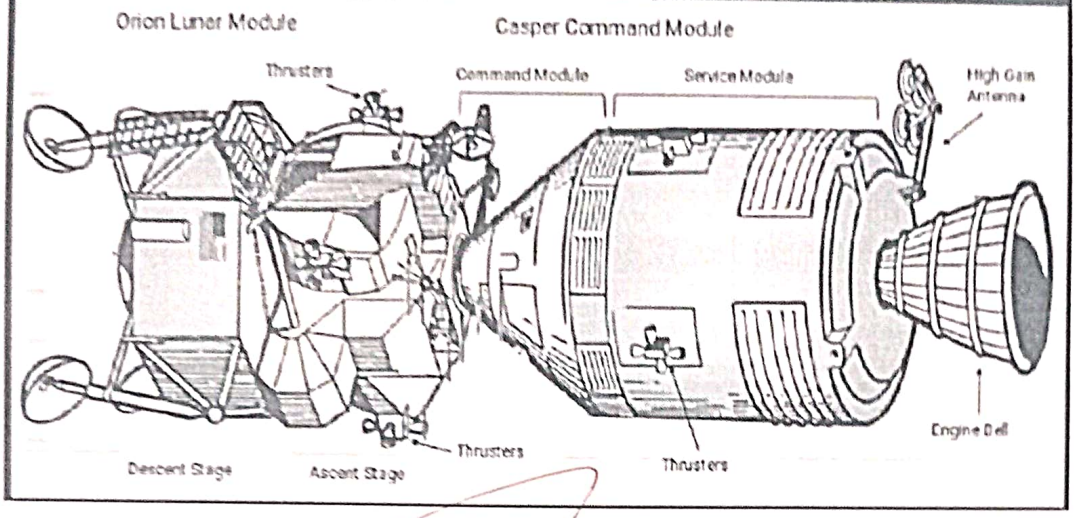
Early history

- Soon after NASA's formation, the Space Task Group (STG) formed within NASA
- NASA assigned STG to plan and develop manned missions that began with Mercury and extended quickly to Gemini and Apollo
- Soviet's first manned launch in 1961 drove the decision by Kennedy to pursue the Apollo lunar landing project
  - Alternative was a space station
    - Later became Skylab that used much of the Apollo hardware

APOLLO 16 HEIGHT

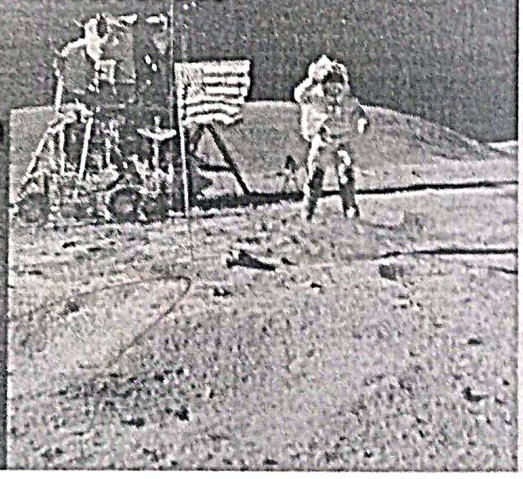


Apollo Spacecraft



Science-focused Mission

- Lunar geology studies
- Lunar sample collection
- Lunar surface science experiments
- Orbital science experiments
  - Lunar-focused
  - Space environment-focused



On the Moon

- Surface experiments
  - Soil Mechanics Investigation
  - Lunar Portable Magnetometer
  - Solar Wind Composition Experiment
  - Cosmic Ray Detector

K-Newton
12/03/2024

THANK YOU!

Electromagnetic fields

boundary Conditions.

maxwell's equation characterize

Name: V. Gayathri

ROLL NO: 22ECA19.

CLUE CARDS

SUB :

ELECTROMAGN

- ETIC FIELD

SUB CODE: EC3452.

Good.

Electromagnetic fields

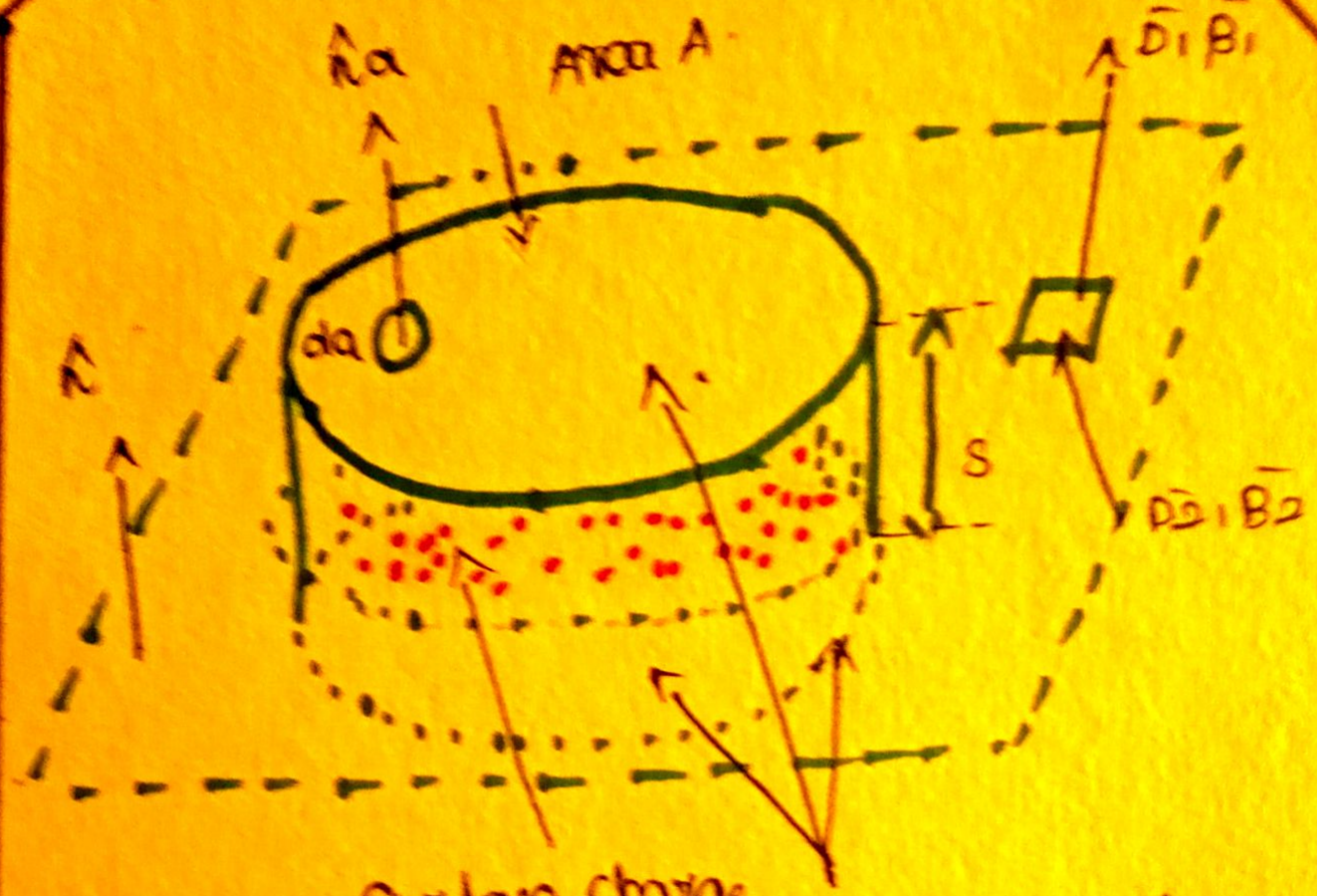
boundary Conditions.

maxwell's equation characterize macroscopic matter by means its permitivity ε, permeability μ and Conductivity σ.

$$\int_S (\bar{D} \cdot \hat{n})\, da = \iiint_V dv$$

$$\int_S (\bar{B} \cdot \hat{n})\, da = 0.$$

may integrate equations over surface. S and volume V infinite pillbox parallel. Surface and straddles half being each side boundary.



Surface charge density σ_s

Pillbox Surface. Volume V.

$$s(\bar{D} \cdot \hat{n}_a)\, da \cong (D_1 \perp D_2)$$

$$A = \iint_V \int \rho\, dV = \rho_s A.$$

$$\hat{n} \cdot (\bar{D}_1 - \bar{D}_2) = \rho_s.$$

(boundary condition for $\bar{D}_\perp$)

unit outward normal boundary and point medium1 perpendicular component electric displacement over vector $\bar{D}$

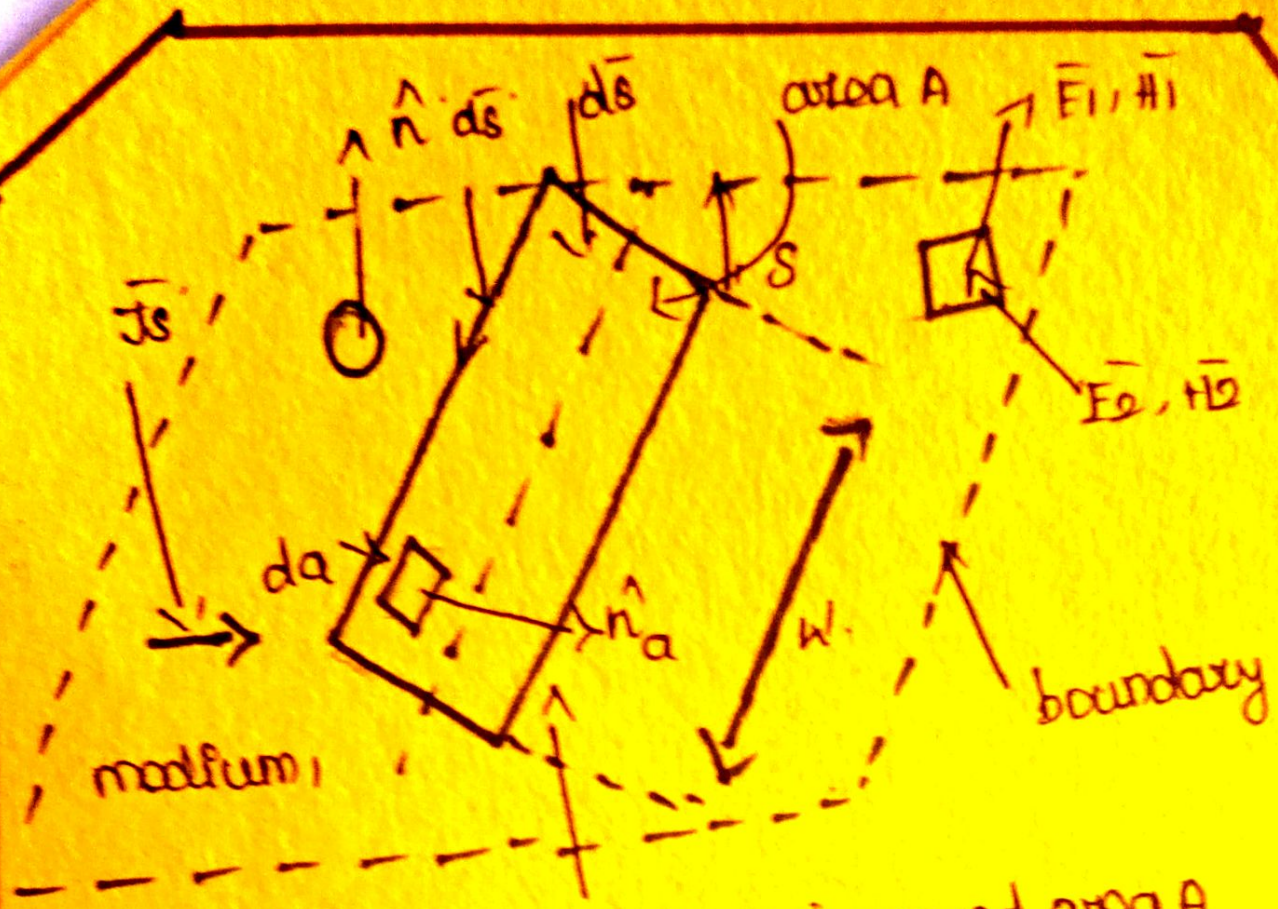
$$\hat{n} \cdot (\bar{B}_1 - \bar{B}_2) = 0$$

(boundary condition for $\bar{B}_\perp$)

Boundary condition parallel field components.

$$\oint_c \bar{E} \cdot d\bar{s} = -\frac{d}{dt} \iint_A \bar{B} \cdot \hat{n}\, da$$

$$\oint_c \bar{H} \cdot d\bar{s} = \iint_A \left[\bar{J} + \frac{d\bar{D}}{dt} \right] \cdot \hat{n}\, da$$



$$\oint_C \bar{E}\cdot d\bar{s} \cong (\bar{E}_{1\parallel} - \bar{E}_{2\parallel})\, W = -\frac{d}{dt}$$

$$\iint_A \bar{B}\cdot\hat{n}\,da \to 0.$$

$$\bar{E}_{1\parallel} - \bar{E}_{2\parallel} = 0$$

$$\hat{n} \times (\bar{E}_1 - \bar{E}_2) = 0.$$

(boundary Condition for $\bar{E}_{\parallel}$)

$$\oint_c \bar{H} \cdot d\bar{s} = (H_{1\parallel} - H_{2\parallel})w$$

$$= \iint_A \left[\bar{J} + \frac{d\bar{D}}{dt} \right] \cdot \hat{n}\, da$$

$$\Rightarrow \iint_A \bar{J} \cdot \hat{n}_a\, da = J_s w.$$

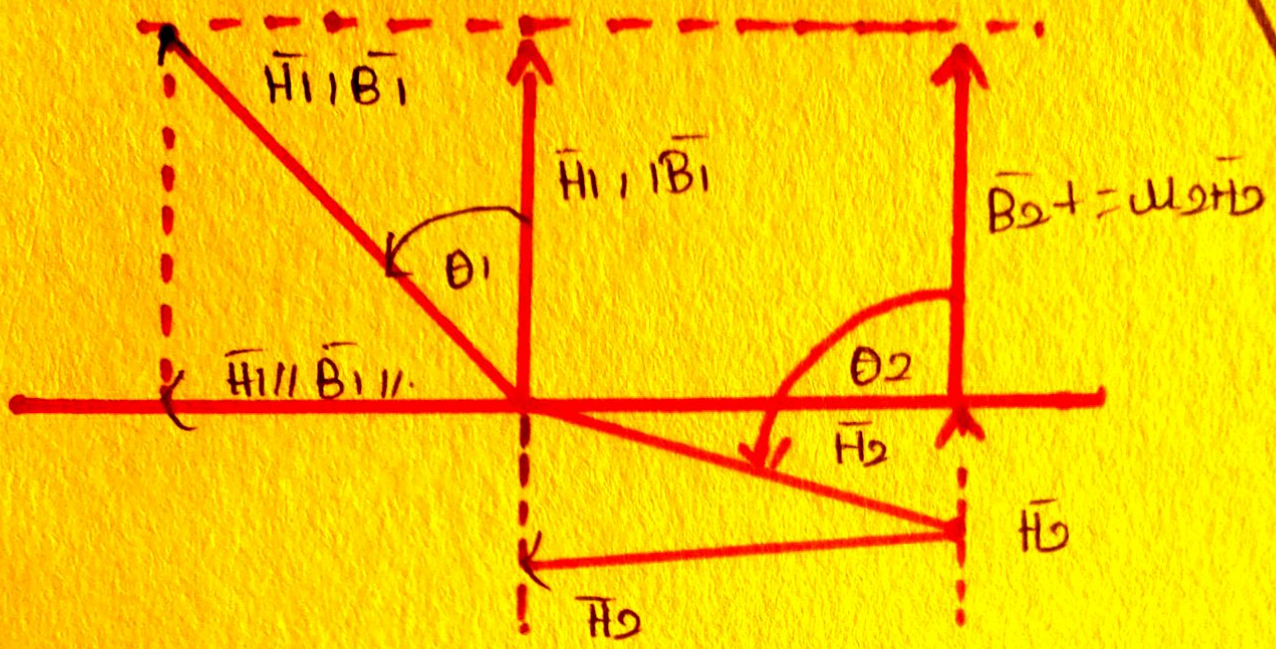
$$\boxed{\bar{H}_{1\parallel} - \bar{H}_{2\parallel} = \bar{J}_s}$$

$$\hat{n} \times (\bar{H}_1 - \bar{H}_2) = \bar{J}_s$$

(boundary condition or $\bar{H}_{\parallel}$).

$$\bar{H}_{2\parallel} = \bar{H}_{1\parallel}.$$

$$H_{2\perp} = B_{2\perp} / \mu_2 = B_{1\perp} / \mu_2 = \mu_1 H_{1\perp} / \mu_2.$$



$$\theta_2 = \tan^{-1}(|\bar{H}_{2//}|/|\bar{H}_{2\perp}|)$$

$$= \tan^{-1}(\mu_2|\bar{H}_1|/\mu_1 H_1)$$

$$= \tan^{-1}[(\mu_2/\mu_1)\tan\theta].$$

θ_2 approaches 90 degrees when $\mu_2 \gg \mu_1$.

almost regardless of magnetic flux inside.

high permeability material.

Boundary Condition adjacent to perfect conductor.

$$\hat{n} \cdot \bar{B} = 0$$

[from $\hat{n} \cdot (\bar{B}_1 - \bar{B}_2) = 0$]

$$A \cdot \bar{D} = \rho_s \cdot -$$

[from $\cdot (\bar{D}_1 - \bar{D}_2) = \rho_s$]

$$\hat{n} \times \bar{E} = 0$$

[from $\hat{n} \times (\bar{E}_1 - \bar{E}_2) = 0$]

$$\hat{n} \times \bar{H} = J_S$$

[from $\hat{n} \times (\bar{H}_1 - \bar{H}_2) = \bar{J}_S$]

Name : R. Mahadevan

Register NO : 821122106046

Subject : Electromagnetic Field

Subject code : EC3452

Title : Electrostatics boundary value problems

40/40

CLUE CARDS

Electrostatic boundary value problems.

Electrostatic boundary values problems typically involve finding the electric potential and electric field distribution in regions with different boundary conditions. common scenarios include.

parallel plate capacitor:

determining the electric field and potential between two parallel conducting plates with a potential difference applied.

$$E = \frac{V}{d}$$

$E \rightarrow$ electric field

$V \rightarrow$ potential difference

$d \rightarrow$ distance between the plates.

Spherical conductors:

calculating the electric potential and field both inside and outside a charged conducting sphere.

$$V = \frac{kQ}{r}$$

$V \rightarrow$ electric potential

$k \rightarrow$ coulomb's constant

$Q \rightarrow$ charge

$r \rightarrow$ distance from the center.

Dielectric Boundary:

Investigating the electric field and potential across the interface between two different dielectric materials

$$\varepsilon_1 E_{normal,1} = \varepsilon_2 E_{normal,2}$$

ϵ_1 and ϵ_2 → permittivities of the two dielectric materials

$E_{normal,1}$ and $E_{normal,2}$ → normal components of electric field across the boundary.

cylindrical conductors:

Analyzing the electric field and potential in systems involving cylindrical conductors with different charge distributions

$$E = \frac{1}{2\pi\epsilon_0 r}$$

$E \longrightarrow$ electric field

$\lambda \longrightarrow$ charge per unit length

$\epsilon_0 \longrightarrow$ vaccum permittivity

$r \longrightarrow$ distance from the axis

Finite charge distributions:

solving problems involving non-uniform charge distributions on conducting surfaces or within dielectric materials.

$$V = \frac{1}{4\pi\epsilon_0} \int \frac{dq}{r}$$

$V \rightarrow$ electric potential

$dq \rightarrow$ infinitesimal charge element

$r \rightarrow$ distance from the charge element to the point of interest

In a one dimensional device the charge density is given by $\rho_v = \rho_0 x/a$. If $\vec{E} = 0$ at $x=0$ and $V=0$ at $x=a$, find V and E

Soln

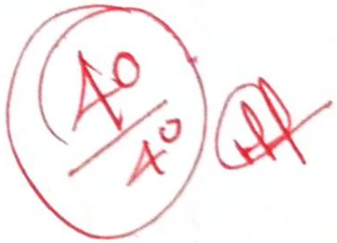
$$\frac{d^2V}{dx^2} = -\frac{\rho_v}{\varepsilon} = \frac{\rho_0 x}{a\varepsilon}$$

$$\frac{dV}{dx} = -\frac{\rho_0 x^2}{2a\varepsilon} + C_1$$

$$V = -\frac{\rho_0 x^3}{6a\varepsilon} + C_1 x + C_2$$

MAXWELL EQUATION

CLUE CARDS



J. ESTHAR NAGOMY
821122#06020
EMF
22ECA18

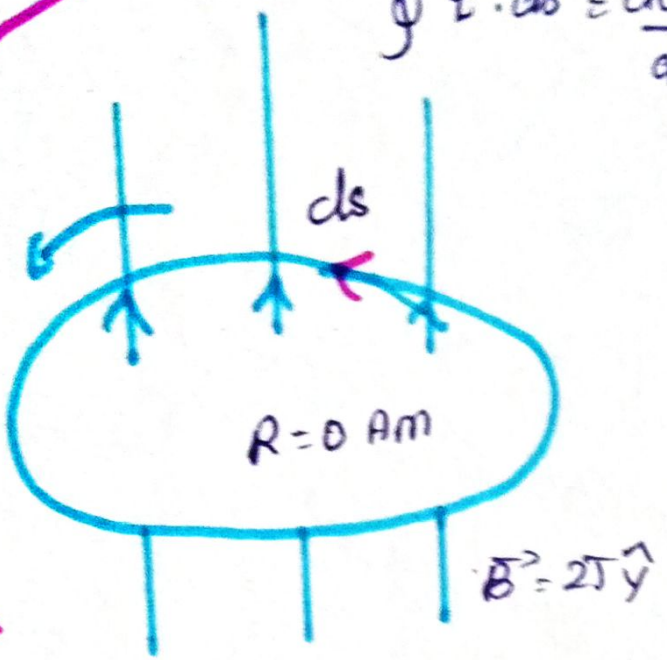
Maxwell's equation:

Four equations that together form a complete description of the production and interrelation of electric and magnetic field.

The physicist James Clerk maxwell, in the 19th century, based his description of electromagnetic fields on these four equations which express experimental laws.

The statements of these four equation are respectively: (1) electric field diverges from electric charges, an expression of the Coulomb force (2) There are no isolated magnetic poles.

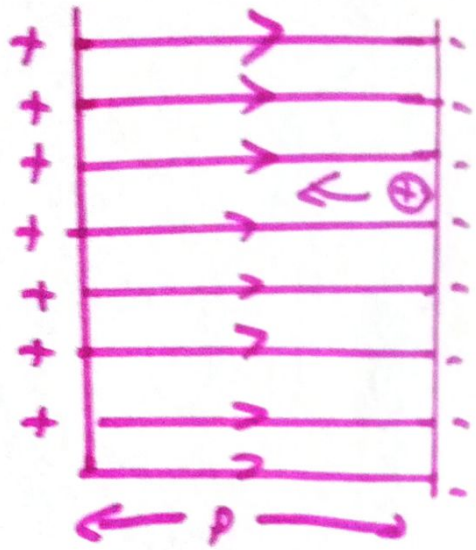
$$\oint \vec{E} \cdot d\vec{s} = \frac{d\phi_s}{dt}$$



$$\frac{dB}{dt} = \frac{-0.1T}{s}\hat{y}$$

$$\phi_s = BA$$

$$EMF = \frac{d\phi_e}{dt}$$



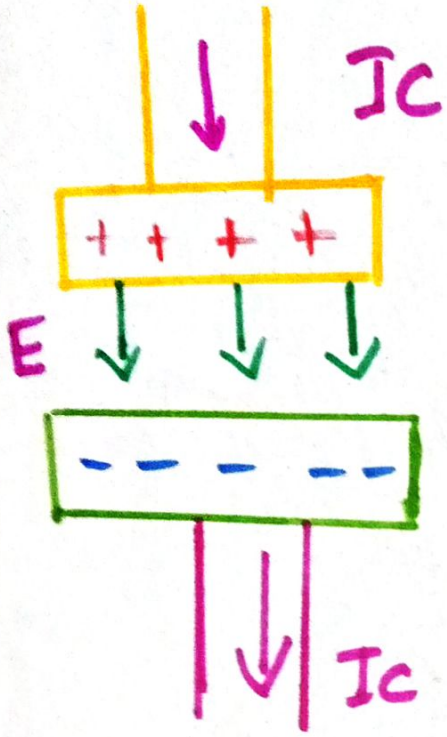
$$W = Pd = EqVd$$

$$W/q = \frac{Eqd}{q}$$

$$V = Ed$$

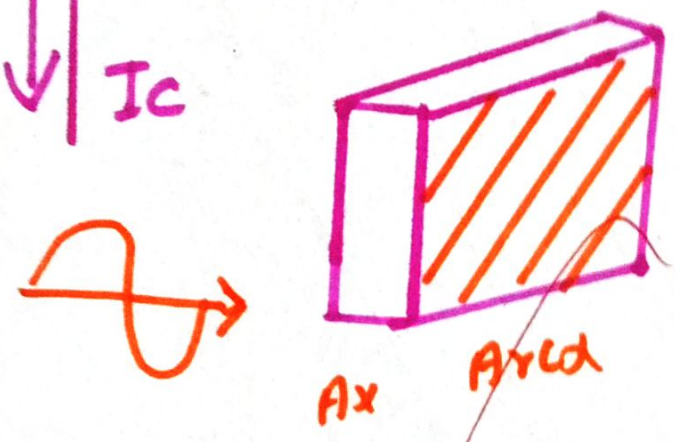
$$V = \mathcal{E}MF$$

Maxwell's Equations:



$$\int \vec{B} \cdot d\vec{l} = \mu_0 J_{cn}$$

$$I_d = \frac{\varepsilon_0 \Delta \Phi_E}{\Delta t}$$



$$E = CB$$

$$S = \varepsilon_0 CE$$

$$\Delta U = \varepsilon_0 C E^2 A \cdot t$$

$$\nabla \times B = \mu_0 J + \mu_0 \varepsilon_0 \frac{\partial}{\partial}$$

Ampere's law current makes a magnetic field

Maxwell's "Displacement current"

Maxwell Equations of
Eletromagnatic feild theory

$\nabla \cdot E = \frac{P}{\varepsilon_0}$ => Gauss law - Charges makes are eletric filed.

$\nabla \cdot B = 0$ => The magnatic feild is Solenoidal (no monopole sauces).

$\nabla \times E = -\frac{\partial B}{\partial t}$ => Faradays law of electromagnatic induction .. E curls coreunds a changing B.

A) charges create eletric fields

B) Accelerating charges create EsM wave

C) moving charges (current) create magnatic fields.

D) magnatic fields cause force to path against charges moving perpendicular to the field

E) Eletric fields cause face to push agins charges (moving of not)

1) $\oint \vec{E} \cdot d\vec{A} = \frac{Q_{in}}{\epsilon_0} = \phi_E$

2) $\oint \vec{B} \cdot d\vec{A} = 0 = \phi_S$

3) $\oint E \cdot ds = \frac{d\phi_B}{dt}$

An infinitely small length of the closed path

Induced electric field vector

$$\oint \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int_S (\vec{B} \cdot \vec{n})\, ds$$

Integral closed path

This is a line integral

Dot product - The correspond of in the direction

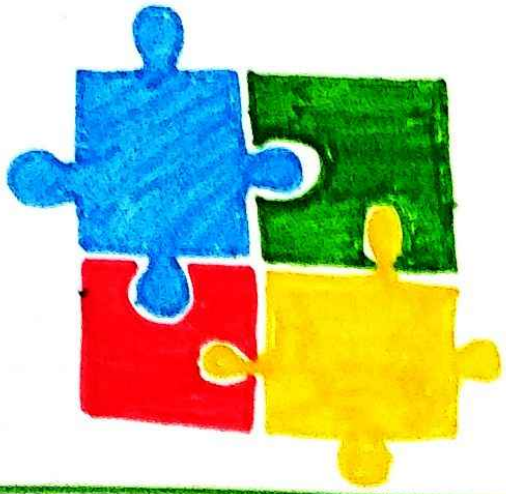
The rate of change with time.

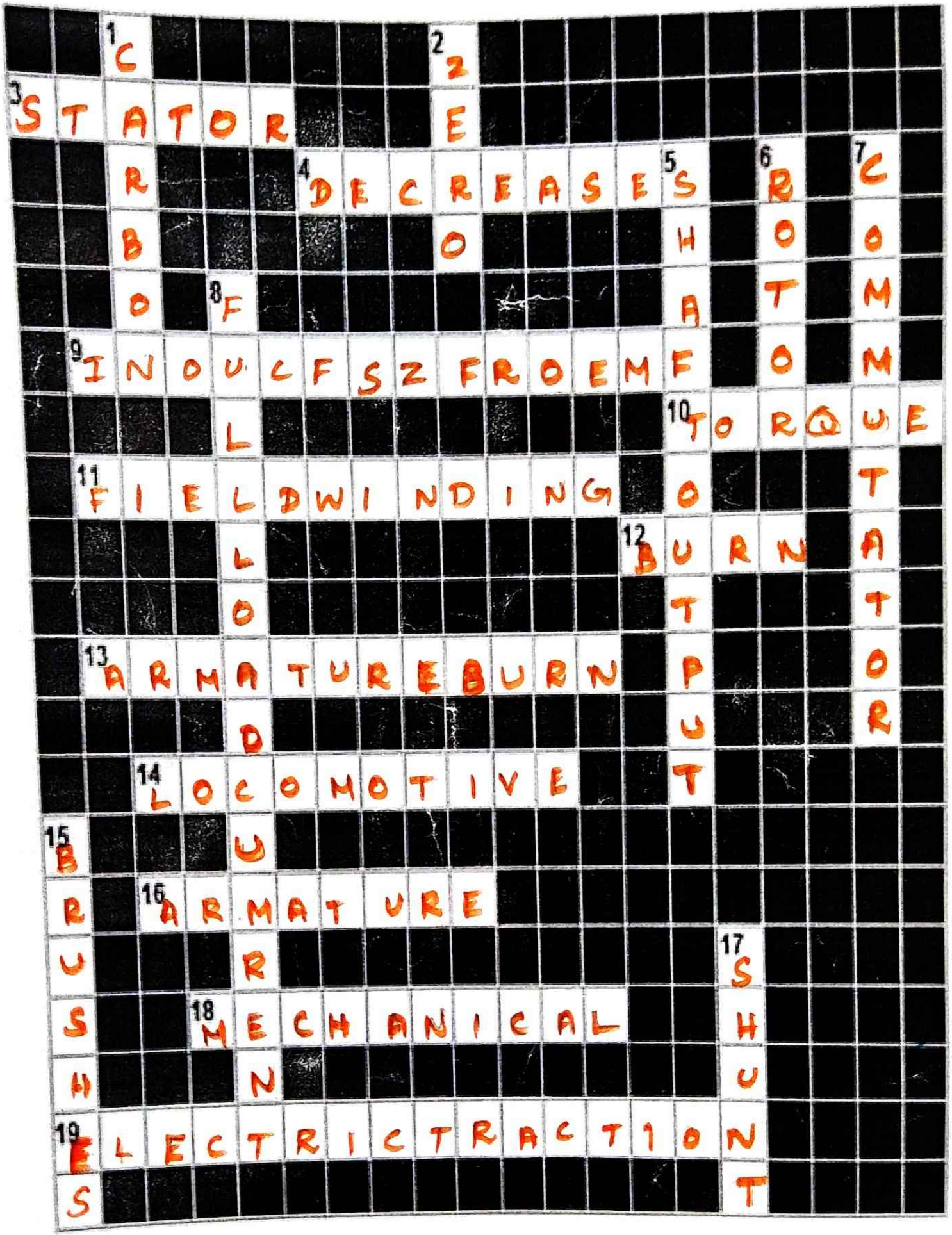
S. SORNA LAKSHMI

23CSB29

Ist - CSE - B

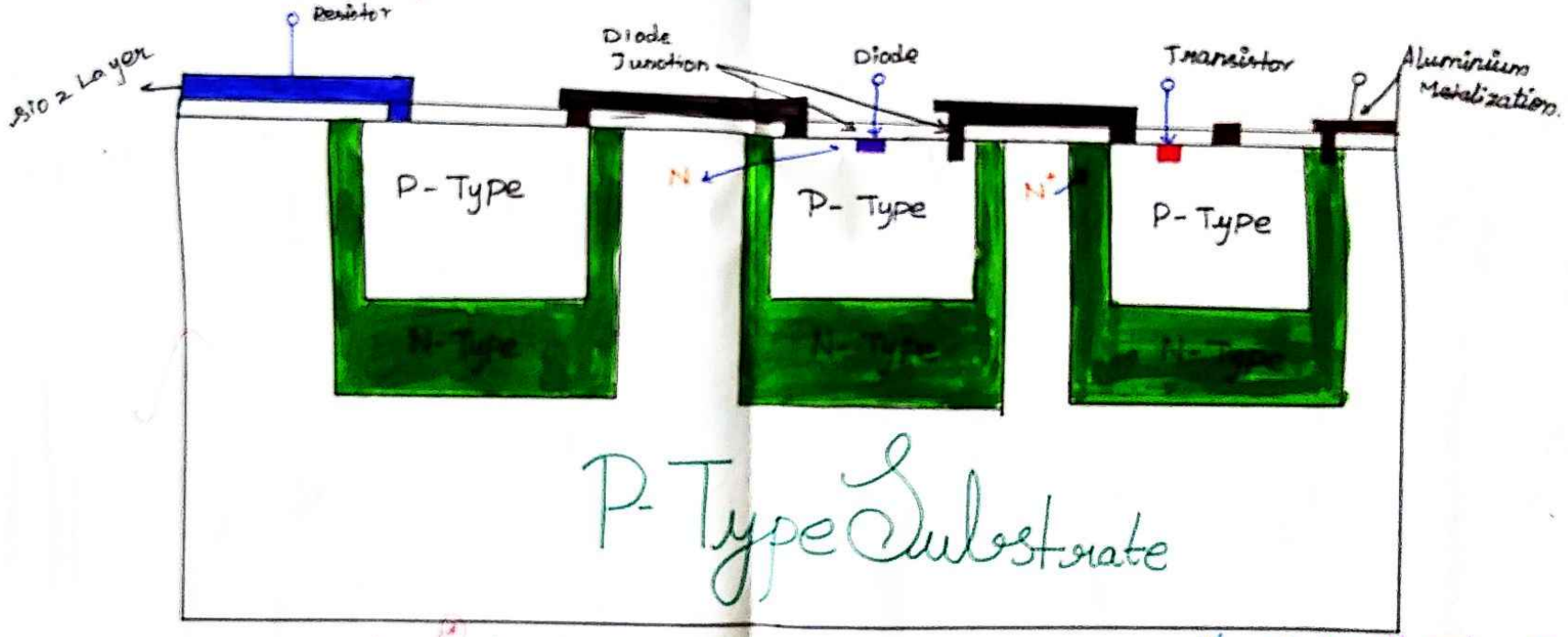
CROSSWORD PUZZLES




1 C
2 Z
3 STATOR
E
R
4 DECREASES
5 S
6 R
7 C
B
O
H
O
O
O
8 F
T
M
A
9 INDUCFSZFROEMF
O
M
10 TORQUE
L
11 FIELDWINDING
O
T
L
12 BURN
A
O
T
T
13 ARMATUREBURN
P
O
D
J
R
14 LOCOMOTIVE
T
15 B
U
R
16 ARMATURE
U
R
17 S
S
18 MECHANICAL
H
H
N
U
19 ELECTRICTRACTION
S
T

Fundamental Of Monolithic IC Technology

* Monolithic IC's are those in which transistors, diodes, resistors are fabricated and interconnected on the same chip.
* Hybrid IC's those in which elements are of discrete from and others are connected on the chip with discrete element externally to those formed on this chip.



Name: Devatharshan. T
Roll No: 22EE09 II year
Sub: Linear Integrated Circuits

INTEGRATED CIRCUIT

Introduction:-

All the IC's have interconnected discreat device inside the chip and the corresponding external manufacturing & design.

IC TYPES:

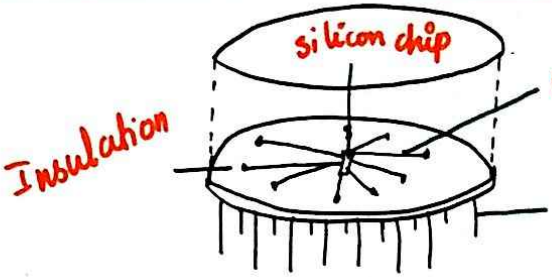
i) Metal can Ic
ii) Ceramic Flat Pack IC
iii) DIP - 14 Pin
iv) 8 Pin (DIP)

Linear IC's are used cases when the relationship between the input and output of a circuit is Linear.

1. Monolithic integrated circuits

⇒ The word "Monolithic" comes from the Greek words 'monos' 'lithos' when means 'single' 'stone'. It is very less.

eg: TV, circuits, computer circuits, Amplifiers.

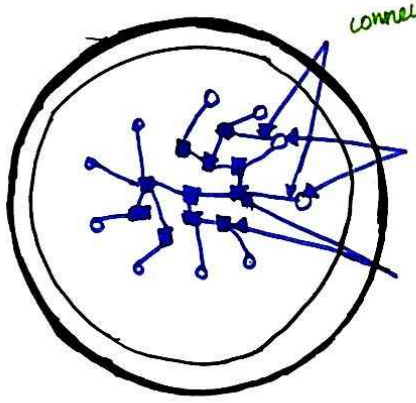


MONOLITHIC - IC - in can - TYPE Enclosure

2. Thin and Thick Film integrated circuit:-

⇒ Through the IC's have similar appearence. properties and general characteristics, the main difference between two of them manner Film deposited on to the IC.

3. Hybrid or Multi-chip integrated circuits:-



⇒ 5 Watts more than
⇒ 50 watts
⇒ capacitor on a single chip.

Hybrid or Multichip IC

DIGITAL SYSTEM DESIGN.

ASSIGNMENT-II

POSTER PRESENTATION : SHIFT REGISTER.

Serial in serial out Shift Register

Entry of four bit 1111.

$Q_A\ Q_B\ Q_C\ Q_D = 0000$

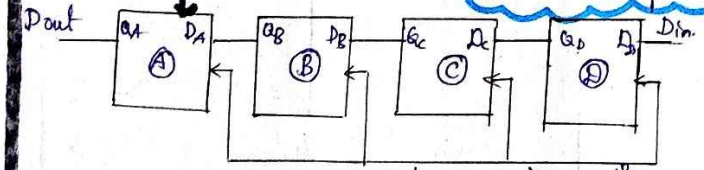
(a) Din = 1.

$Q_A\ Q_B\ Q_C\ Q_D = 0001$

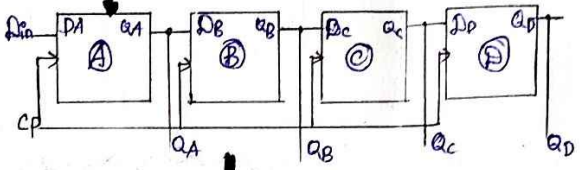
(b) $Q_A\ Q_B\ Q_C\ Q_D = 0011$.

(c) $Q_A\ Q_B\ Q_C\ Q_D = 0111$

(d) $Q_A\ Q_B\ Q_C\ Q_D = 1111$.



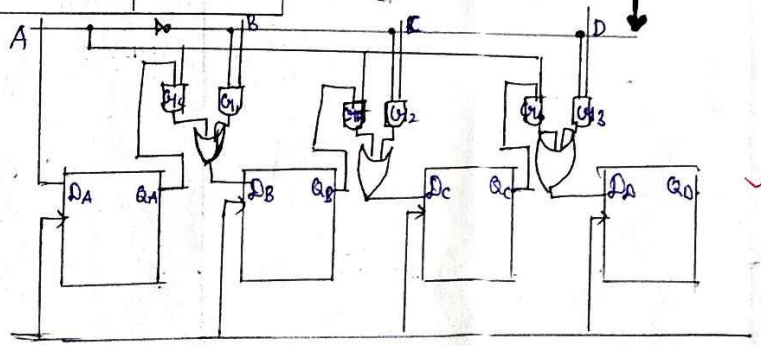
Serial in parallel out shift register.



* In this the data bits are entered into the register in a serial manner.
* But Output is parallel manner

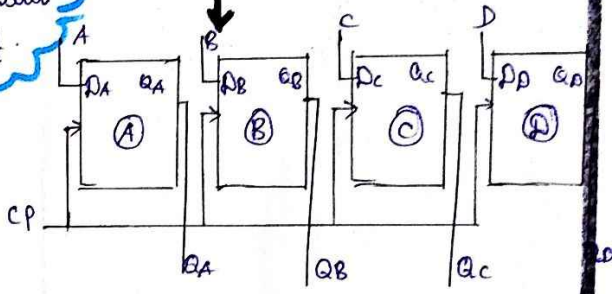
Parallel in serial out shift register

Shift - load input



Parallel in parallel out shift register.

* In this all the bits are entered into the register and after storing all bits at output parallelly.



Bidirectional Shift Register

* Shifting of data bits either to the left or its right side

S. Adhilakshmi

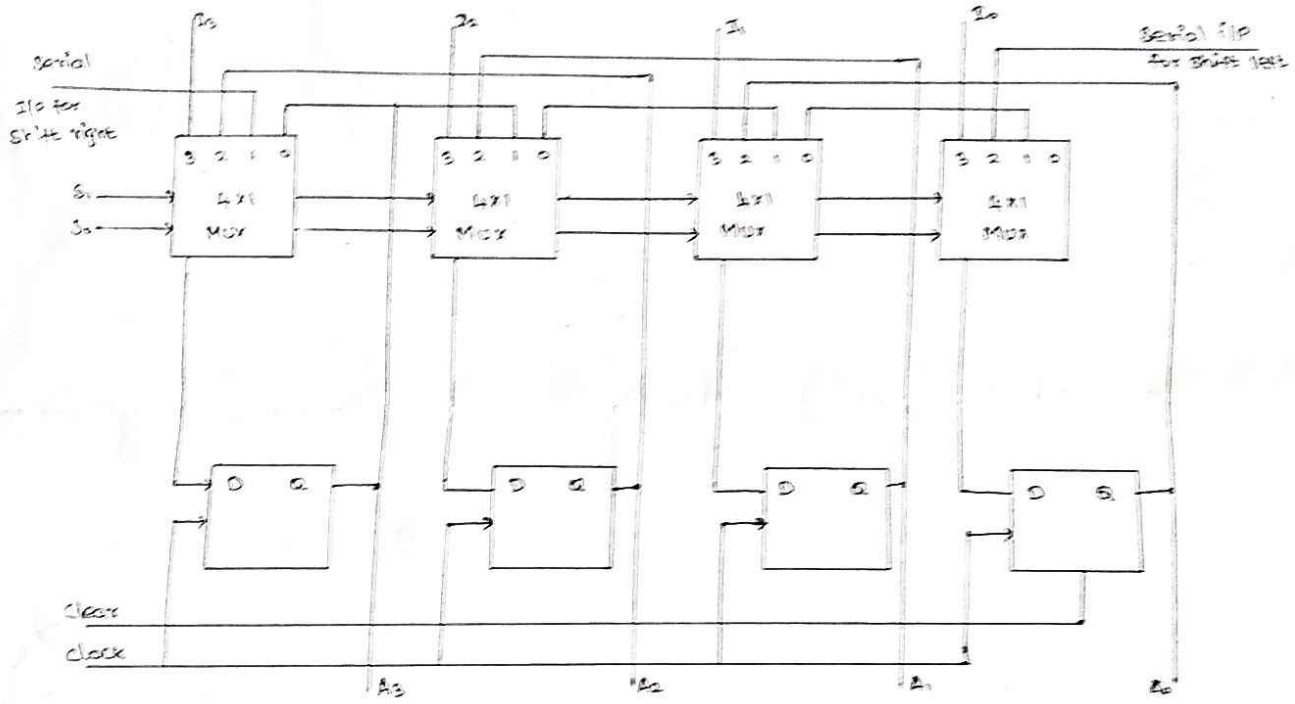
ECE - A.

23 ECA03.

UNIVERSAL SHIFT REGISTER

- A Register capable of Shifting in one direction only is a unidirectional shift register.
- A register capable of shifting in both the directions is called bidirectional shift register.
- If the register has both the shifts (right shift and left shift) and parallel load capabilities. It is referred to as a universal shift register.

Example :



- It consist of 4 flipflops and 4 mux
- The 4 mux have a common selection input S_1 and S_0, and they select appropriate input for D flipflop.
- When $S_1S_0 = 00$, Input 0 is selected and the present value of register is applied to D inputs to the flipflops. This results in No change.
- When $S_1S_0 = 01$, Input 1 is selected and it operates as a right shift.
- When $S_1S_0 = 10$, Input 2 is selected and it operates as a Left shift register.
- When $S_1S_0 = 11$, The binary information on the parallel input is transfered into the register simultaneously and it is a parallel load operation.

Applications :

- The primary use of shift register is temporary data storage and bit manipulations.
- Used for serial to parallel converter
- Used for parallel to serial converter
- Used as a shift register counter.

SEMICONDUCTOR MEMORIES

Read only Memory (ROM)

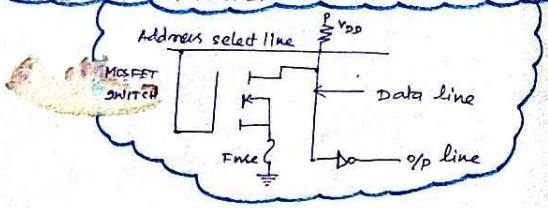
In integrated circuits a thin metallized layer connects the gates of some transistors to the row select lines.

The gate connections of MOS transistor depend on the data to be stored in the ROM.

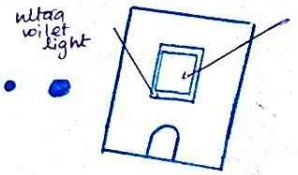
Masked ROM

PROM

To provide the programming facility each address select and data line intersection has its own fused MOSFET or transistor



EPROM



It uses MOS circuitry

EEPROM

It uses MOS circuitry Similar to EPROM

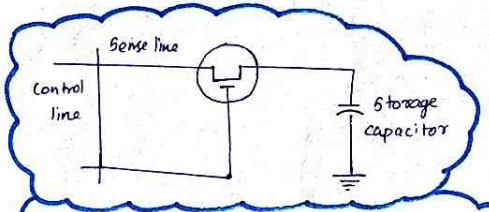
Data is stored as charge or no charge on an insulated layer or an insulated floating gate in the device.

Random Access memory (RAM)

Memories that consists of circuits capable of retaining their state as long as power is applied are known as static memories.

Most RAM's are built using MOS technology but some are built using bipolar technology.

STATIC RAM



It stores the data as a charge on the capacitor.

A dynamic RAM contains thousands of such Memory cells.

Dynamic RAM

Hazards

A hazards in digital circuit is a situation where unintended changes or glitches occur in the output

Types:

-> Static Hazards: Occur when an output should remain constant but briefly changes

-> Dynamic Hazards: Occur when an output should changes once but momentarily changes multiple times

Type of Hazard

-> Static 1 Hazard: Glitch when the output should stay '1':

-> Static 0 Hazard: Glitch when the output should stay '0':

Dynamic Hazard: Output should change form 0 to 1 or vice vera but momentaily oscillates.

Causes of Hazards

-> Logic Gate Delays: Different propagation delays in the circuit

-> Incorrect Circuit Design: Improper optimization or incomplete simplification.

-> Physical Factors: parasitic capacitance or inductive coupling can introduce delays

Hazard Mitigation Techniques

-> Adding Redundant Logic: Design modifications to eliminate hazards.

-> Clock Synchronization: Controlling timing with clocks to avoid incorrect transitions

-> Use of karnaugh maps: Systematically checking for potential hazards during simplification.

Real world importance

-> Applications in Circuits: Ensuring accurate digital communication in processors controllers etc

-> Consequences of Ignoring Hazards: Risks includs system malfunctions data corruption or failure in safety critical systems.

Examples of Hazards

Visual representation using wave form or logic diagram to demonstrate each type of hazard

Show how a delay in gate signals creates temporary incorrect outputs.

Conclusion

-> Summary of Hazards Type and Solutions: Briefly reiterate type and how to address them.

-> Future of Hazard-Free Designs: importance of continued research and best practices in design to create reliable digital systems.

KINGS COLLEGE OF ENGINEERING

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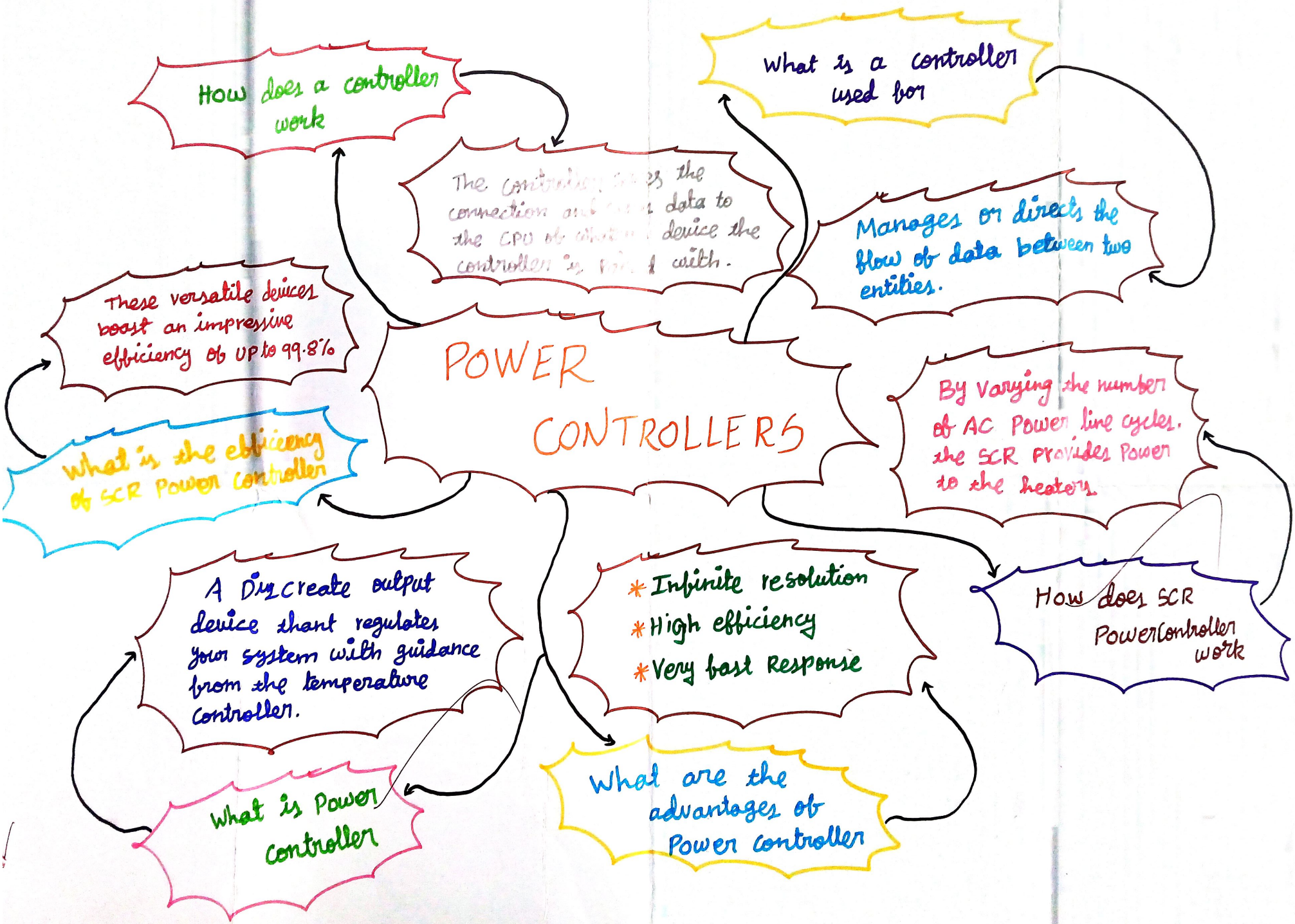
ACCREDITED WITH GRADE B++ NAAC

DEPARTMENT OF ELECTICAL AND ELECTRONICS ENGINEERING

ACADEMIC YEAR

2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS


POWER CONTROLLERS
How does a controller work
The controller [illegible] the connection and [illegible] data to the CPU of [illegible] device the controller is [illegible] with.
What is a controller used for
Manages or directs the flow of data between two entities.
These versatile devices boost an impressive efficiency of UP to 99.8%
What is the efficiency of SCR Power Controller
By varying the number of AC Power line cycles. the SCR provides Power to the heaters.
How does SCR PowerController work
A Discreate output device that regulates your system with guidance from the temperature controller.
What is Power controller
*Infinite resolution
*High efficiency
*Very fast Response
What are the advantages of Power controller

SAFETY PRECAUTIONS

1. **Personal Protective Equipment (PPE):**

- Wear insulated gloves and boots.
- Use safety glasses or face shields to protect against sparks and flying debris.
- Use insulated tools and equipment

2. **Power Off:**
- Always ensure the power is off before starting work. Use a voltage tester to confirm.
- Lockout/Tagout (LOTO) procedures should be followed to ensure that the power cannot be accidentally turned on.

3. **Proper Training:**
- Only qualified and trained personnel should perform electrical work.
- Regular training and refreshers on electrical safety procedures.

Empathize with them.

4.**Use of Insulated Tools:**
- Use tools with insulated handles to prevent accidental electric shock.

5. **Work in Dry Conditions:**
- Ensure that the work area is dry to prevent electrical shocks.
- Avoid working in wet or damp environments. If necessary, use rubber mats to stand on.

6. **Avoid Overloading Circuits:**
- Do not overload electrical outlets or circuits as this can cause overheating and fires.
- Use appropriate circuit breakers and fuses.

7. **Maintain Clear Workspaces:**
- Keep the work area clear of clutter and flammable materials.
- Ensure good lighting and ventilation.

8. **Regular Inspections:**
- Regularly inspect electrical equipment and wiring for signs of wear, damage, or faults.

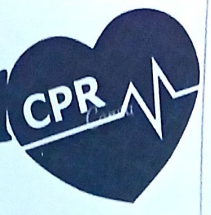
Safety precautions

9. **Proper Grounding:**
- Ensure all electrical systems are properly grounded to prevent electric shocks.

10. **Emergency Procedures:**
- Know the location of emergency shutoffs and fire extinguishers.
- Have a plan for responding to electrical emergencies, including knowing how to perform CPR.

11. **Labeling and Signage:**
- Clearly label all electrical panels, switches, and circuit breakers.
- Use warning signs to alert personnel to potential electrical hazards.

First aid



1. **Ensure Safety**: Do not touch the person if they are still in contact with the electrical source. Turn off the power source or use a non-conductive object to separate them from the electricity.

2. **Call for Help**: Dial emergency services immediately.

3. **Check for Responsiveness**: Once the person is free from the electrical source, check if they are responsive and breathing.

4. **Perform CPR if Needed**: If the person is unresponsive and not breathing, begin CPR immediately if you are trained to do so.

5. **Treat Burns**: If there are burns, cover them with a sterile gauze or a clean cloth. Avoid using adhesive bandages or any material that might stick to the burn.

6. **Keep the Person Warm**: Keep the person warm and comfortable until help arrives.

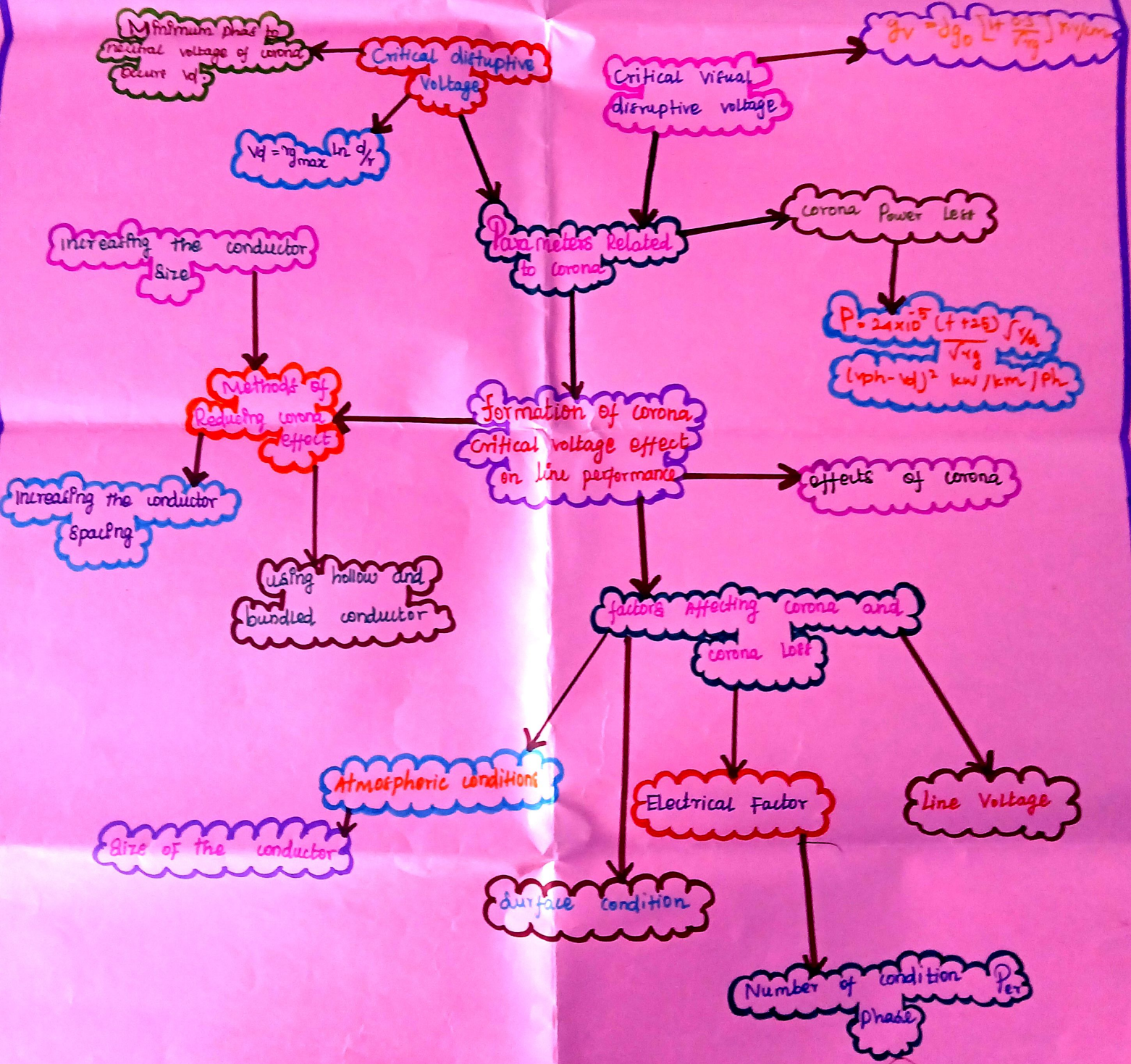
7. **Stay with the Person**: Monitor the person's condition and stay with them until medical professionals arrive.

8. **Avoid Moving the Person**: Unless there is an immediate danger, avoid moving the person, as they might have injuries that are not visible

ASSIGNMENT 2

G. Sanjay
ECE-B
23ECB24
BE3254
Electrical and instructions
Engineering

formation of Corona Critical Voltage effect on Line performance



40/40

S. Nachiyammal
22 EE 23
TRD
Assignment 2

P. Pandhiya

ECE - "B"

Electrical and Instrumentation Engineering {BE325H}

Assignment - I

Gate solution question

40

13/4/24

Phase Diagram

1. The crystal structure of austenite is hexagonal closed packed.

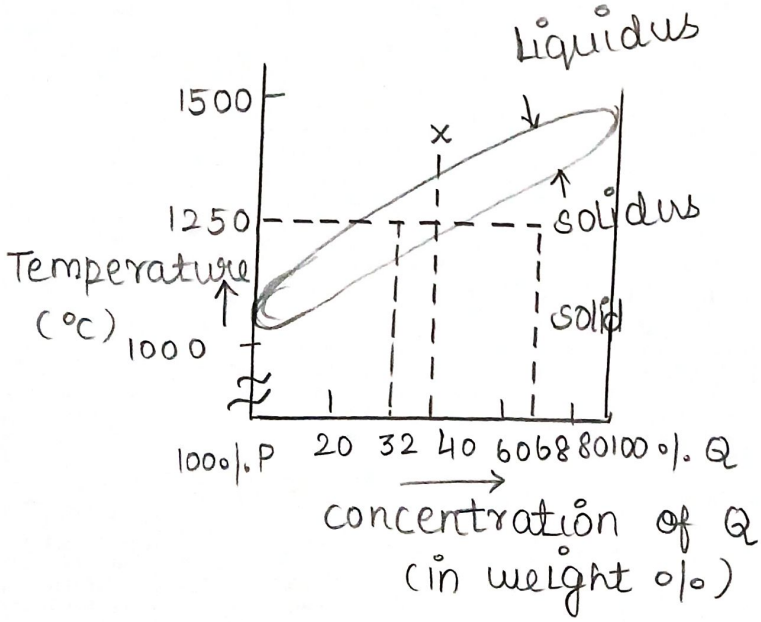
a) body centered cubic

b) face centered cubic

c) hexagonal closed packed

d) body centered tetragonal.

2. The binary phase diagram of metals P and Q is shown in the figure. An alloy X containing 60% P and 40% Q is cooled from liquid is solid state. The fractions of solid and liquid at 1250°C, respectively, will be.



c. 22.2% and 77.8%

a) 68.0% and 32.0%

b) 32.0% and 68.0%

c) 22.2% and 77.8%

d) 77.8% and 22.2%

3. Denoting L as liquid and M as solid in a phase diagram with the subscripts representing different phases, a eutectoid reaction is described by.

a. $M \rightarrow M_2 + M_3$

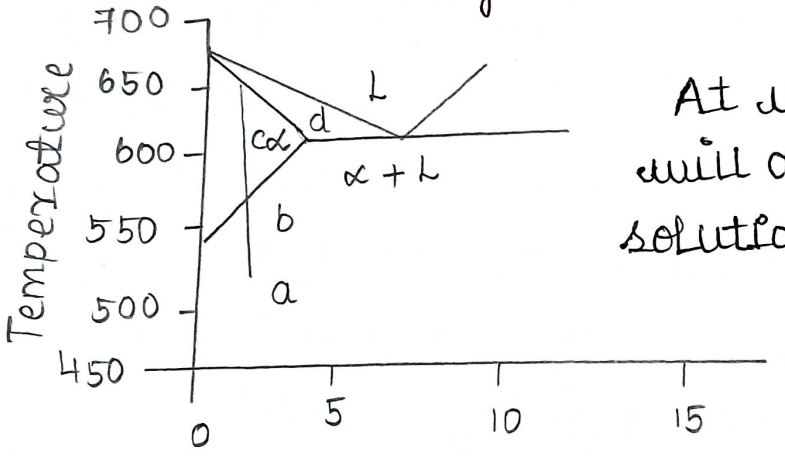
a) $M \rightarrow M_2 + M_3$

b) $L_1 \rightarrow M_1 + M_2$

c) $L_1 \rightarrow M_1 + M_2$

d) $M_1 + M_2 \rightarrow M_3$

4. In the phase diagram shown in figure, four samples of the same composition are heated to temperatures marked by a, b, c and d.



At which temperature will a sample get solutionized the fastest?

c. c

a) a

b) b

c) c

d) d

5. In binary system of A and B a liquid of 20% A (80% B) is coexisting with a solid of 70% A (30% B). For an overall composition having 40% A the fraction

of solid is a. 0.40.

a) 0.40

b) 0.50

c) 0.60

d) 0.75

6. If a particular Fe-C alloy contains less than 0.83% carbon, it is called b. hypoeutectoid steel

a) high speed steel

b) hypoeutectoid steel

c) hypereutectoid steel

d) cast iron

7. The percentage of carbon in grey cast iron is in the range of 3 to 4 percent.

a) 0.25 to 0.75 percent

b) 1.25 to 1.75 percent

c) 3 to 4 percent

d) 8 to 10 percent

8. The iron carbon diagram and the TTT curves are determined under.

a. Equillibrium and non-equillibrium conditions respectively

a) Equillibrium and non-equillibrium conditions respectively.

b) Non-equillibrium and equillibrium conditions respectively.

c) Equillibrium conditions for both.

d) non-equilibrium conditions for both.

9. Increase in carbon content in plain carbon steel raise its. c. Tensile strength and hardness.

a) Ductility and UTS.
b) Tensile strength and malleability
c) Tensile strength and hardness.
d) Ductility and melting temperature.

10. The process of reheating the martensitic steel to reduce its brittleness without any significant loss in its hardness is d. tempering

a) normalising
b) annealing
c) quenching
d) tempering

11. When 1.0% plane carbon steel is slowly cooled from the molten state to 740°C, the resulting structure will contain. d. Austenite and cementite

a) Pearlite and cementite
b) Ferrite and cementite
c) Austenite and ferrite
d) Austenite and cementite

12. which of the following is not a name for phases present in a system of a material in various conditions?

c. Interstitial diagram

a) phasor diagram

b) Equilibrium diagram

c) Interstitial diagram

d) constitutional diagram

13) which of the following cannot be obtained using a phasor diagram?

d. purity of materials

a) melting temperatures of various phases

b) Temperature range for solidification.

c) Equilibrium solid solubility

d) purity of materials

14) A specific body of material of a series of alloys with the same compositions is / are known as b. system

a) component

b) system

c) Alloy

d) solute

S. Raja Gowri

II-EEE

22EE38

EE3405

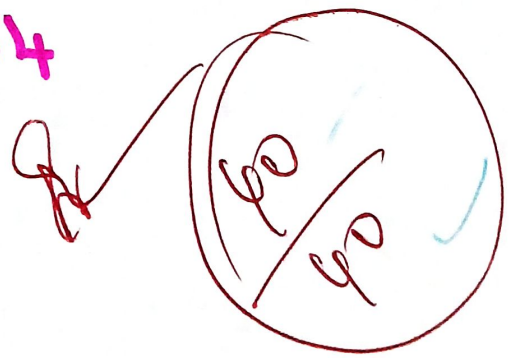
Electrical Machines - II

Assignment - 1

Experiment

Operation on infinite bus bars

12.04.2024



AIM

To conduct the load test on three phase squirrel cage induction motor and draw the performance characteristic curves.

NAME PLATE DETAILS

3ϕ Induction Motor

APPARATUS REQUIRED

S. NO	Name of the APPARATUS	TYPE	Range	Quantity
1.	Ammeter	MI	(0-6)A	1
2.	voltmeter	MI	(0-600)V	1
3.	Wattmeter	UPF	(600V, 16A)	2
4.	Tachometer	-	-	1
5.	connecting wires	-	-	Required

FORMULA USED

1. Torque : $(S_1 - S_2) \times (R + \frac{d}{2}) \times 9.8$ N-m

2. Output Power $(P_{out}) = \frac{2\pi NT}{60}$ Watts

3. Input Power $(P_{in}) = W_1 + W_2$ Watts

4. Percentage of efficiency $\eta = \frac{\text{output power}}{\text{input power}} \times 100$

5. Percentage of slip, $S = \frac{N_s - N_r}{N_s}$

PRECAUTIONS

The motor should be started without load

PROCEDURE

Step 1: Note down the name plate details of the motor.

Step 2: Make the connections as per the circuit diagram.

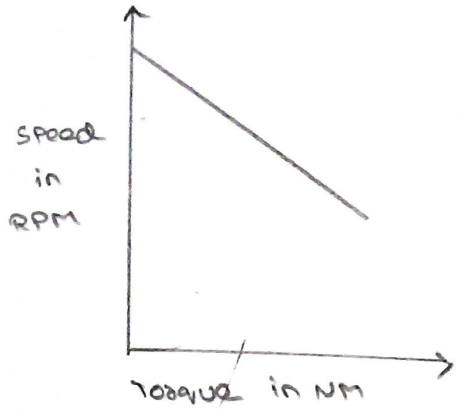
Step 3: The TPST switch is closed and the motor is started using star delta starter to run at rated speed.

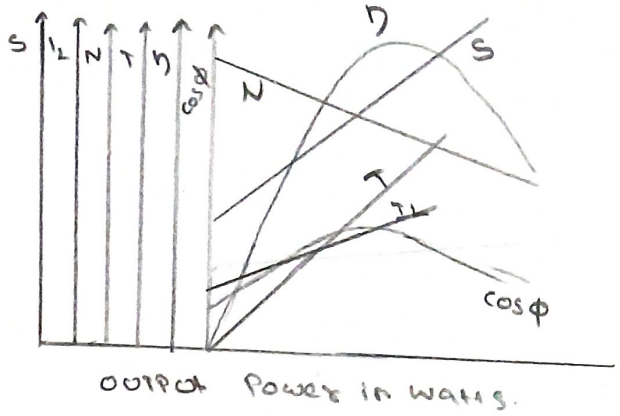
Step 4: At no load the speed, current, voltage and power are noted.

Step 5: By applying the load for various values of current and the above mentioned readings are noted in tabular column.

Step 6: The load is later released and the motor is switched off and the graph is drawn

MODEL GRAPH





CALCULATION

$$T = (0) \times (0.095 + \frac{0.005}{2}) \times 9.81$$

$$= 0$$

$$P_{out} = \frac{2 \times 3.14 \times 1495 \times 0}{60}$$

$$= 0$$

$$P_{in} = 920 + (-880)$$

$$= 40$$

$$\eta = \frac{0}{40} \times 100$$

$$= 0$$

$$S = \frac{1500 - 1495}{1500}$$

$$= 0.003$$

$$\cos\phi = \frac{940}{\sqrt{3} \times 4.8 \times 106} = 0.04.$$

RESULT

Thus the load test on three phase squirrel cage induction motor was conducted and the performance characteristic curves were drawn.

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Department of Mechanical Engineering

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ACCREDITED WITH GRADE B++ NAAC

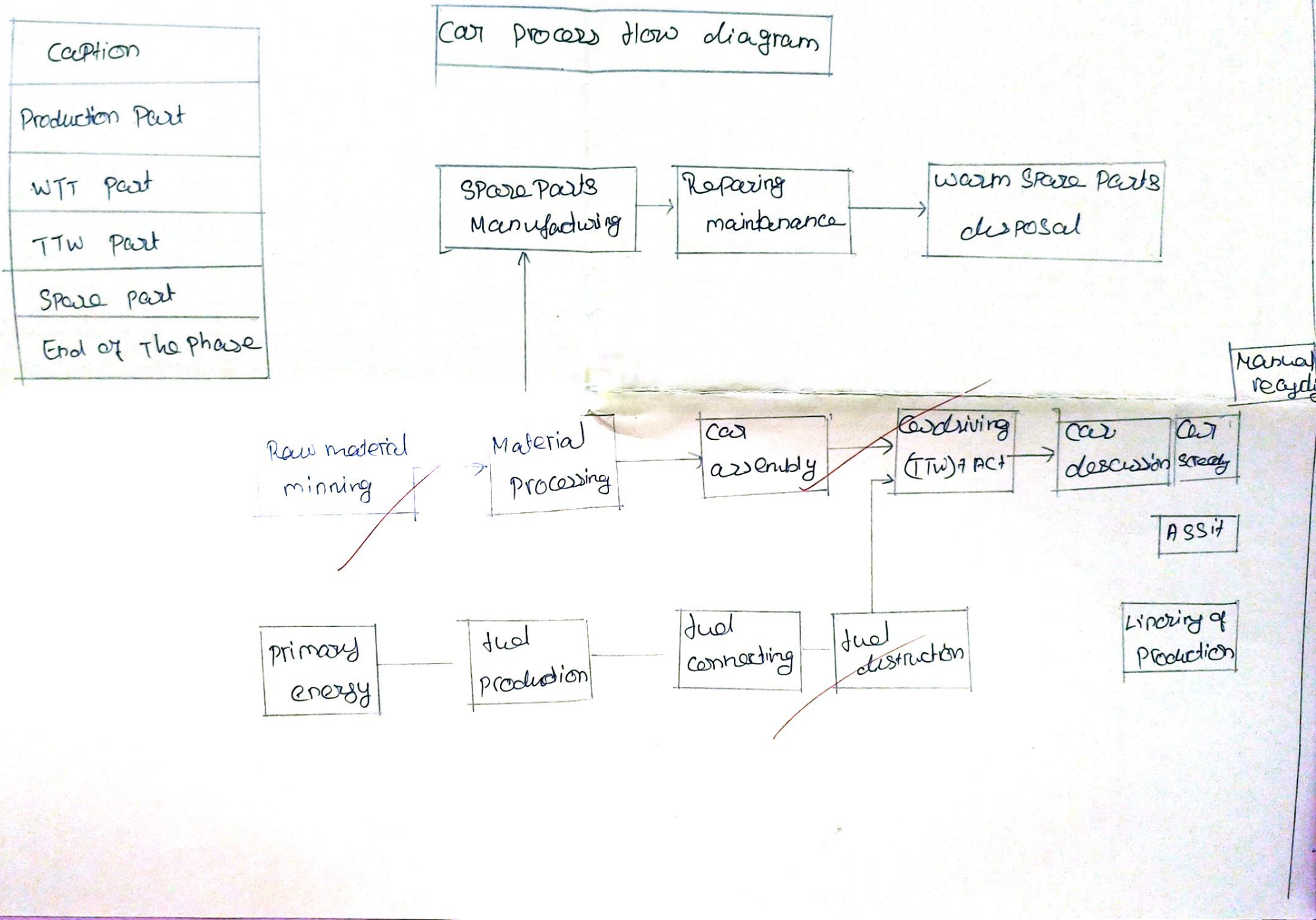
DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR 2023-24

PROFESSIONAL CAREER ENHANCEMENT SKILLS

Car process flow diagram

Caption
Production Part
WTT Part
TTW Part
Spare part
End of The phase



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B++ NAAC

DEPARTMENT OF MECHANICAL ENGINEERING

IV/MECH/B

PCE ACTIVITY I

Application of Concept

ME8094

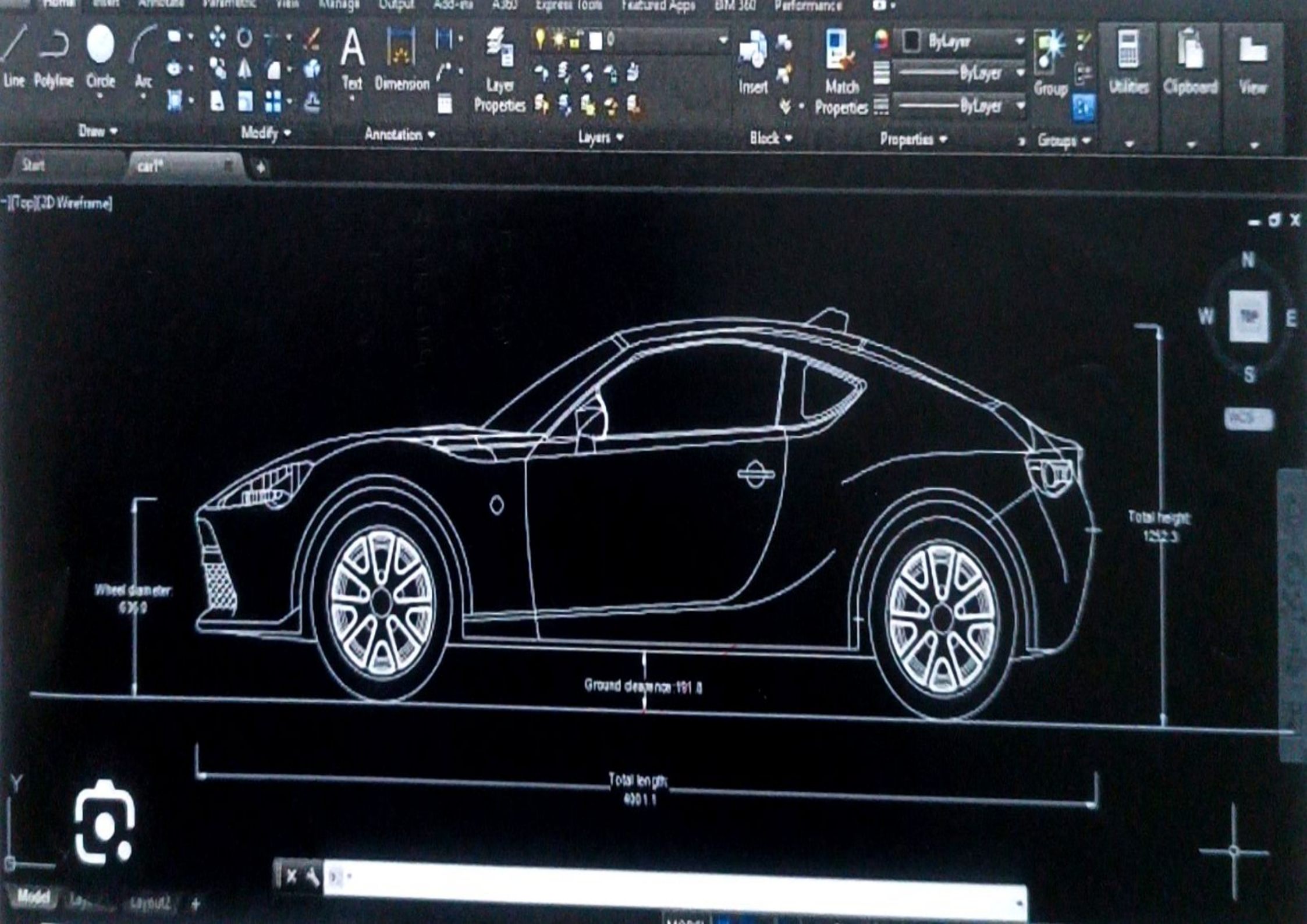
Computer Integrated Manufacturing Systems

Name : S. Balaji
Roll No : 28
Register No : 821120114305
Date : 01/4/24

50/50

20/20

Staff signature


Line
Polyline
Circle
Arc
Text
Dimension
Layer Properties
Insert
Match Properties
Group
Utilities
Clipboard
View
Draw
Modify
Annotation
Layers
Block
Properties
Groups
Start
car1*
-][Top][2D Wireframe]
N
W
E
S
Wheel diameter
Ground clearance 191.8
Total height
Total length
Model

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Ji

DEPARTMENT OF MECHANICAL ENGINEERING

IV/MECH/B

PCE ACTIVITY II

Picture Prompt

ME8094

Computer Integrated Manufacturing Systems

Name : S. Balaji
Roll No : 28
Register No : 821120114305
Date : 01/4/24

15/15

Staff signature

By V.Ryan

THE COMPUTER SYSTEM CONTROLS EVERY ASPECT FROM DESIGN TO MANUFACTURE TO STORAGE AND DISTRIBUTION

Role of computer in manufacturing planning and manufacturing control

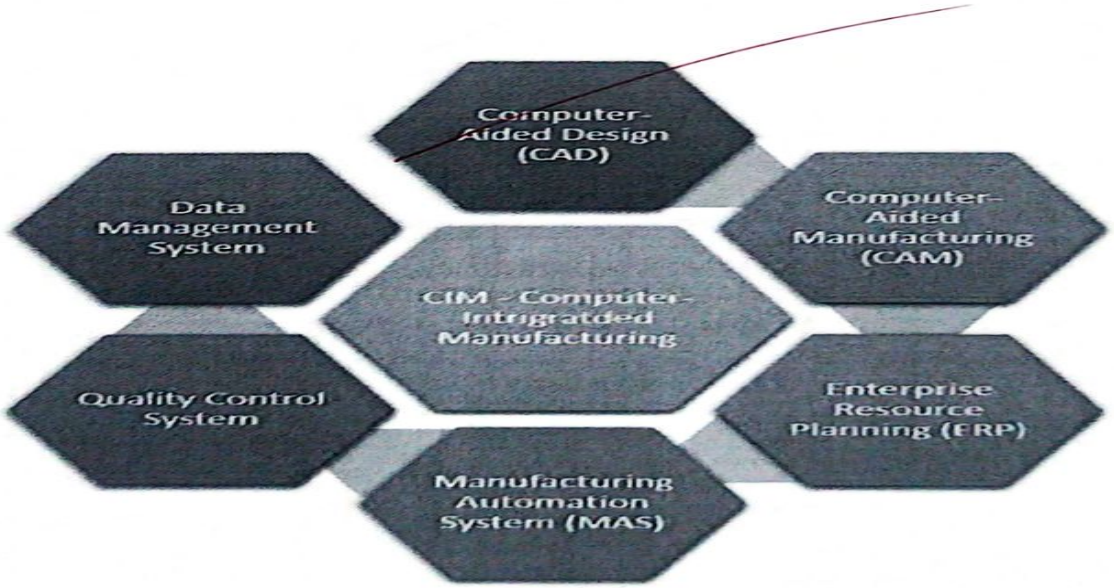
Computer-aided manufacturing (CAM) is the use of software and computer-controlled machinery to automate a manufacturing process. As its name implies, CAM does this by controlling machine tools in the production of goods.

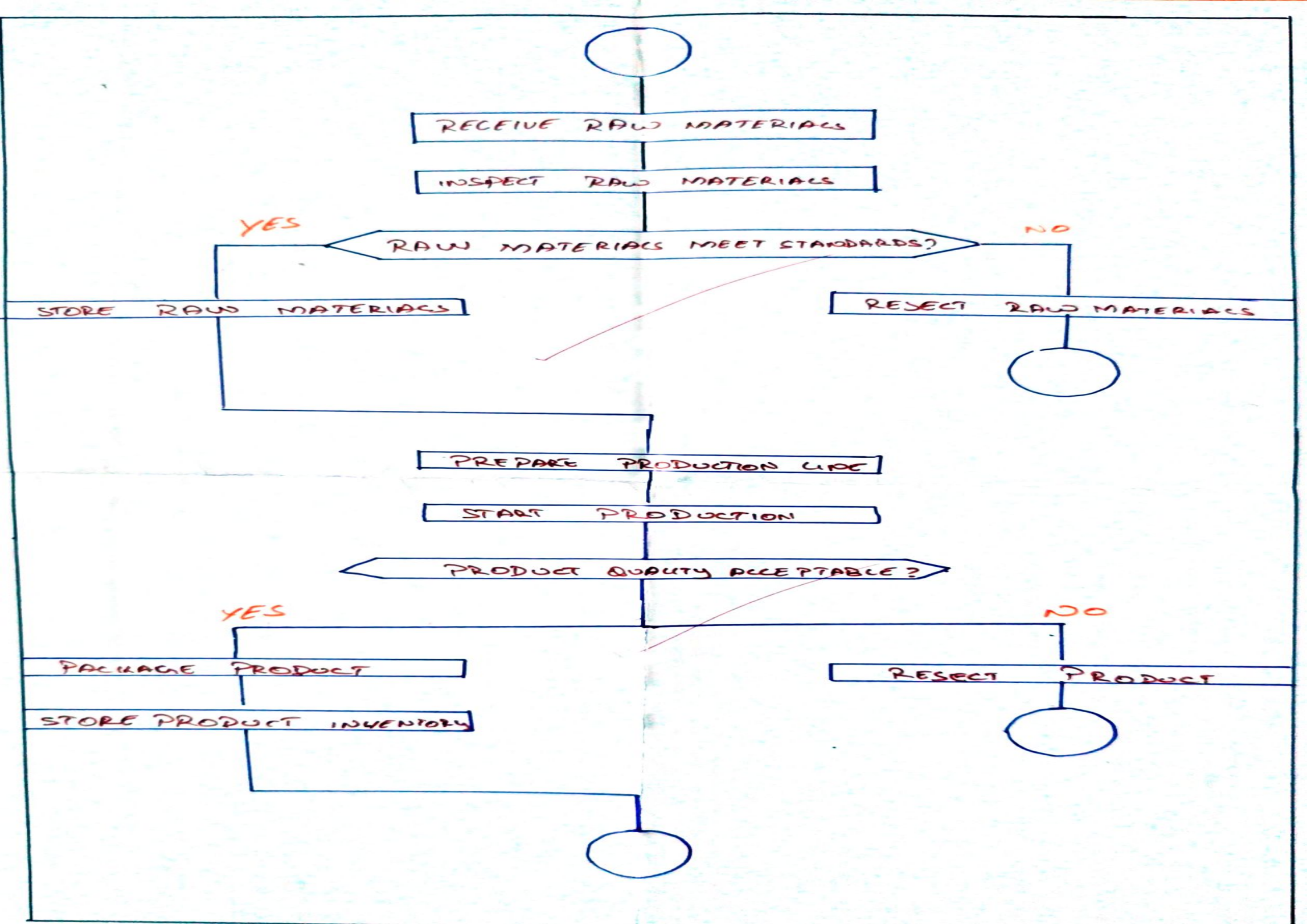
Computers used in computer integrated manufacturing

In straightforward terms, CIM is the technique of using computers to control an entire production process. It's commonly used by factories to automate functions such as analysis, cost accounting, design, distribution, inventory control, planning and purchasing.

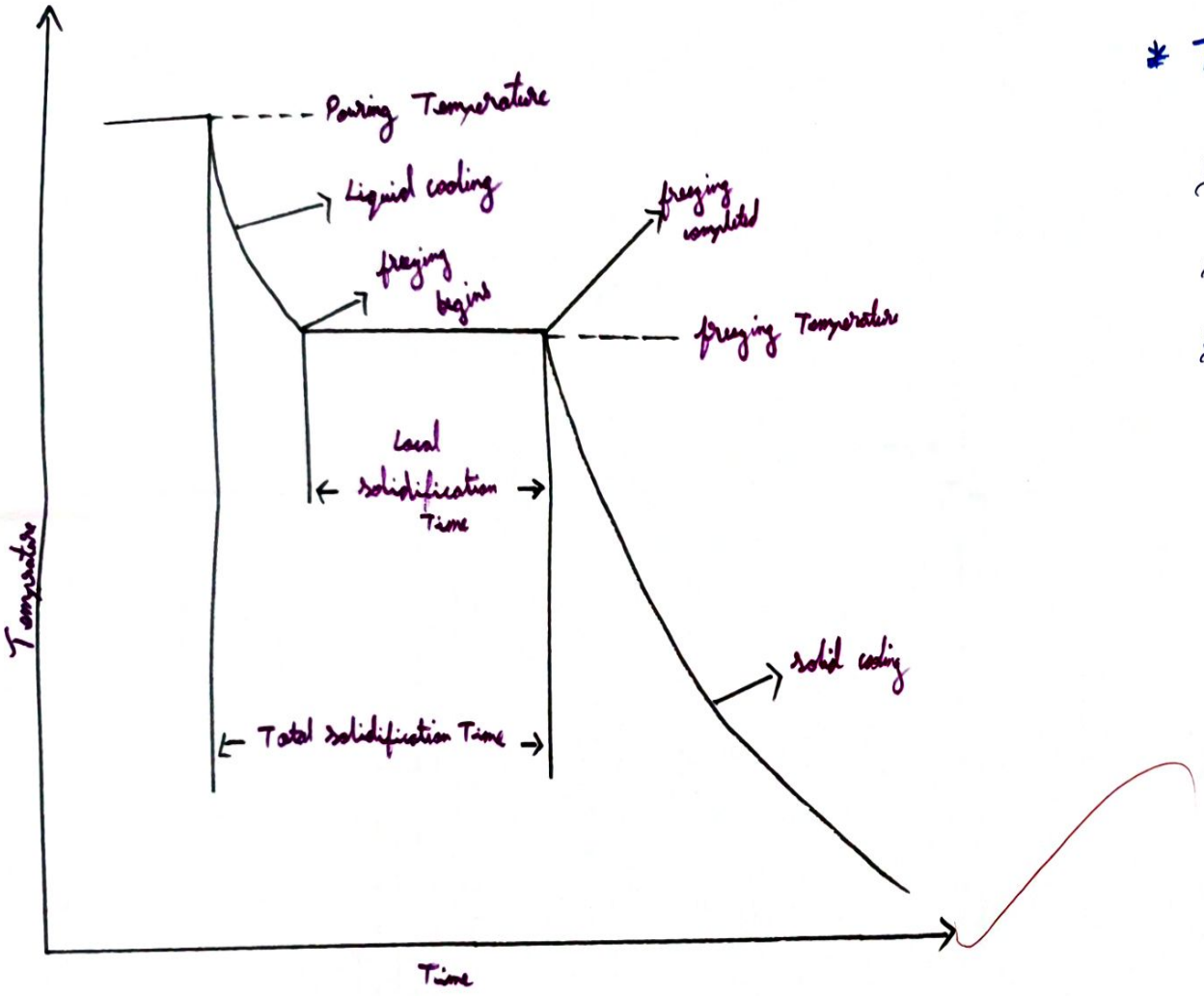
Computer integrated design and manufacturing

Computer Integrated Manufacturing, known as CIM, is the phrase used to describe the complete automation of a manufacturing plant, with all processes functioning under computer control with digital information tying them together.




RECEIVE RAW MATERIALS
INSPECT RAW MATERIALS
YES
RAW MATERIALS MEET STANDARDS?
NO
STORE RAW MATERIALS
REJECT RAW MATERIALS
PREPARE PRODUCTION LINE
START PRODUCTION
PRODUCT QUALITY ACCEPTABLE?
YES
NO
PACKAGE PRODUCT
REJECT PRODUCT
STORE PRODUCT INVENTORY

Solidification of Pure metals and alloys and eutectics



* The solidification divided into Three Types:-

1. At constant Temperature (pure metals and eutectic alloys)
2. Over a Temperature Range (solid solutions)
3. by a combination of solidification over a Temperature Range followed by constant Temperature freezing.

NAME :- O. MANIKANDAN

Roll NO :- 81 ME19

Subject :- casting and welding Process

Sub code :- CME 395

Stainless steell

what is Stainless steel :-

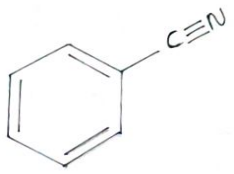
* Stainless steel also called inox steel which is derived from french world which is means inoxyble or a inoxidizable.

* Stainless cannot oxidize in the presence of moisture and air in Stainless steel

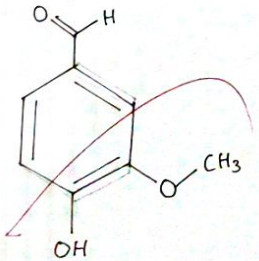
* Stainless steel is an iron based alloy made of some of the basic element such as, iron, chromium, silicon, nickel carbon, copper, etc

uses of a Stainless steel :-

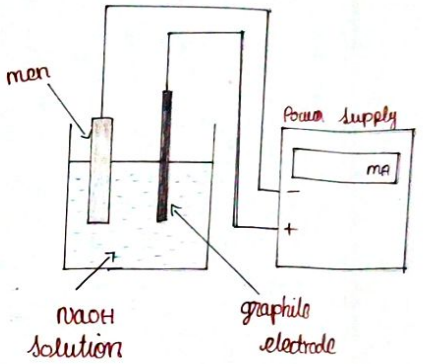
* food and catering
* chemical industry
* storage tanks
* civil engineering
* offshore Technology
* Bridges
* storage tanks
* Power plant

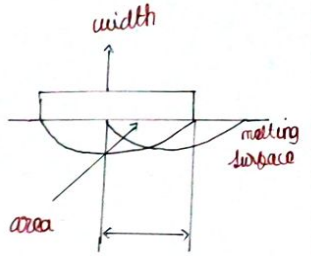


(a)

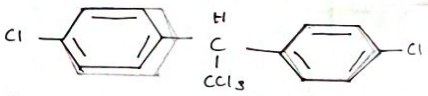


(b)

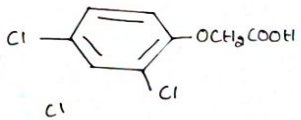




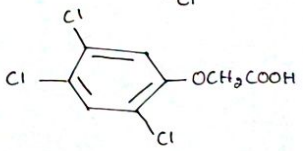
degrees of overlapping = 50%.



DDT



2,4-D

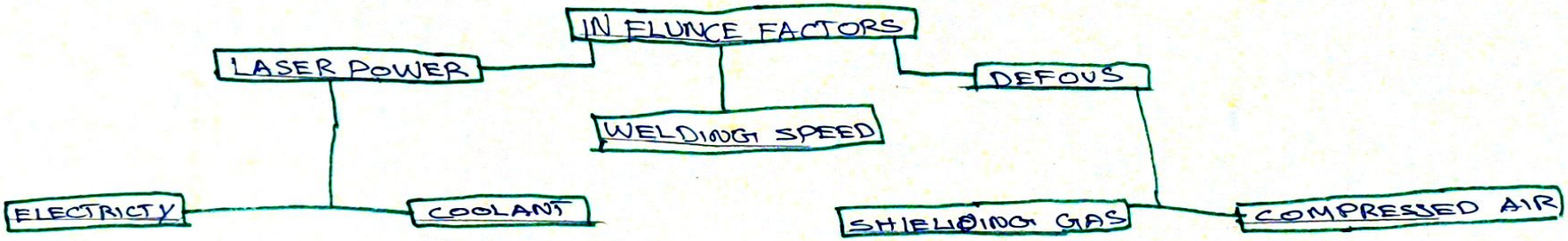


2,4,5

Types :-

* Precipitation Hardening
* astenitic
* ferritic
* martensitic
* Duplex
* astenitic

MEEING PROCEDURE AND COMPOSITION CONTROL FOR CORBON STEELS



WHICH MATHEMATICAL MODELLING METHODS ARE USED BY DESISION MAKERS IN IRELAND REGARDING CARBON EMISSIONS FROM AGRICULTURE

TENSILE STRENGTH MESURMENT

↓

DEFORMATION PREDICATION

↓

Heat source model

carbon emission characters

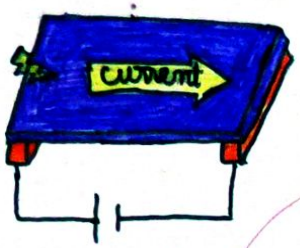
↓

carbon emission modeling

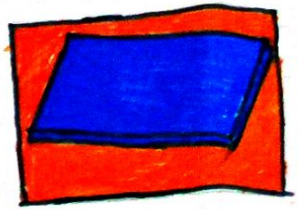
Heat Treatment of The aluminium alloys :-

Resistance heating

furnace heating

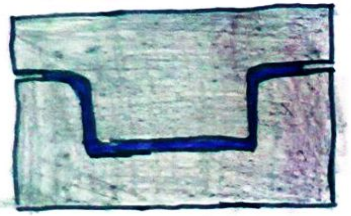


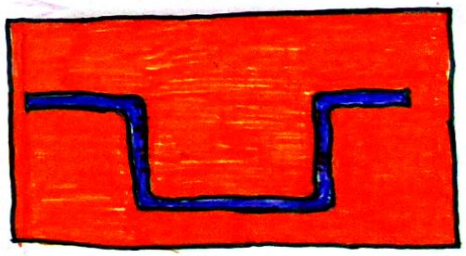
(OR)



(A) TH Sheet

(B) Quick heating below Solution temperature

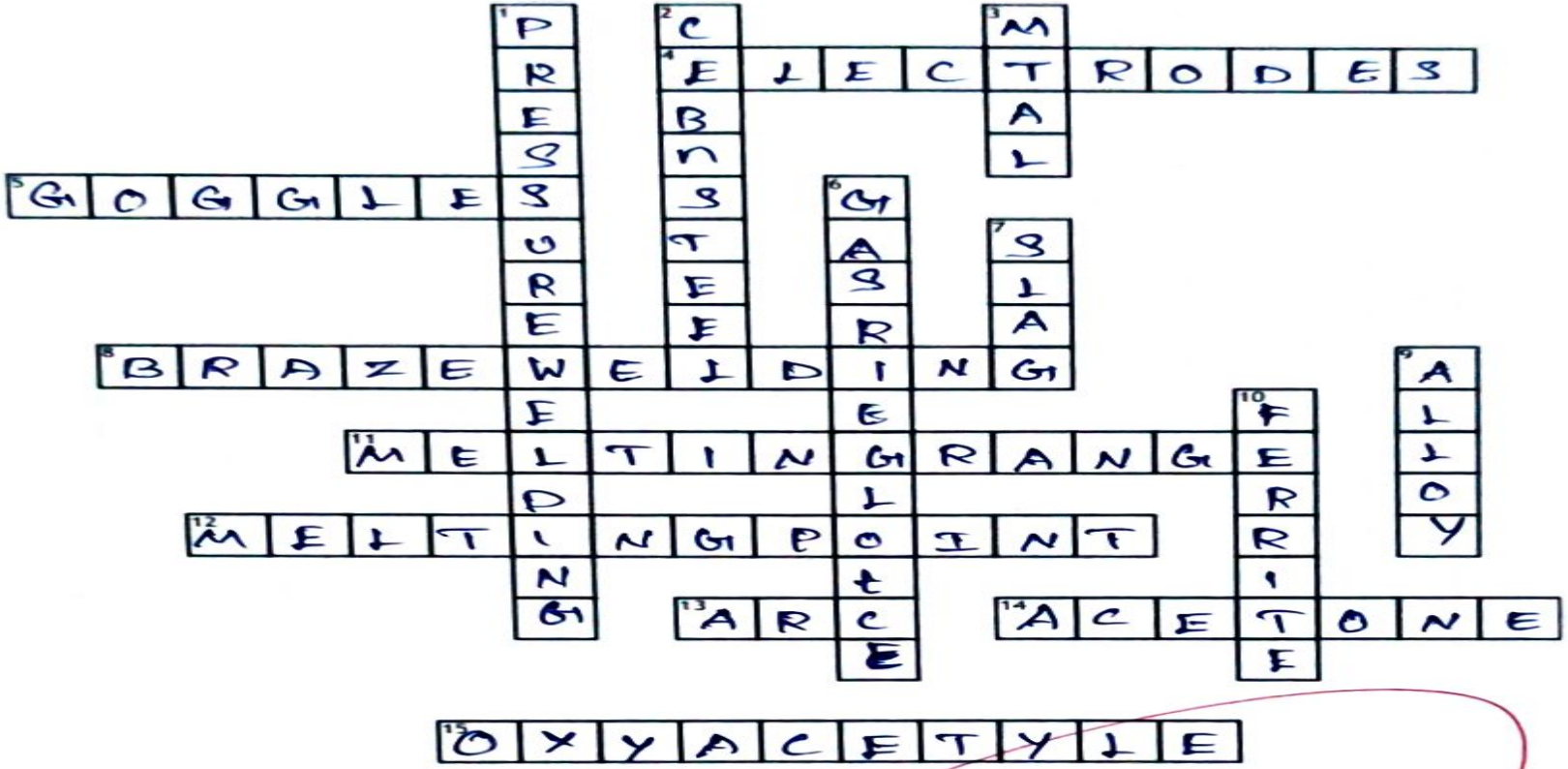




(C) hot stamping

(D) Artificial heating

Welding words



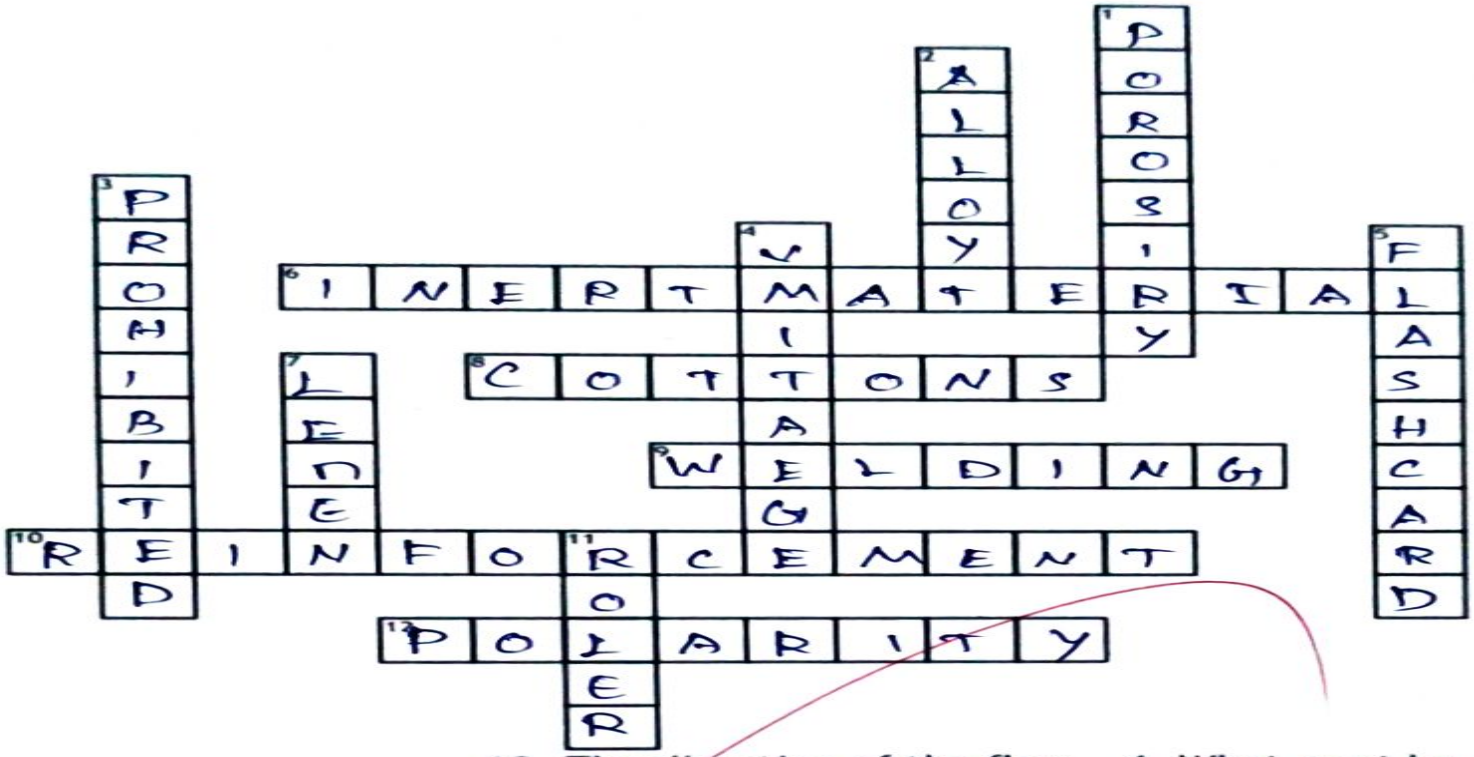
Across

4. the voltage that runs along the welding arc.
5. safety equipment worn to protect the welder's eyes from harmful radiation while welding and cutting
8. a welding process where the filler metal is liquefied above 842 F and beneath the base metals' solid state.
11. the range of temperatures between solidus and liquidus.
12. the temperature that needs to be reached to allow metal to begin to liquefy
13. process that is used to join metal to metal by using electricity to create enough heat to melt metal,
14. flammable and unstable liquid that is used to dissolve and stabilize acetylene.
15. a welding process where a gas flame creates the welding heat.

Down

1. a welding process where pressure is used to make a weld.
2. the metal material that will be welded or cut
3. the joining of welding metal and base metal.
6. tool used for gas welding to control the flow of gases used.
7. stony waste matter separated from metals during the smelting or refining of ore. verb
9. mixture of one or more elements with at least one being a metal.
10. a pure form of iron that exists below the lowest critical temperature.

Welding



Across

6. An undesirable substance in or around a weld.

8. A groove angle is made up of two seperate _ _ _ _ _ _ _ plates.

9. Run off tabs are part of a strip of metal known as _ _ _ _ _ _ _ _.

10. Weld metal extending beyond the upper and lower surfaces of the base metal.

12. The direction of the flow of electrons in a closed direct current welding circuit.

Down

1. The presence of gas pockets or voids in weld metal

2. The intimate mixing or combining of molten metals.

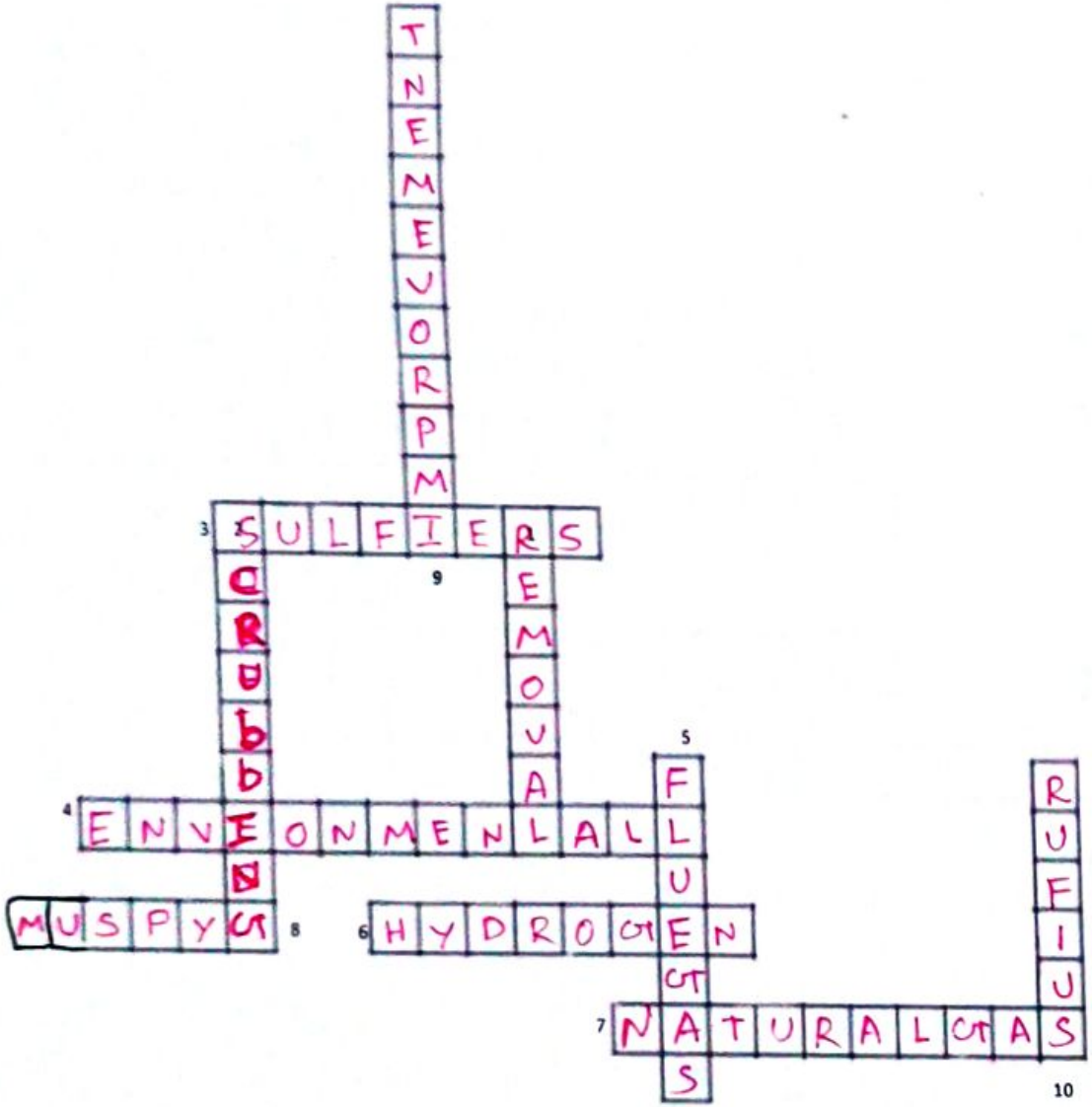
3. Arc strikes outside the groove or fusion faces to be welded are _ _ _ _ _ _ _ _ _ _ _ _.

4. What must be adjusted on the machine when changing electrode size for SMAW? (hint: not temperature)

5. A condition in which the molten metal sags downward and does not fill the top part of the welding joint.

7. Length of a groove weld test plate in inches.

11. A set of guidelines designed to help keep students safe.



Down

1.What is desulphurization?

3.Common sulfur source in fuels? SCRUBBING

5.Desulphurization in coal?

Left to right

2.Common sulfur source in fuels?

4.Desulphurization purpose?

6.Catalyst in desulphurization?

7.Alternative fuel for low sulfur?

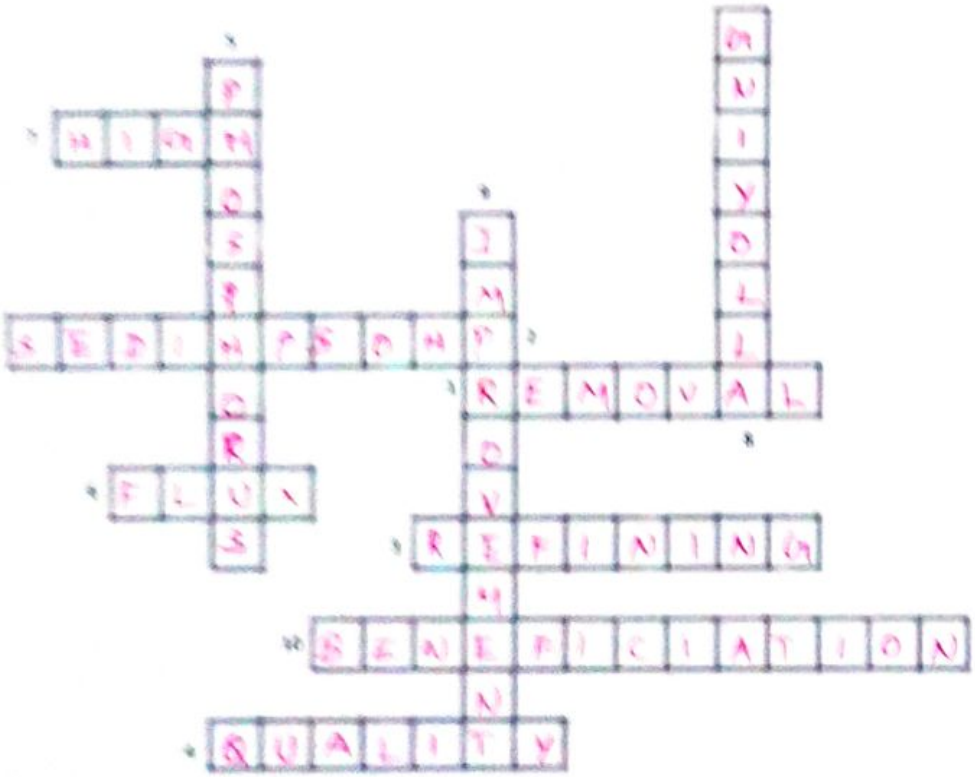
Right to left

8.Desulphurization byproduct?

Up

9.Impacts on air quality?

10.Name a common impurity in steel that desulphurization targets.



Left to right

1.What is dephosphorization?

3.Dephosphorization methods in steelmaking?

4.Dephosphorization purpose?

6.Dephosphorization agent in steel production?

7.Temperature range for dephosphorization?

10.Dephosphorization in iron ore processing?

Right to left

2.Common phosphorus source in metals?

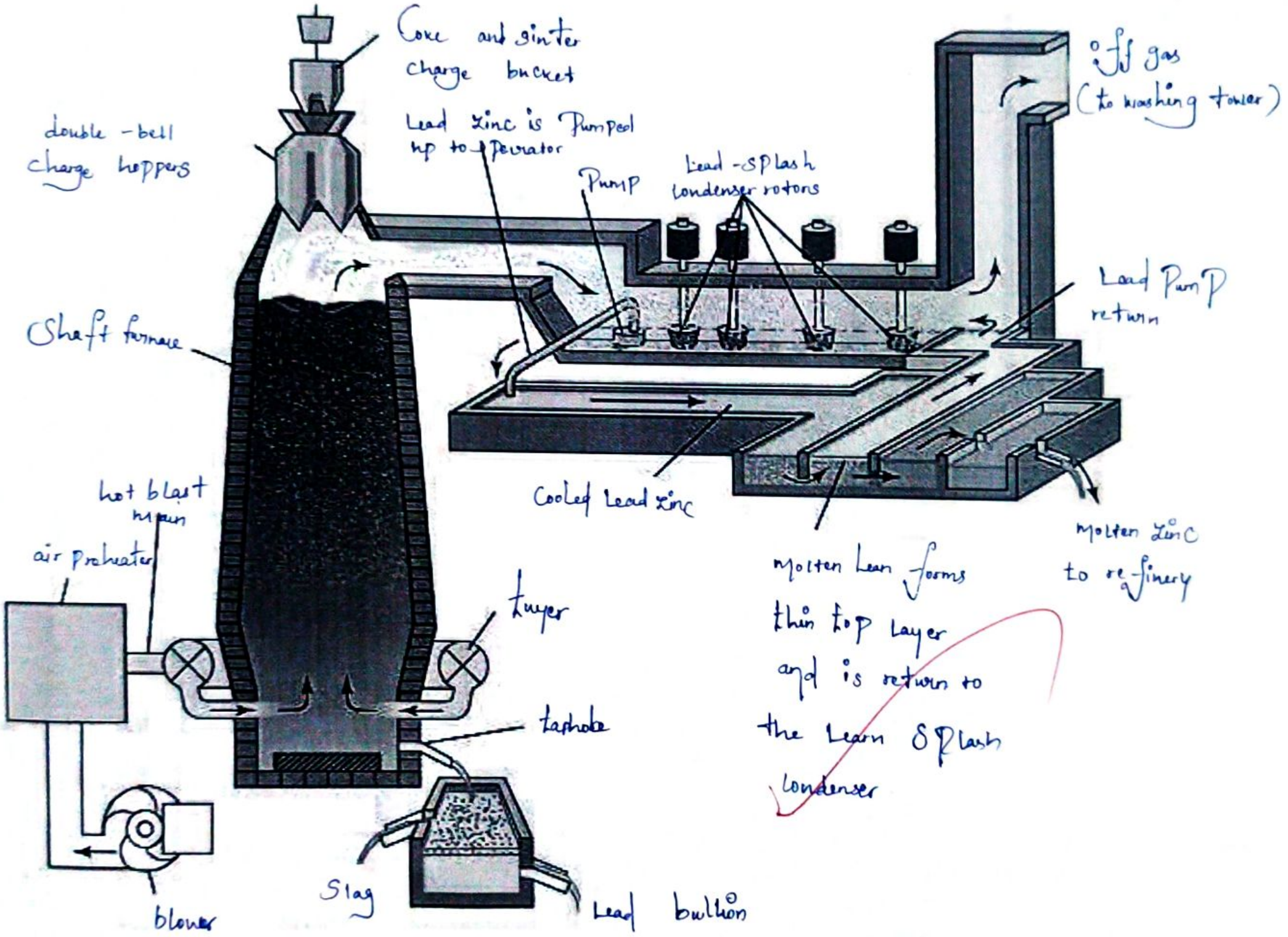
Down

5.Main element targeted for removal?

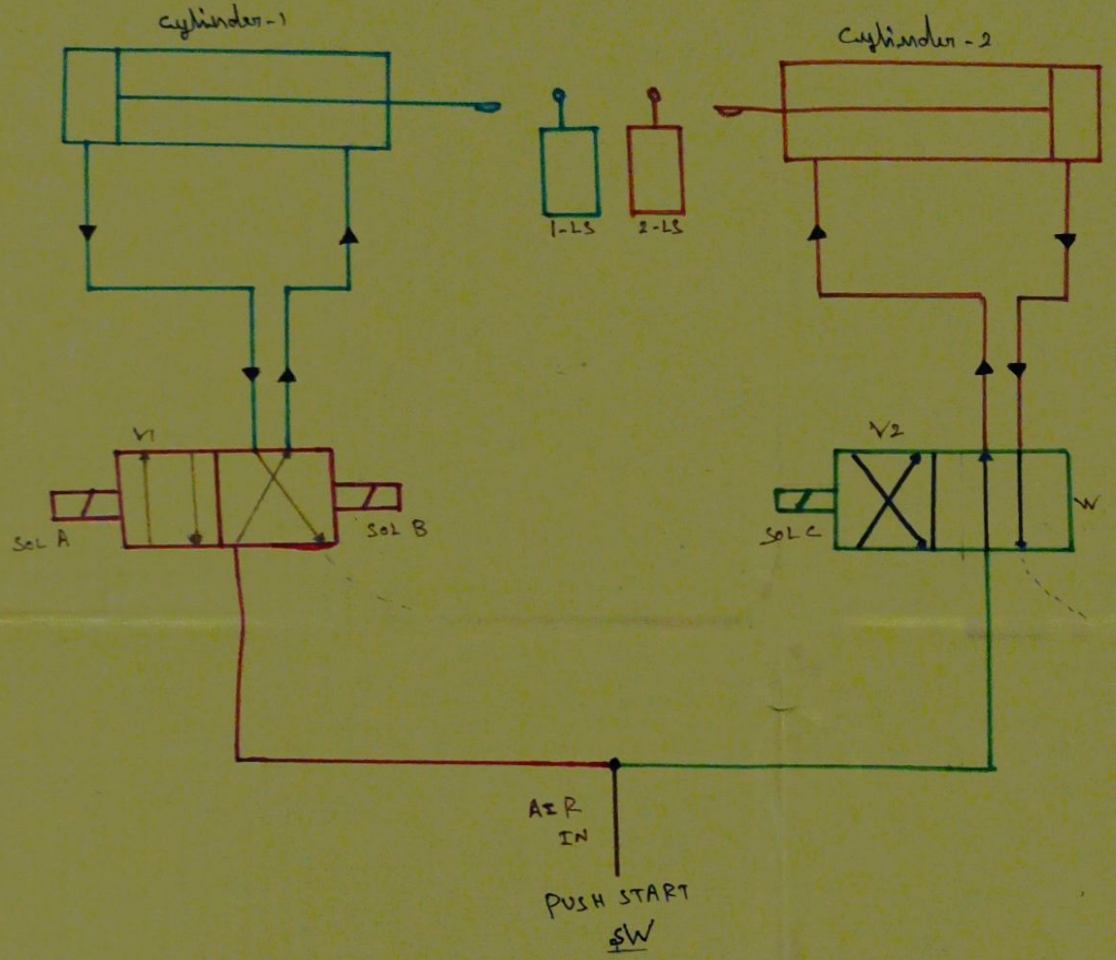
9.Dephosphorization impact on metal strength?

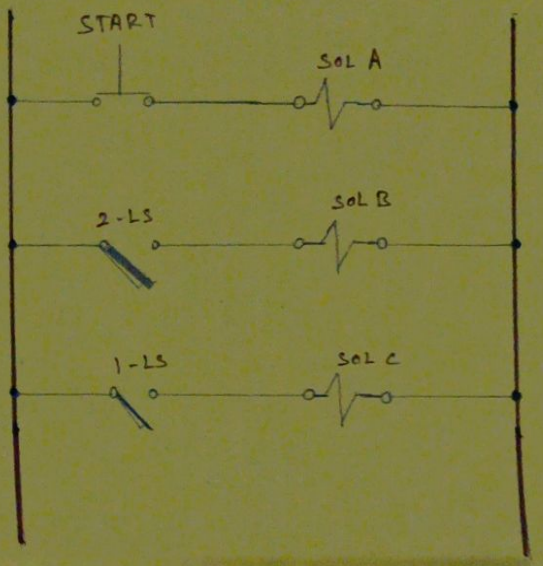
Up

8.Alternative alloys with lower phosphorus?


Coke and sinter charge bucket
Lead zinc is Pumped up to elevator
double-bell charge hoppers
Pump
Lead-splash condenser rotors
off gas (to washing tower)
Lead Pump return
Shaft furnace
hot blast main
air preheater
tuyer
taphole
Cooled Lead zinc
molten Lead forms thin top layer and is return to the Lead Splash condenser
molten zinc to refinery
Slag
Lead bullion
blower

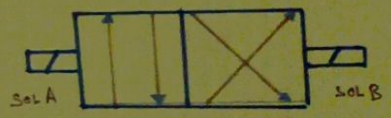
LADDER DIAGRAM FOR HYDRALIC CIRCUIT

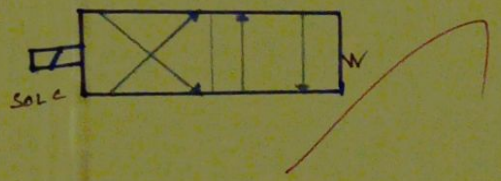


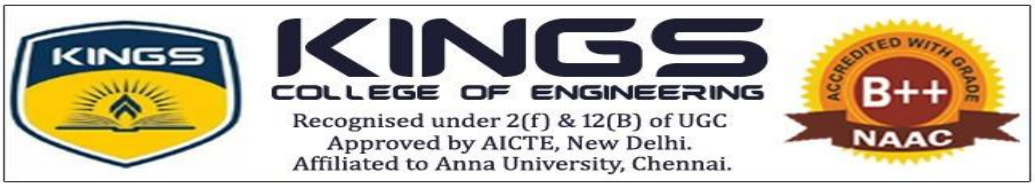


vi Dual - cylinder sequencing circuit

* cylinder ① extends
* cylinder ② extends
* Both cylinder Retract
* cycle is ended







DEPARTMENT OF SCIENCE AND HUMANITIES

ACADEMIC YEAR 2023-2024

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DEPARTMENT OF SCIENCE AND HUMANITIES

ACADEMIC YEAR 2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

List of PCE Activities

- **Mind Mapping**
- **Quiz**
- **Power Point Presentation**
- **Case Study Report**
- **Report on Eco-Friendly Activities**
- **Field Visit Report**

Carbon Emissions.....

CARBON EMISSIONS MIND MAP

Sources of Carbon Emmissions :-
- Fossil fuels eg:- coal, Oil.
- Transportation eg:- Cars, Trucks.
- Industry eg:- Mining, Construction.
- Agriculture eg:- Livestock, fertilizers.

Mitigations Strategies:-
- Renewable Energy Eg:- Solar, Wind.
- Energy Efficiency eg:- LED Lighting.
- Transport changes Eg:- Public Transit
- Behavioural changes eg:- Reduced Meat consumption.

Effects of Carbon Emissions :-
- Climate change eg:- Global Warming
- Enivromental Impact:- Air pollution
- Human Health eg:- Respiratory Issue Spread of Diseases

Monitoring And Reporting:-
- Emissions Tracking Eg:- National Inventories.
- Climate Models. Eg:- Predictive Tools.
- Transparency And Accountability. Public Disclosure.

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SWATHI.M
22CS57.

M. Bargavi

II - CSE

(10)

Evs Assignment - 2.

Quiz.

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Circular economy

1. What is the main Principle of the circular economy?

a, Linear production

b, Reduce, Reuse, Recycle

c, waste disposal

d, signal-use products

b, Reduce, Reuse, Recycle

2. Which of the following is not a component of the circular economy?

a, linear production

b, Recycling

c, Remanufacturing

d, Product design for durability

a, Linear production

3, What does "cradle to cradle" mean in the context of the circular economy

a, Products are designed to be disposed

b, products are designed to be recycled indefinitely

b, Products are designed to be recycled indenfintely.

4, Which of the following is an example of a circular business model?

a, selling single-use plastic water bottles

b, Offering a subscription service for refurbished electronics

c, Manufacturing disposable plastic utensils

b, offering a subscription service for refurbished electronics

5, What is the purpose of the circular economy?

a, TO maximize resource extraction

b, TO minimize waste and resource use

c, TO increase landfill space.

b, TO minimize waste and resource use.

6, Which industry benefits the most from implementing circular economy principles?

a, Oil and gas

b, Fast fashion

c, Renewable energy

c, Renewable energy

7. which of the following is a key challenge in transiting to a circular economy?

a) Limitted availability of raw materials

b) High Initial Investement costs

c) High initial investment carts.

c) High initial investment costs

8) what role does innovation play in the circular economy?

a) It is not necessary for circular

b) It helps clevelop new ways to reduce

c) it discourages sustainable practices

b) it helps develop new ways to reduce

9) what is the concept of "upcycling" in the circular economy?

a) Recycling products into lower-quality materials

b) Recycling products into highes-quality materials

b) Recycling products into higher-quality materials.

10, which of the following is an example of a circular supply chain?

a, A company sourcing new materials

b, A company producing disposable, single use products

c, A company repairing and refurbishing used products for resale

c, A company repairing and refurbishing used products for resale.

11, what is the aim of circular design principles?

a, To make products cheaper to produce

b, To minimize waste throughout a product's.

b, To minimize waste throughout a product's

12, which of the following is a benefit of implementing circular economy

a, Increased waste generation

b, Higher production costs

c, improved brand reputation.

c, improved brand reputation.

13, What is the concept of closed-loop recycling?

a, Recycling materials indefinitely without degradation

b, It reduce greenhouse gas emission by minimizing resources use

b) It reduce greenhouse gas emission by minimizing resources use.

14) How does the circular economy?

a, It exacerbate climate change by promoting resources exercation

b, It is helps reduce greenhouse gas emissions by minimizing resource use and waste.

b, It is helps reduce greenhouse gas emissions by mimizing resource.

15, Which of the following is not a circular economy strategy?

a, Extended Producer Responsibility (EPR)

b, Produce as a serive (Paas)

c, Planned Obsolescence

c, Planned Obsolescence

16, What is the role of government in promoting the circular economy ?

a, Enforcing the regulation that prioritize lineproduction.

b, implementing policies that incentivize circularity and innovation.

b, implementing policies that incentivize circular and innovation

17, How does the circular economy concept contribute to resource efficiency?

a, By encouraging excessive consumption

b, By promoting the reuse and recycling of materials.

b, By promoting the reuse and recycling of materials

18, Which sector is not directly impacted by principle of the circular economy?

a, Healthcare b, Education c, Agriculture.

d, Manufacturing d. Manufacturing.

19, What is the goal of circular supply chain?

a, To maximize waste production

b, to maximize environmental impact

c) To increase linear production

d) To promote planned obsolescence

b) To minimize environmental impact

20. Which of the following is an example of a circular economy success story?

a) A company increasing single-use plastic production

b) A city implementing a zero-waste program

c) A business prioritizing planned

b) A city implementing a zero waste program

PPT

SUSTAINABLE DEVELOPMENT GOALS

Presented by,
R.ragavi, 22CS44.
Assignment-2

40/40 B 23/5

INTRODUCTION

On September 25, 2015, 193 Heads of State at the United Nations General Assembly set up a collection of 17 goals known as The Sustainable Development Goals (SDGs) or simply Global Goals.

The SDGs and their 169 targets form the core of Resolution 70/1 of the United Nations, which is a breakthrough agreement called AGENDA 2030. The goals are to be achieved by all member states by year 2030.

They are a universal call to action to end poverty, protect the planet and ensure all people enjoy peace and prosperity.

The goals are broad, interdependent and cover social, economic and social issues and making them work is everyone's responsibility.

The following slides present a brief overview of the goals.

1. END POVERTY IN ALL ITS FORMS EVERYWHERE

Poverty is defined as income less than 1.25 USD per day.

The targets for this goal include a world where the poor are not vulnerable to climate change and have equal rights to economic resources.

Economic growth must be inclusive to provide sustainable jobs and promote equality.

This goal aims to eradicate extreme poverty by year 2030.

2. END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

Many still suffer from hunger and malnutrition around the world, mostly women and children.

The food and agriculture sector offers key solutions for development, and is central for hunger and poverty eradication.

Targets for this goal include ending malnutrition, protecting small farmers, protecting the genetic diversity of crops produced and investing in research to make farming more productive.

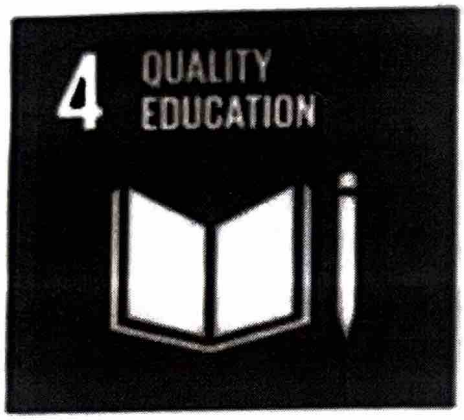
3. ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

Ensuring healthy lives and promoting the well being for all at all ages is essential to sustainable development.

Goal includes calls for universal health coverage, increasing healthcare workforce, reducing illness and death by pollution, comprehensive agenda for tackling a wide range of global health challenges such as AIDS, malaria, tuberculosis.

Vaccinate your family to protect them and improve public health.

4. ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL



Obtaining a quality education is the foundation to improving people's lives and sustainable development.

Targets for this goal include the need for access to university level education, vocational training and entrepreneurial skills.

Help children in your community to read.

5. ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

Gender equality is not only a fundamental human right, but is necessary foundation for a peaceful, prosperous and sustainable world.

Targets for this goal include freedom from discrimination and violence, ensuring equal share of leadership opportunities and responsibilities for women as well as property ownership.

Several references are made to 'national appropriateness' in interpreting these targets.

Callout sexist language and behavior.

6. ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

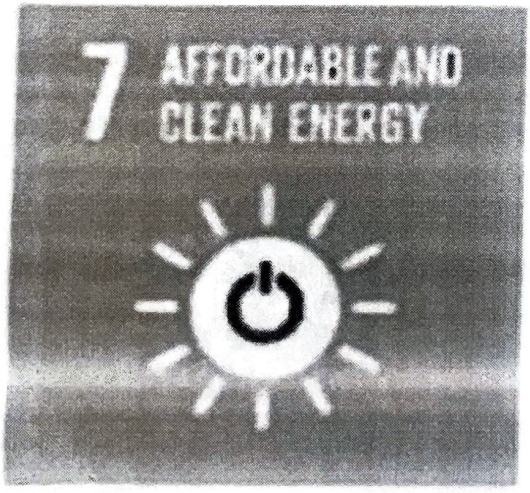
Clean, accessible water for all is an essential part of the world we want to live in.

Basic water scarcity affects 40% of world population.

Targets for this goal include programs that provide access to basic technologies like toilets or latrines as well was protecting ecosystems that provide water.

Avoid wasting water.

7. ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL



Energy is central to nearly every major challenge and opportunity.

About 1.3 billion people globally have no access to electricity.

Targets for this goal emphasize a conversion to renewable sources and a dramatic improvement in efficiency everywhere.

Use only energy efficient light bulbs or appliances.

8. PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL

Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.

About 75 million people between ages 15 and 24 are estimated to be unemployed and out of school globally.

This goal targets closing that gap using innovation, as well as separating growth from ecosystem degradation.

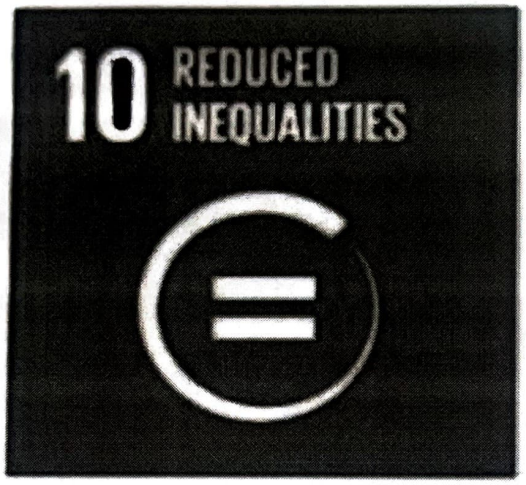
9. BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

Investments in infrastructure are crucial to achieving sustainable development.

Targets for this goal include fostering a more innovative and environmentally sound approach to industrial development.

Think of innovative new ways to repurpose old material.

10. REDUCED INEQUALITY WITHIN AND AMONG COUNTRIES

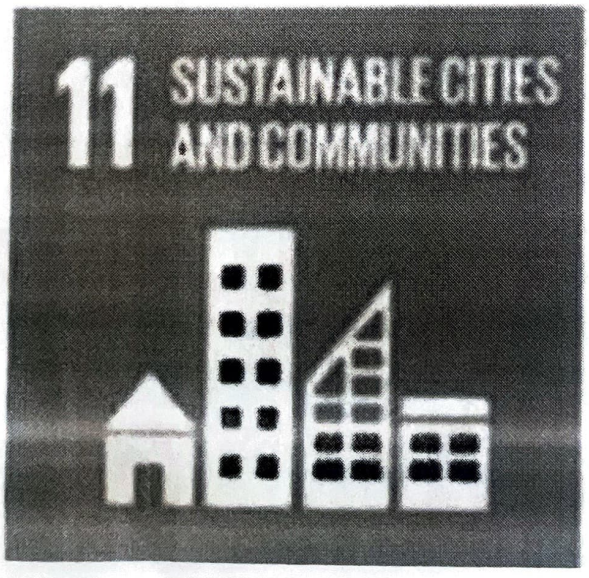


The world is massively unequal.

To reduce inequalities, policies should be universal in principle, paying attention to the needs of disadvantaged and marginalized populations.

Targets for this goal include financial market regulation to make the playing field more equal, making migration more orderly, safe, regular and responsible.

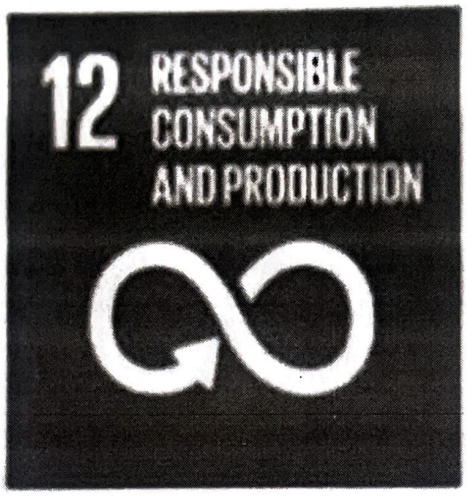
11. MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE



There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more.

More than half the world population lives in cities. Targets for this goal include addressing issues like transportation, disaster preparedness, as well as preservation of the world's cultural and natural heritage.

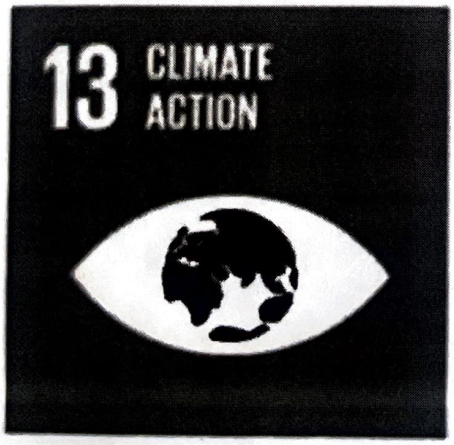
12. ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS



This goal targets topics like reducing food wastage, corporate sustainability practice, and educating people on the impact of their lifestyle choices.

Recycle paper, glass, plastic and aluminum.

13. TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS*

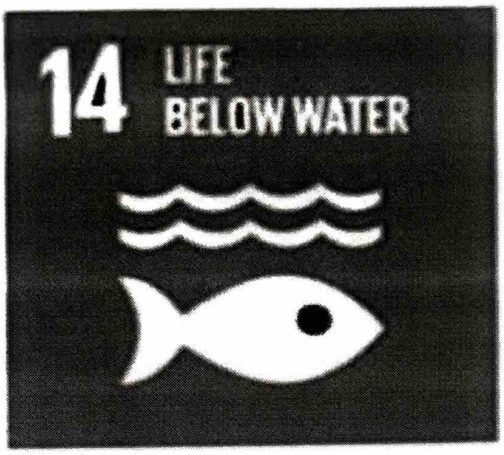


Climate change is a global challenge that affects everyone, everywhere.

This goal has an asterisk as it references the "Paris Agreement" of December 2015, which guides nations to jointly commit to limiting global warming to not more than 2 degrees Celsius.

Educate young people on climate change to put them on a sustainable path early.

14. CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT



Careful management of this essential global resource is a key feature of a sustainable future.

The world's oceans are overfished, under-protected and stressed from climate change and pollution.

The target for this goal include research and learning to find out more about what lies beneath the oceans so as to better save them.

Avoid plastic bags to keep the oceans safe and clean.

15. PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS

Sustainably manage forests, combat desertification, halt and remove land degradation, halt biodiversity loss.

This goal targets halting the threat to living ecosystems and biodiversity on land.

Plant a tree and help protect the environment.

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17. STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT

Every country and every sector has a role to play in achieving the SDGs.

This goal targets ensuring that countries have what is needed in achieving the rest of the SDGs such as funds, capacities and technologies.

The goal emphasizes the need for partnership and collaboration.


thank
you

Case Study

Welcome

NAME :- *E.RAJASHREE*

DEPARTMENT :- *CSE*

ROLL NO :- *22CS45*

SUBJECT :- *ENVIRONMENTAL SCIENCE AND SUSTAINABILITY*

SUBJECT CODE :- *GE3451*

TITLE :- *GEOTHERMAL ENERGY*

ASSIGNMENT NO :- *01*

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Topics

- *Introduction to Geothermal Energy*
- *Geothermal Reservoirs*
- *Geothermal Reservoirs in India*
- *Advantages of Geothermal Energy*
- *Disadvantages of Geothermal Energy*
- *Geothermal exploration in Gujarat – A Case study*

INTRODUCTION TO GEOTHERMAL ENERGY

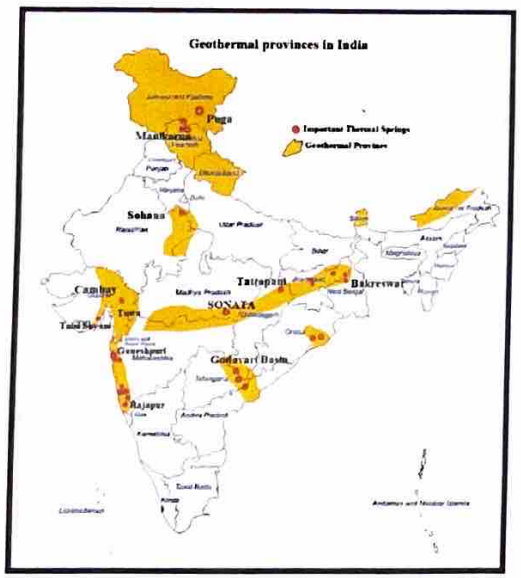
It's simply the heat energy of the earth, generated by various processes:

*** Heat from when the planet formed and accreted, which has not yet been lost.**

*** Decay of radioactive elements.**

*** Friction.**

GEOTHERMAL PROVINCES IN INDIA



GEOTHERMAL RESERVOIRS

Reservoirs can be suspected in areas where we find:-

- **Geyser**
- **Boiling mud pots**
- **Volcano**
- **Hot Springs**

GEOTHERMAL PROVINCES IN INDIA

☆ Geothermal provinces are estimated to produce 10,600 MW of power (experts are confident only to the extent of 100 MW).

☆ Geothermal provinces in India :- The Himalayas, Sohana, West coast, Son-Narmada- Tapi, Godavari, and Mahanadi.

☆ Reykjavik Geothermal will assist Thermax to set up a pilot project in Puga valley, Ladakh (Jammu and kashmir)First operational commercial Geothermal power plant is likely to come up in AP with a capacity of 25 MW by Geosyncdicate Pvt Ltd.

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ADVANTAGES OF GEOTHERMAL ENERGY

- Available all the year around.
- Does not involve any combustion of fuel.
- Independent of weather.
- Clean resource – very little emissions or overall environmental impact.
- Economically sound alternative – This fuel is free, rate / K Wh likely to be competitive.
- Overall Geothermal energy is a sustainable resource.

DISADVANTAGES OF GEOTHERMAL ENERGY

- ◇ Not widespread source of energy.
- ◇ High installation costs.
- ◇ Can run out of stream.
- ◇ May release harmful gases.
- ◇ Transportation.
- ◇ Earthquakes.

GEOTHERMAL EXPLORATION IN GUJARAT- A CASE STUDY

♧ Dholera is located 30 km away in southwest direction from Dhandhuka village of Ahmedabad district and 60 km away in nort direction from city of Bhavnagar.

♧ Dholera thermal springs are located along the margin of Saurashtra Peninsula falling in the vicinity of Western Marginal fault of Cambay Basin.

♧ Terrain in Dholera is covered by recent to alluvium and mud flats. The area is also occupied by quaternary soils deposited in subsiding area by the side of Cambay Basin to a thickness of about 100 m over Tertiary sediments resting on Deccan Traps at a depth of about 500–600 m.

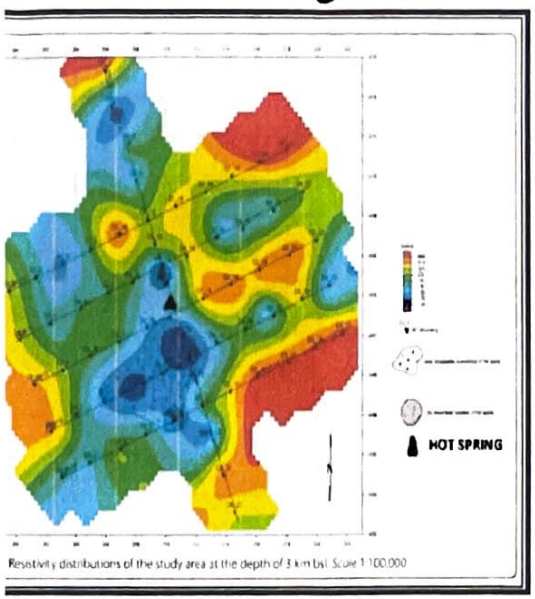
♧ The general slope of the ground is from west to east in the investigation area. The study area falls under western margin of the Cambay Basin.

♧ In Dholera we have presence of old mud flats, flood plains and sal flat areas. The soil in Dholera region mainly consists of alternate layers of gravels, fine to coarse grained sand and clay. Chemically the soil is loamy, mixed montmorillonitic, calcareous and mostly saline.

♧ Dholera springs are also located over the high gravity area (400 × 400 m) indicating a shallow mantle and presence of granitic basement rocks.

♧ A total of four springs were demarcated in a radius of 4 km Dholera, Uthan, Swaminarayan temple and Bhadiyad. Dholera springs have the highest geothermal flow rate in Gujarat.

- At Dholera geothermal site, extensive exploration activities ave been carried out to delineate the geothermal prospect. he Landsat imagery study was carried out to identify target ones based on Low Vegetation Index and high land surface emperature.
- Geochemical analysis of hot water from Dholera spring was arried out to determine the physical and chemical properties f water which is helpful to identify nature of the geothermal eservoir.
- As a part of geophysical exploration, 2D MT and AMT surveys ere carried out along six profiles at Dholera. Based on the values Skew and Tipper, it is concluded that the structure is 1D and 2D nature. The polar diagram shows that the structure is 3D in ture at some places.



Resistivity distributions of the study area at the depth of 3 km bsl. Scale 1:100,000

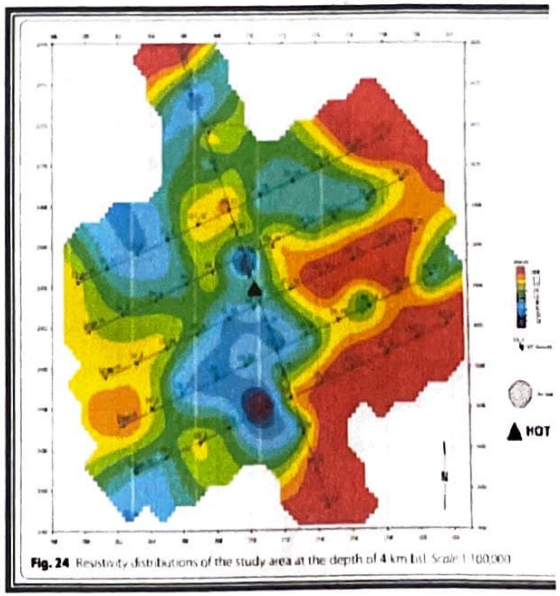


Fig. 24 Resistivity distributions of the study area at the depth of 4 km bsl. Scale 1:100,000

- Both shallow and deep geoelectric maps depict that the reservoir i ale/sandstone body sandwiched between high-resistivity basalts. Ba 2D data, cross-sections were prepared at shallow and deep levels.
- Resistivity closures around the hot springs are seen in both shallo d deep cross sections which is a true validation of the model stulated. Resistivity sections prepared at 3 and 4 km depth support a. These results suggest that Dholera is a promising site from thermal point of view.
- The results will help in harnessing the geothermal energy for nestic and commercial uses. Drilling of wells and data recorded wi help of temperature log will help in estimating geothermal gradie ide the subsurface.

Report

Name: S.S.Dharshini
Roll no: 22CS13
Subject: Environmental Science and Sustainability
Sub code: GE3451
Assignment No:02
Title: Report on Eco-friendly Activities in Green Engineering

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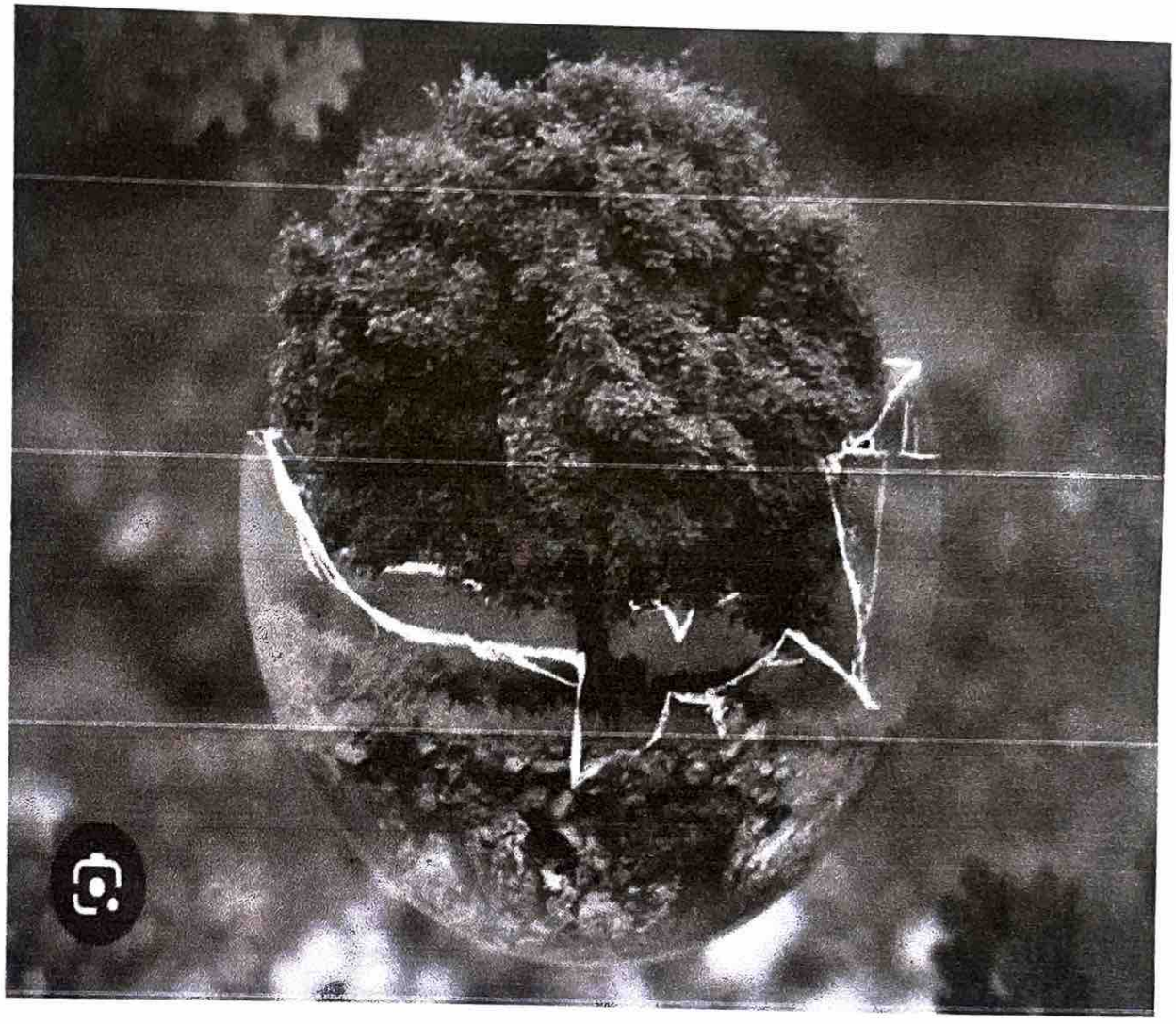
Green engineering

- Green engineering is the design, commercialization, and use of processes and products that minimize pollution, promote sustainability, and protect human health without sacrificing economic viability and efficiency.



What is EPA doing to promote green engineering?

- EPA's Green Engineering Program encourages public and private sectors to incorporate risk-based approaches and methods into the design of chemical processes and products by:

Developing tools

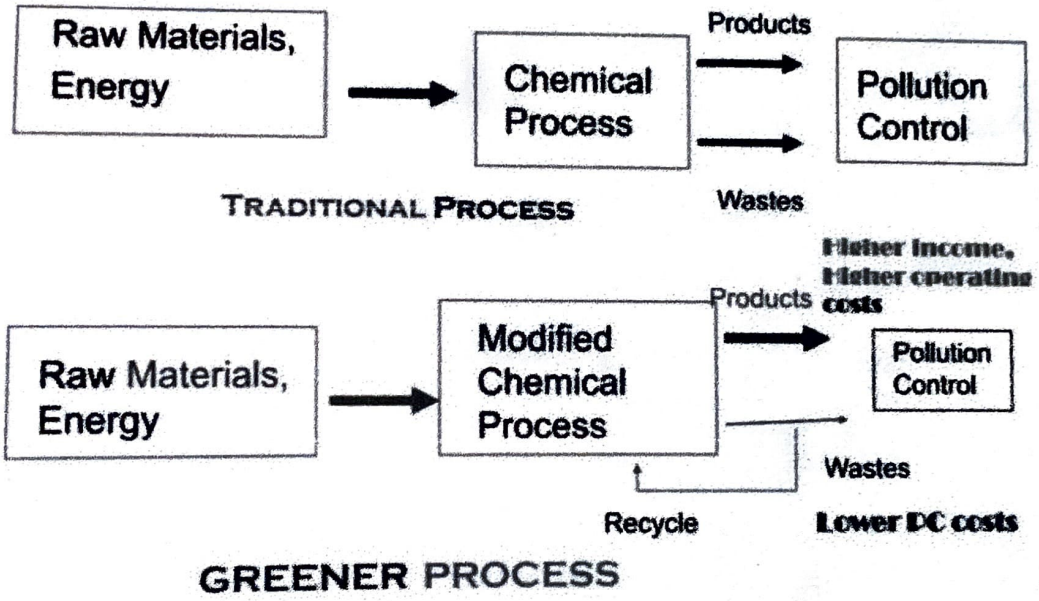
- Integrated computer-based tools
- Green engineering training modules for academic curricula or industry training
- Educational materials for academia

Principles of Green Engineering

Green engineering processes and products

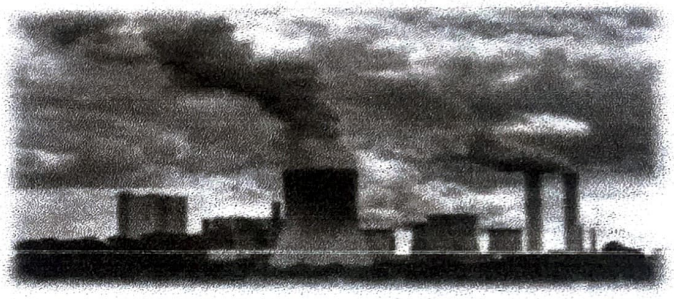
- Holistically use systems analysis and integrate environmental impact assessment tools.
- Conserve and improve natural ecosystems while protecting human health and well-being.
- Use life-cycle thinking in all engineering activities.
- Ensure that all material and energy inputs and outputs are as inherently safe and benign as possible.
- Minimize depletion of natural resources.
- Strive to prevent waste.

Traditional process Vs Greener process



Present Engineering problem

Wireless radiation

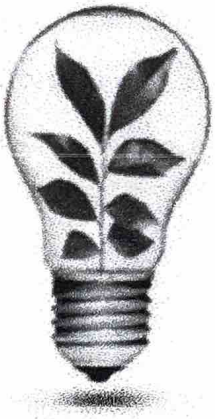


Hazardous air pollution

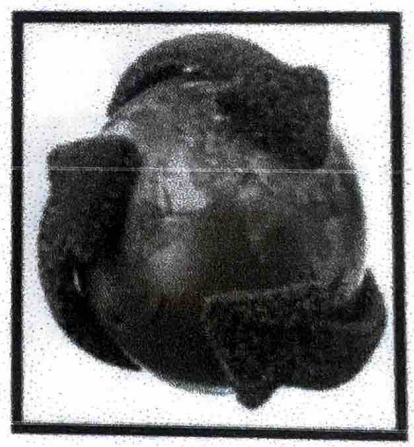
Heat radiation from electronic devices

Industrial solid waste

How it can be achieved ?

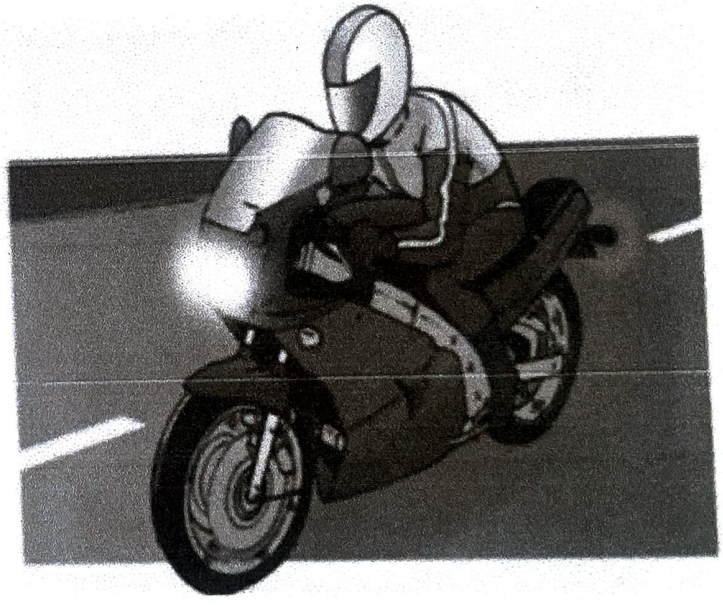


Using eco-friendly
Green technology.



Reduce-Recycle-Reuse

Prefer bicycle instead Of bike to reduce pollution



Conclusion

- In today's environment ,it's matter of how long we live.
- Because our earth in a critical position due to man made disasters
- So,"Green Engineering " should come into act to prevent and overcome environmental problems.

Field visit

NAME: P.NARMATHA

ROLL NO: 22CS37

SUB: EVSS

ASSIGNMENT NO: 02

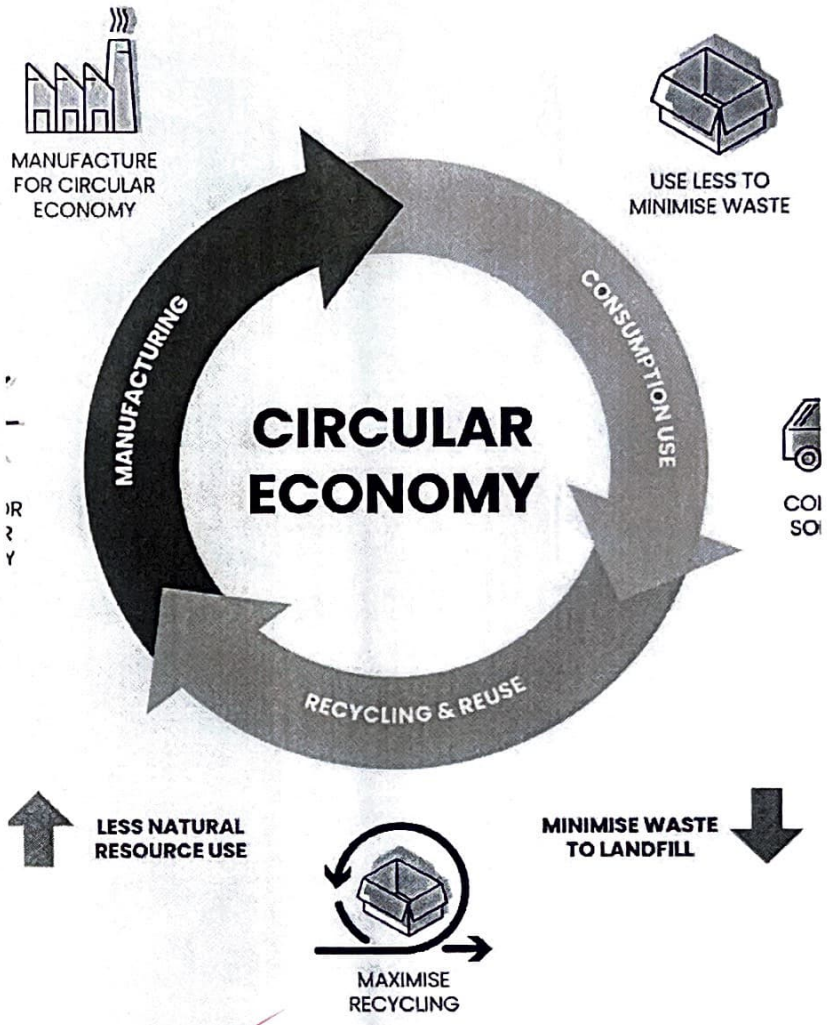
TOPIC: ZERO WASTE AND R CONCEPT

DEPARTMENT OF CSE

40/40 B 2215

INTRODUCTION TO ZERO WASTE AND CIRCULAR ECONOMY

Explore the concepts of zero waste and the circular economy, where waste is minimized and resources are continuously cycled back into productive use. Discover how these innovative approaches can transform communities and create a more sustainable future.



INNOVATIVE ZERO WASTE INITIATIVES

Community Collection Centers

Strategically placed collection hubs allow residents to easily drop off recyclables, compostable materials, and hard-to-recycle items, diverting them from landfills.

Upcycling Workshops

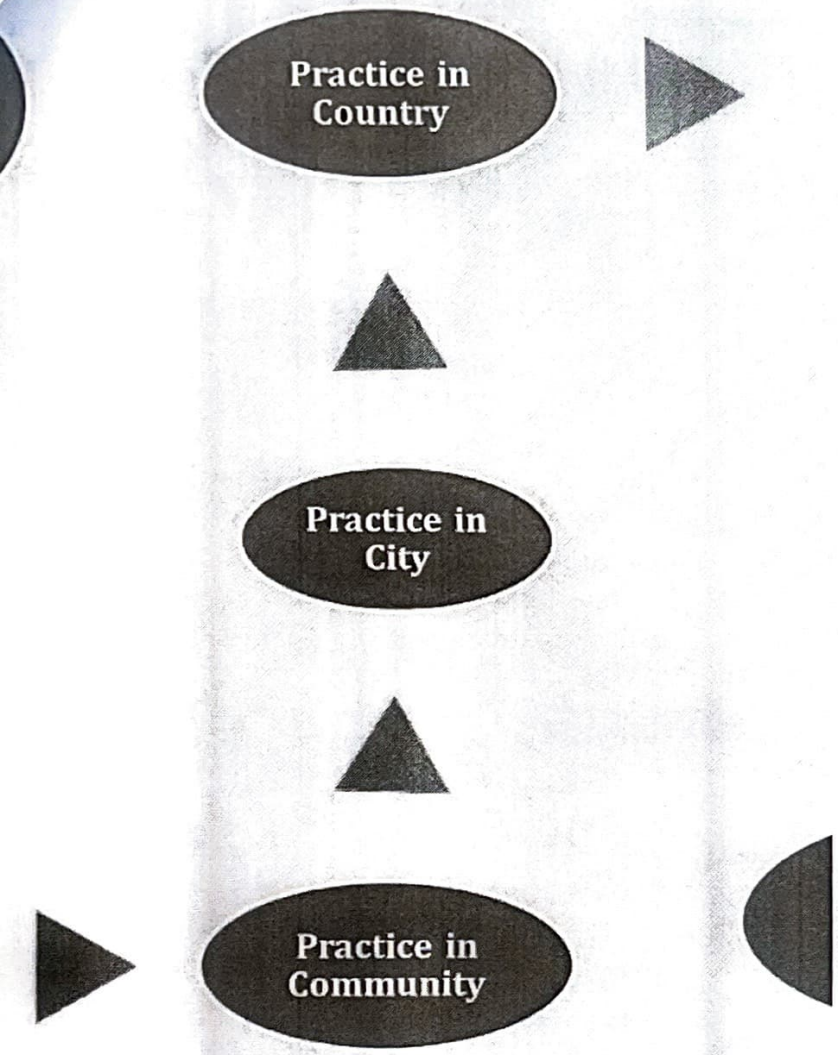
Engaging workshops teach community members creative ways to repurpose and transform waste items into new, useful products, reducing the need for virgin materials.

Neighborhood Sharing Libraries

Shared libraries enable residents to borrow household items, tools, and other goods, minimizing individual ownership and encouraging a more circular use of resources.

Food Waste Reduction Initiatives

Efforts to reduce food waste, such as food rescue programs and composting, ensure that organic matter is diverted from landfills and returned to the soil.



PURPOSE OF THE FIELD VISIT

The purpose of this field visit is to gain first-hand insight into the waste management challenges faced by the local community and explore innovative **zero waste** and **circular economy** initiatives that are being implemented. By immersing ourselves in the real-world experiences of this community, we aim to uncover practical strategies for reducing waste, promoting recycling and reuse, and engaging residents in sustainable lifestyle practices.

WASTE MANAGEMENT CHALLENGES IN THE LOCAL COMMUNITY

The local community faces significant waste management challenges, including:

- Inadequate infrastructure and limited access to **recycling** and waste **disposal** services
- High levels of **single-use plastics** and **packaging waste** due to consumer habits
- Lack of **public awareness** and engagement around **sustainable waste practices**
- Limited **funding** and resources to implement comprehensive **waste management programs**
- Illegal **dumping** and improper **disposal** of hazardous or bulky waste

COMPOSTING AND ORGANIC WASTE MANAGEMENT

The local community has implemented a comprehensive organic waste management program, encouraging residents to divert food scraps, yard trimmings, and other compostable materials from landfills. This includes strategically placed **community composting hubs** where residents can drop off their organic waste, as well as **educational workshops** on the benefits of composting and how to create nutrient-rich soil amendments at home.

The composted organic matter is then utilized by local **community gardens** and urban farming initiatives, closing the loop and returning valuable nutrients to the soil. This not only reduces methane emissions from landfills but also supports sustainable food production within the community.

ENGAGING THE COMMUNITY IN SUSTAINABILITY EFFORTS

Education and Awareness

The community has launched a robust educational campaign to raise awareness about zero waste principles and the benefits of a circular economy. Interactive workshops, public events, and multimedia outreach teach residents easy ways to reduce, reuse, and recycle in their daily lives.

Grassroots Initiatives

Resident-led zero waste groups have emerged, organizing neighborhood clean-ups, clothing swaps, and skills-sharing sessions. These community-driven efforts foster a sense of ownership and empower residents to be active champions of sustainability.

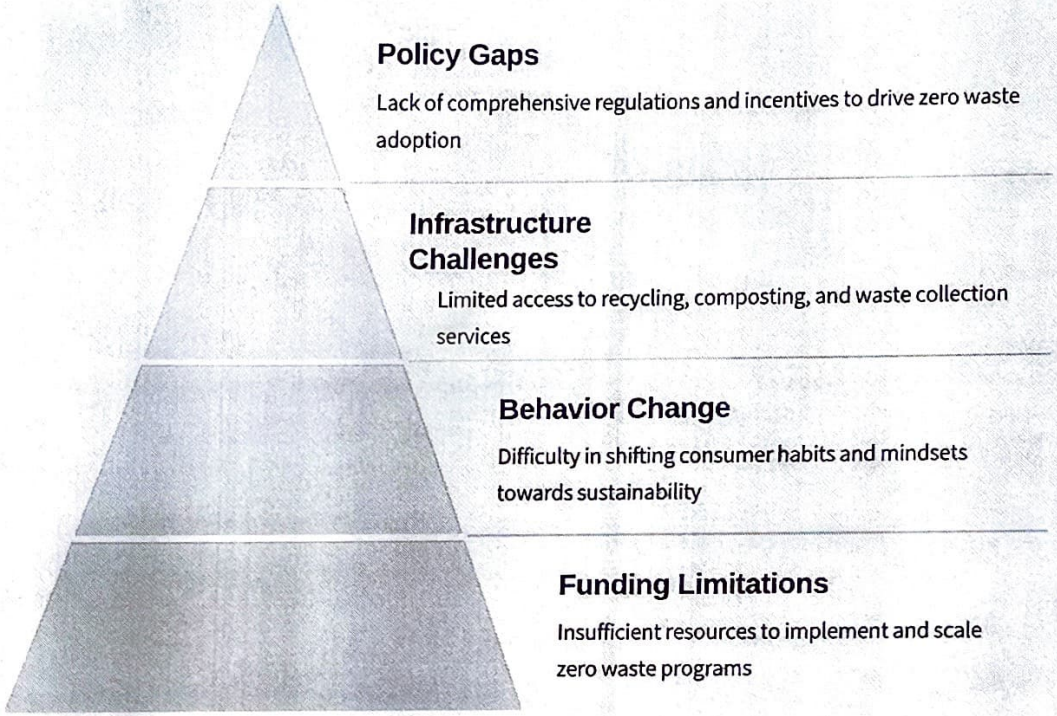
Partnerships and Collaboration

The local government works closely with businesses, schools, and community organizations to align sustainability goals and implement joint initiatives. By leveraging diverse resources and expertise, the community can maximize the impact of its zero waste programs.

Incentives and Recognition

The community offers incentives, such as recycling rewards programs and waste reduction challenges, to encourage residents to adopt more sustainable practices. Public recognition of individual and community efforts further motivates people to be part of the zero waste movement.

BARRIERS AND OPPORTUNITIES FOR ZERO WASTE IMPLEMENTATION



LESSONS LEARNED AND BEST PRACTICES

1

Community Engagement

Engaging residents through educational campaigns, grassroots initiatives, and incentive programs has been crucial for driving sustainable behavior change.

2

Collaborative Partnerships

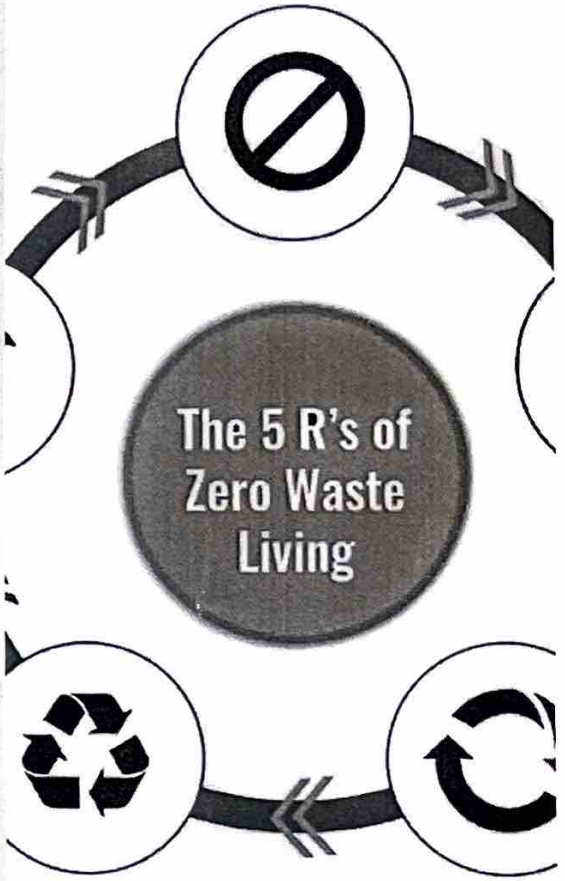
Forging partnerships with local businesses, schools, and organizations has enabled the community to leverage diverse resources and expertise to maximize the impact of zero waste efforts.

3

Infrastructure Investment

Investing in modern waste management infrastructure, such as recycling hubs and composting facilities, has been instrumental in improving the community's waste diversion capabilities.

Refuse: Learn to say no to things you don't need.



CONCLUSION AND NEXT STEPS

1

Collective Impact

The community's zero waste and circular economy initiatives have had a tangible impact, reducing landfill waste, promoting sustainable practices, and inspiring others to join the movement.

2

Continuous Improvement

Building on the momentum, the community will continue to identify and address remaining challenges, explore new innovative solutions, and further strengthen its commitment to a zero waste future.

3

Expanding Partnerships

By fostering deeper collaborations with local businesses, government agencies, and regional partners, the community can scale its efforts and amplify the reach of its sustainability programs.

4

Inspiring Change

The community's journey serves as a model for others, demonstrating the power of grassroots action and the transformative potential of zero waste and circular economy principles.

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COLLEGE OF ENGINEERING
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DEPARTMENT OF SCIENCE AND HUMANITIES
(PHYSICS)

ACADEMIC YEAR 2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

SUBJECT NAME: PH3151 ENGINEERING PHYSICS

INTRODUCTION TO NON-LINEAR OSCILLATIONS

T. ANJEL

CSE-A

23CSA14

1.What distinguishes non-linear oscillations from linear oscillations?

a. Constant frequency

b. Fixed amplitude

c. Variable frequency and amplitude

d. Simple harmonic motion

Answer: c

2.In non-linear oscillations, the restoring force is often a function of:

a. Time

b. Mass of the object

c. Elasticity of the material

d. Amplitude of the oscillation

Answer: d

3.Non-linear oscillations always follow a sinusoidal pattern.

a. True

b. False

Answer: b

4.What is a "limit cycle" in the context of non-linear oscillations?

a. A stable repeating pattern

b. A cycle with ever-increasing amplitude

c. A cycle without oscillations

d. An unpredictable pattern

Answer: a

5.What term describes oscillations that are unpredictable and sensitive to initial conditions in non-linear systems?

a. Harmonic oscillations

b. Chaotic oscillations

c. Damped oscillations

d. Stable oscillations

Answer: b

6.Differentiate between periodic and aperiodic non-linear oscillations.

a. Periodic oscillations are predictable, aperiodic are not.

b. Periodic oscillations have variable amplitudes, aperiodic do not.

c. Periodic oscillations have constant frequency, aperiodic do not.

d. Periodic oscillations are chaotic, aperiodic are not.

Answer: a

7.How does the amplitude of a non-linear oscillation vary with time, and what causes this variation?

a. It remains constant due to the nature of non-linearity.

b. It decreases due to energy loss.

c. It increases indefinitely.

d. It becomes aperiodic.

Answer: b

8.What is the role of nonlinearity in the occurrence of chaotic behavior in oscillatory systems?

a. Nonlinearity stabilizes oscillations.

b. Nonlinearity has no effect on chaos.

c. Nonlinearity can lead to chaotic behavior.

d. Nonlinearity simplifies system behavior.

Answer: c

9.What is "bifurcation" in the context of non-linear systems?

a. A linear oscillation pattern

b. A pattern of amplitude decrease

c. A sudden change in system behavior with parameter variation

d. A constant frequency oscillation

Answer: c

10.How does nonlinearity affect the energy dissipation in oscillatory systems?

a. It decreases energy dissipation.

b. It has no effect on energy dissipation.

c. It increases energy dissipation.

d. It causes chaotic energy fluctuations.

Answer: c

11.Non-linear oscillations can exhibit multiple resonant frequencies.

a. True

b. False

Answer: a

12.What are "strange attractors" in chaotic non-linear systems?

a. Unpredictable system inputs

c. Non-linear oscillations are critical in fields like electronics, chaos theory, and ecology.

d. Non-linear oscillations are primarily used in linear systems.

Answer: c

20.What are the challenges and benefits of controlling non-linear oscillations in complex engineering systems?

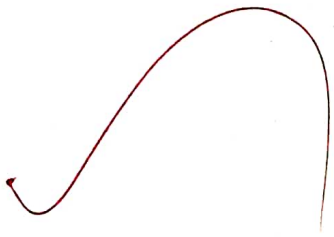
a. There are no challenges in controlling non-linear oscillations.

b. Controlling non-linear oscillations can lead to energy savings and increased system stability.

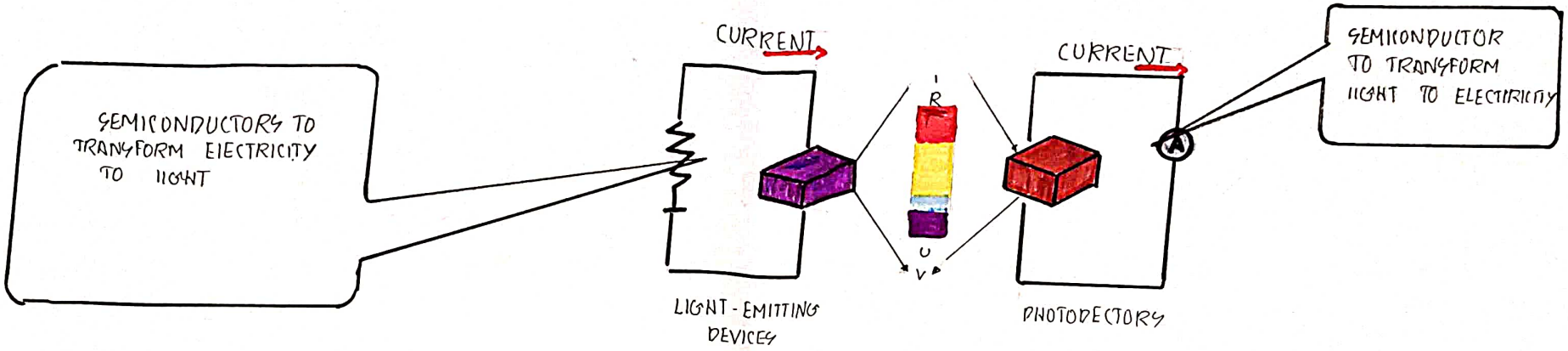
c. Controlling non-linear oscillations is straightforward and requires no special techniques.

d. Controlling non-linear oscillations is only necessary in theoretical systems.

Answer: b

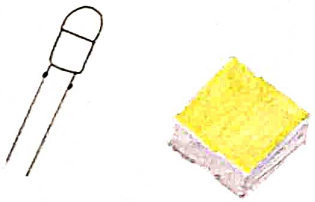


OPTICAL PROCESS IN SEMICONDUCTORS



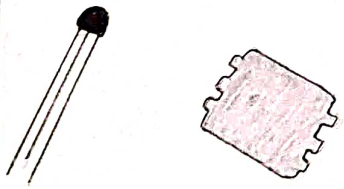
LED

LIGHT- EMITTING ELEMENT THAT EMITS LIGHT VISIBLE TO THE HUMAN EYE SUCH AS PURPLE TO RED OR WHITE



LIGHT-RECEIVING

PHOTODIODE LIGHT-RECEIVING IC ETC PRODUCT THAT OUTPUT CHANGES IN LIGHT AS ELECTRICAL SIGNALS

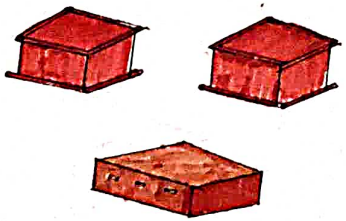


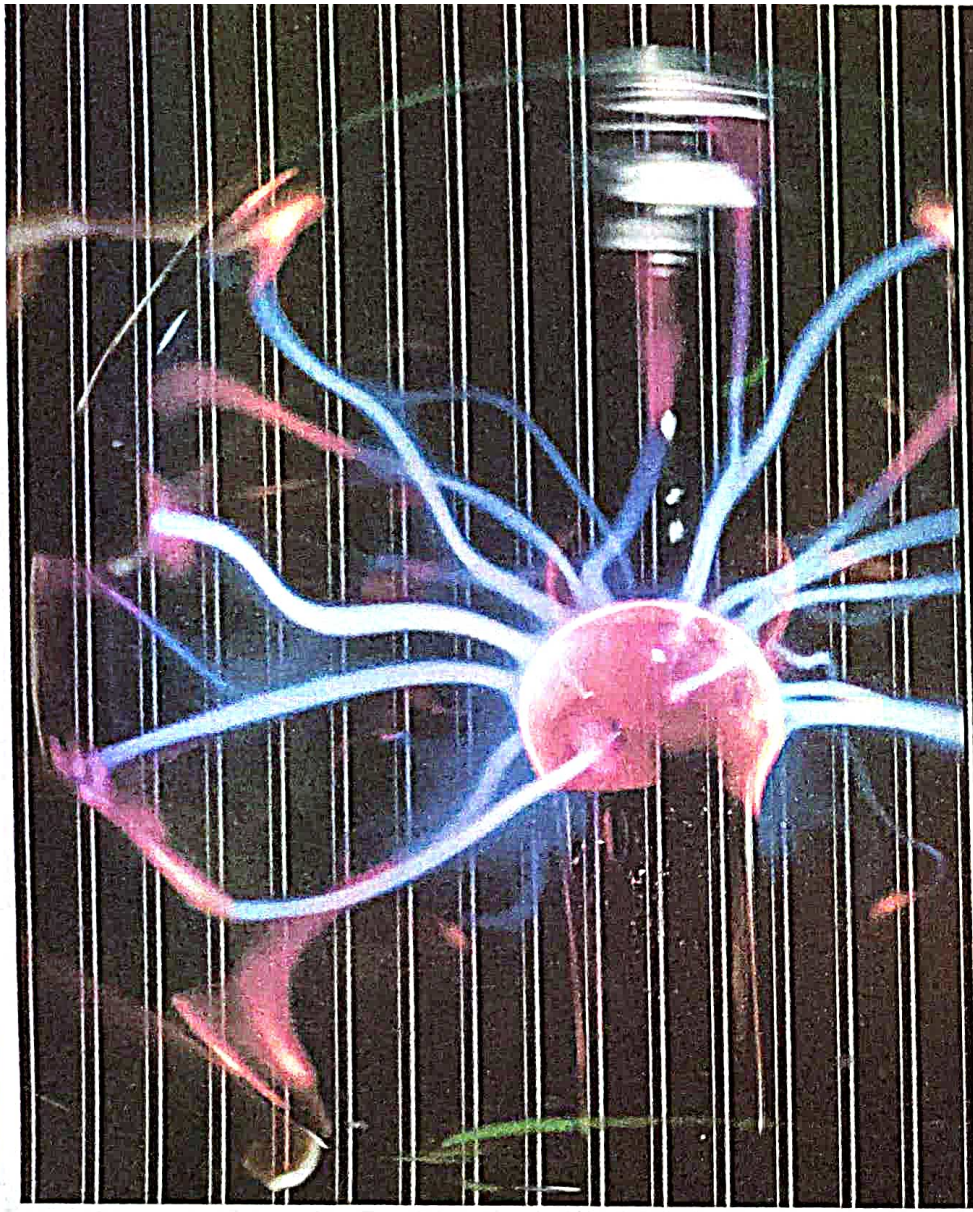
PHOTOCOUPLERS

COMPOSITE DEVICE PACKAGED WITH A LIGHT EMITTING DEVICE AND LIGHT-RECEIVING DEVICE PRODUCT THAT TRANSMIT ELECTRICAL SIGNALS WHILE KEEPING THEM ELECTRICALLY ISOLATED

FIBER COUPLERS

- A PRODUCT THAT PERFORMS ELECTRICAL TO OPTICAL CONVERSION AND VICE VERSA FOR COMMUNICATION USING AN OPTICAL FIBER.

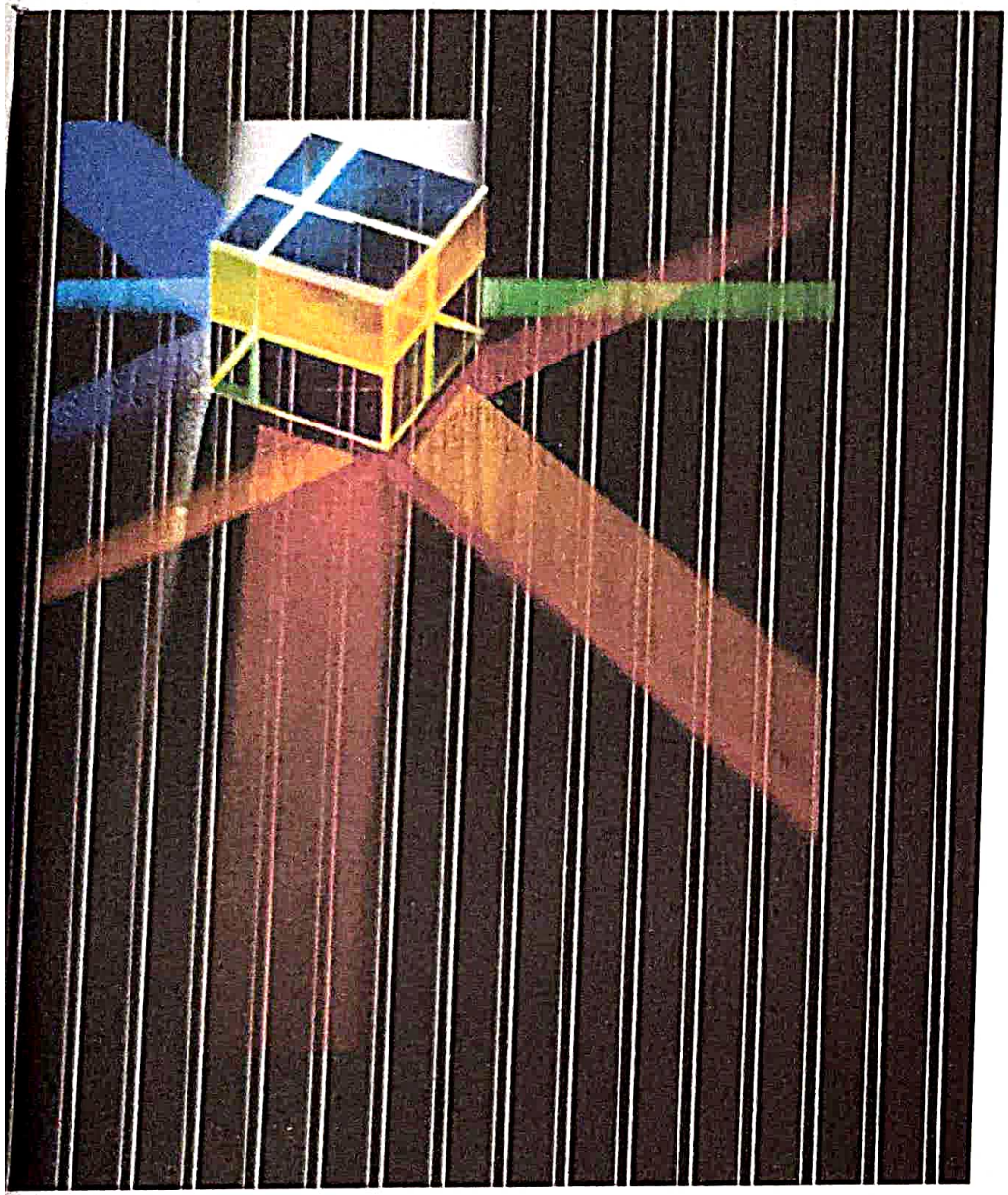




Electron In Periodic Potential

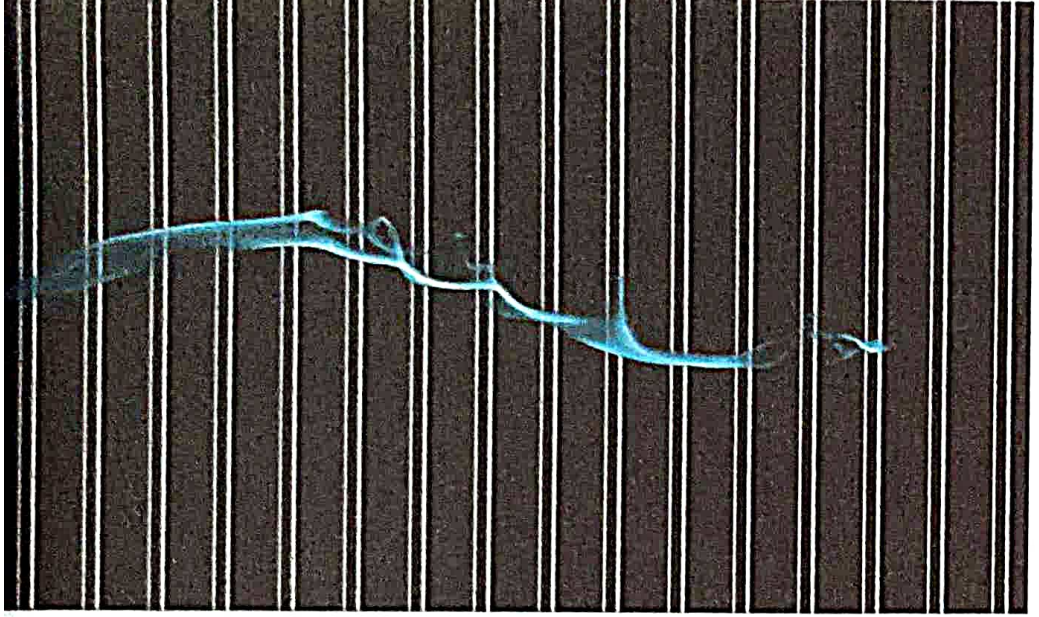
Sandhiya A
23CSB18

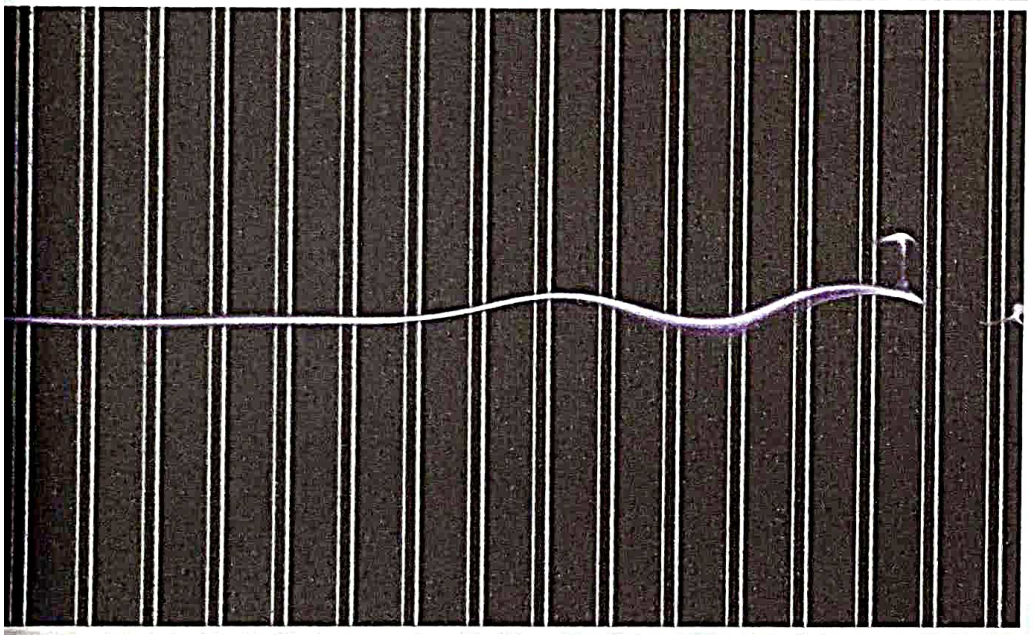
40/40



Introduction

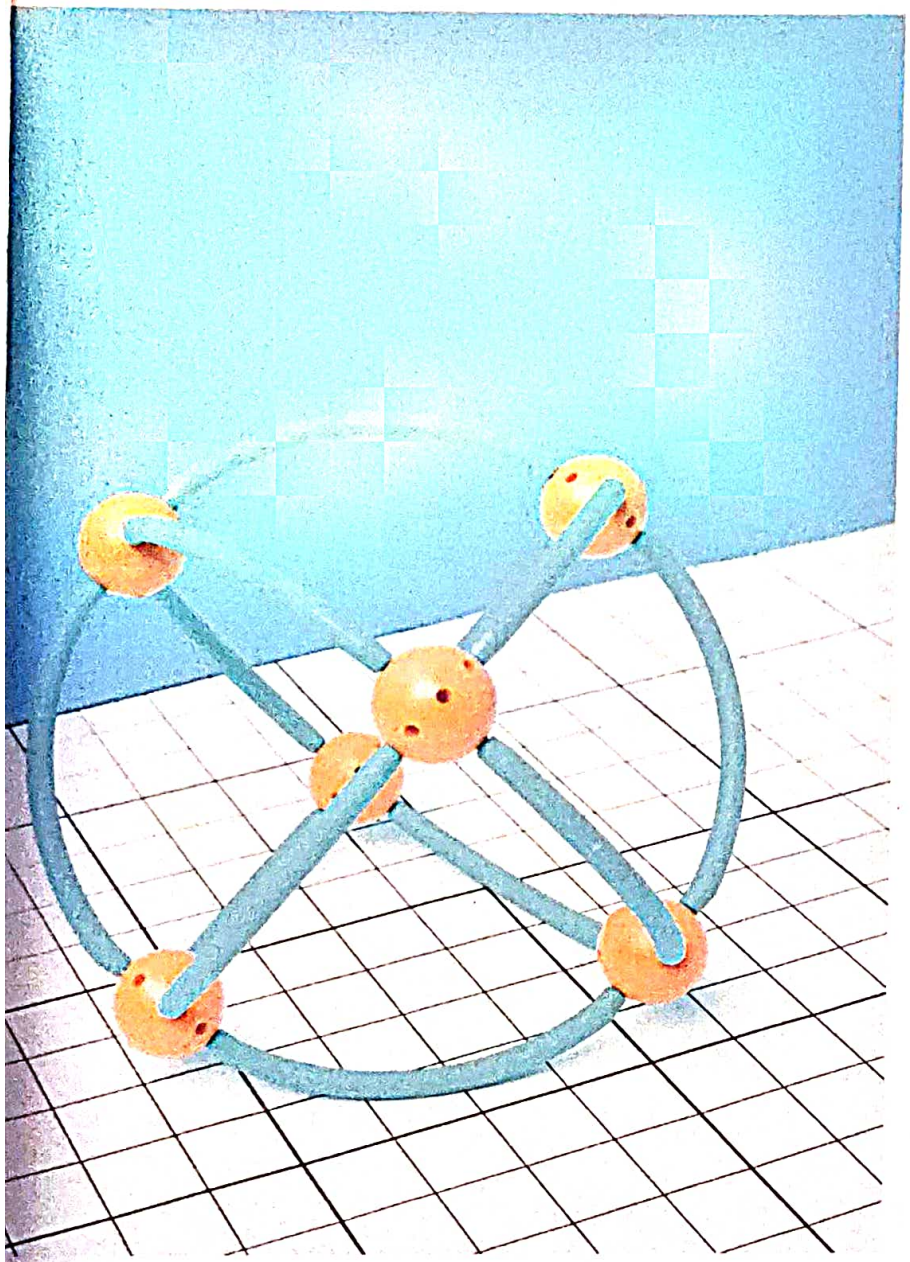
This presentation aims to understand the behavior of electrons in periodic potentials. We will explore the concepts of band structure, Bloch theorem, and quantum mechanics in periodic potentials.





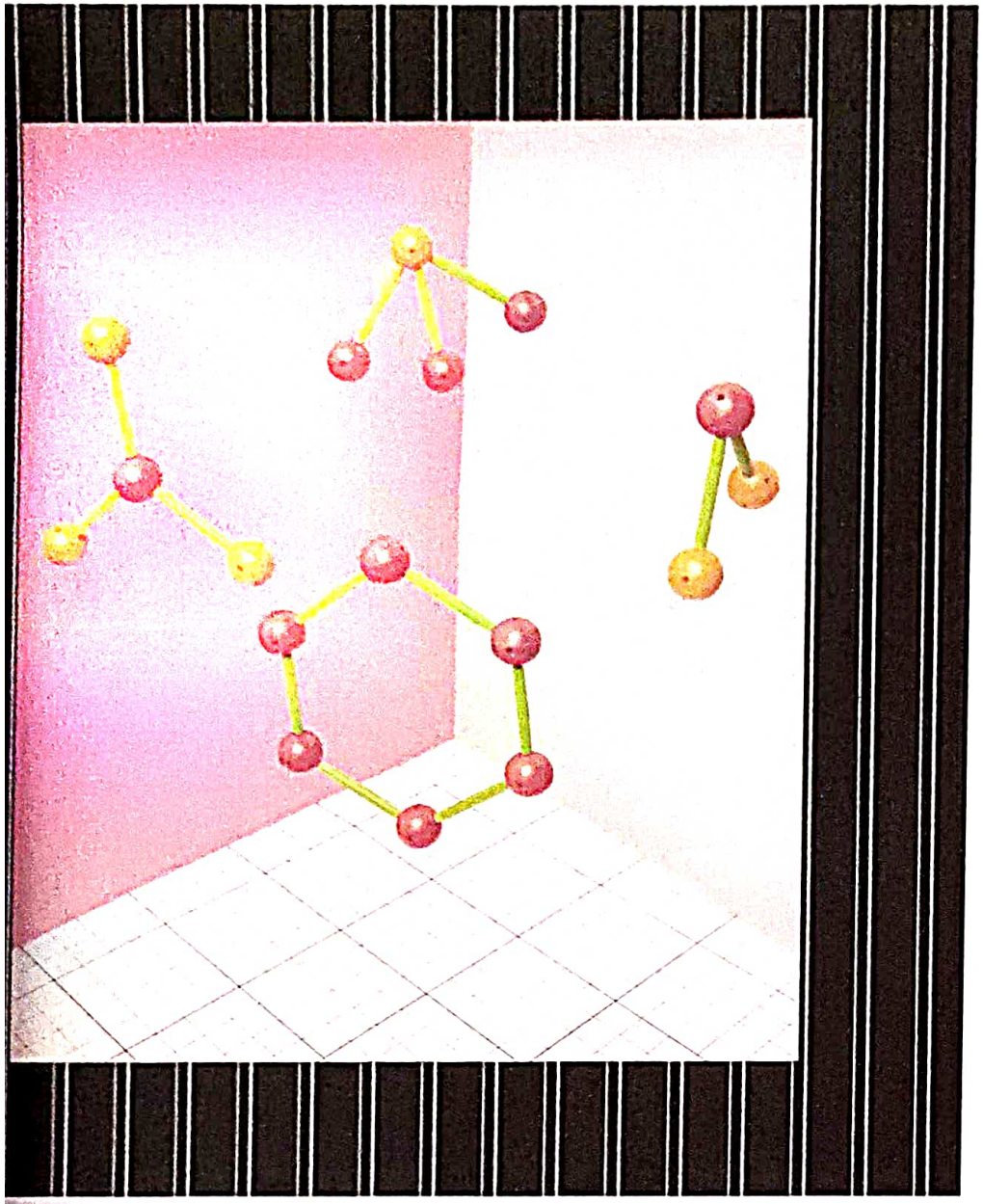
Quantum Mechanics Overview

An overview of **quantum mechanics** principles including wave-particle duality, **Schrödinger equation**, and **wavefunction** will provide the foundation for understanding electron behavior in periodic potentials.



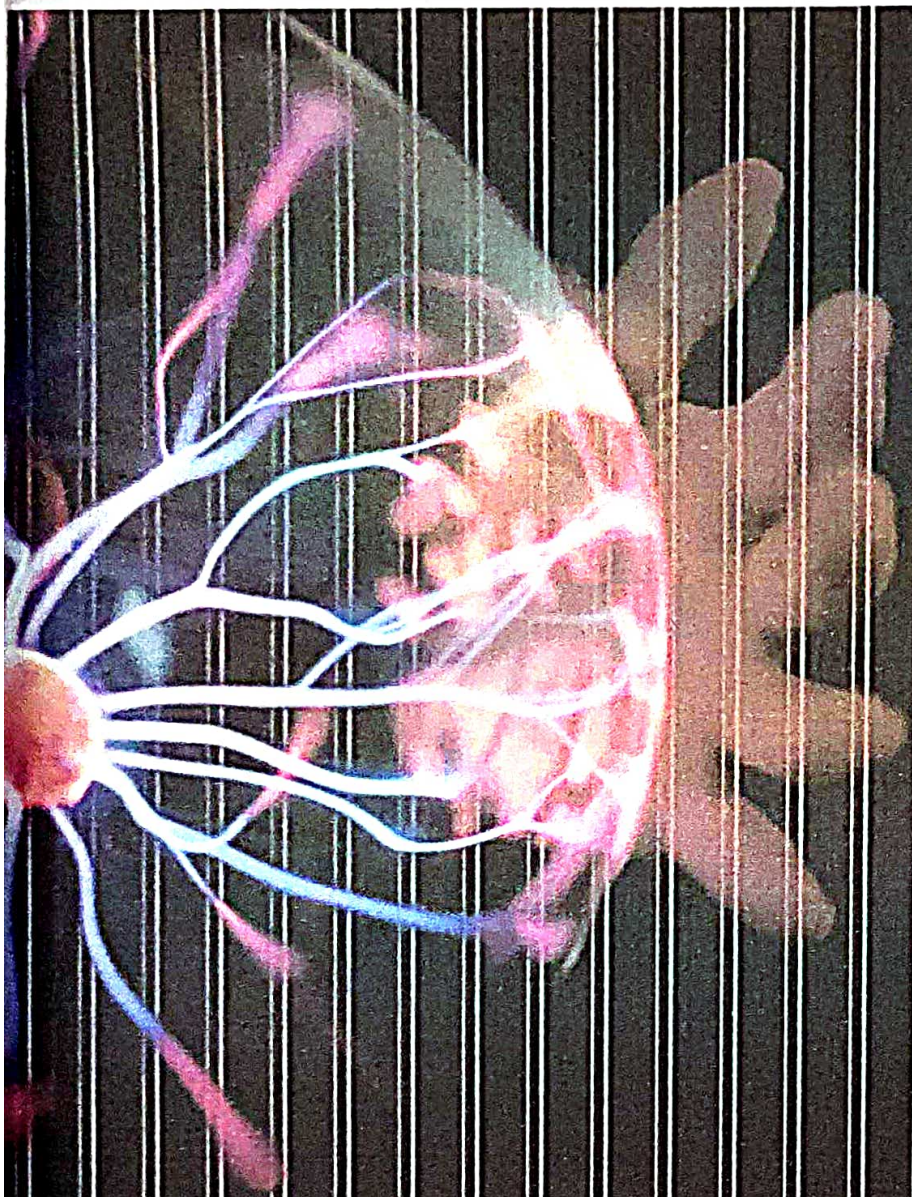
Band Structure

The concept of **band structure** illustrates the allowed and forbidden energy bands for electrons in a periodic potential. Understanding band structure is crucial for understanding the behavior of electrons in solids.



Effective Mass

The concept of **effective mass** helps in understanding the behavior of electrons in periodic potentials. It describes how an electron in a crystal behaves as if it has a different mass than its free electron mass.

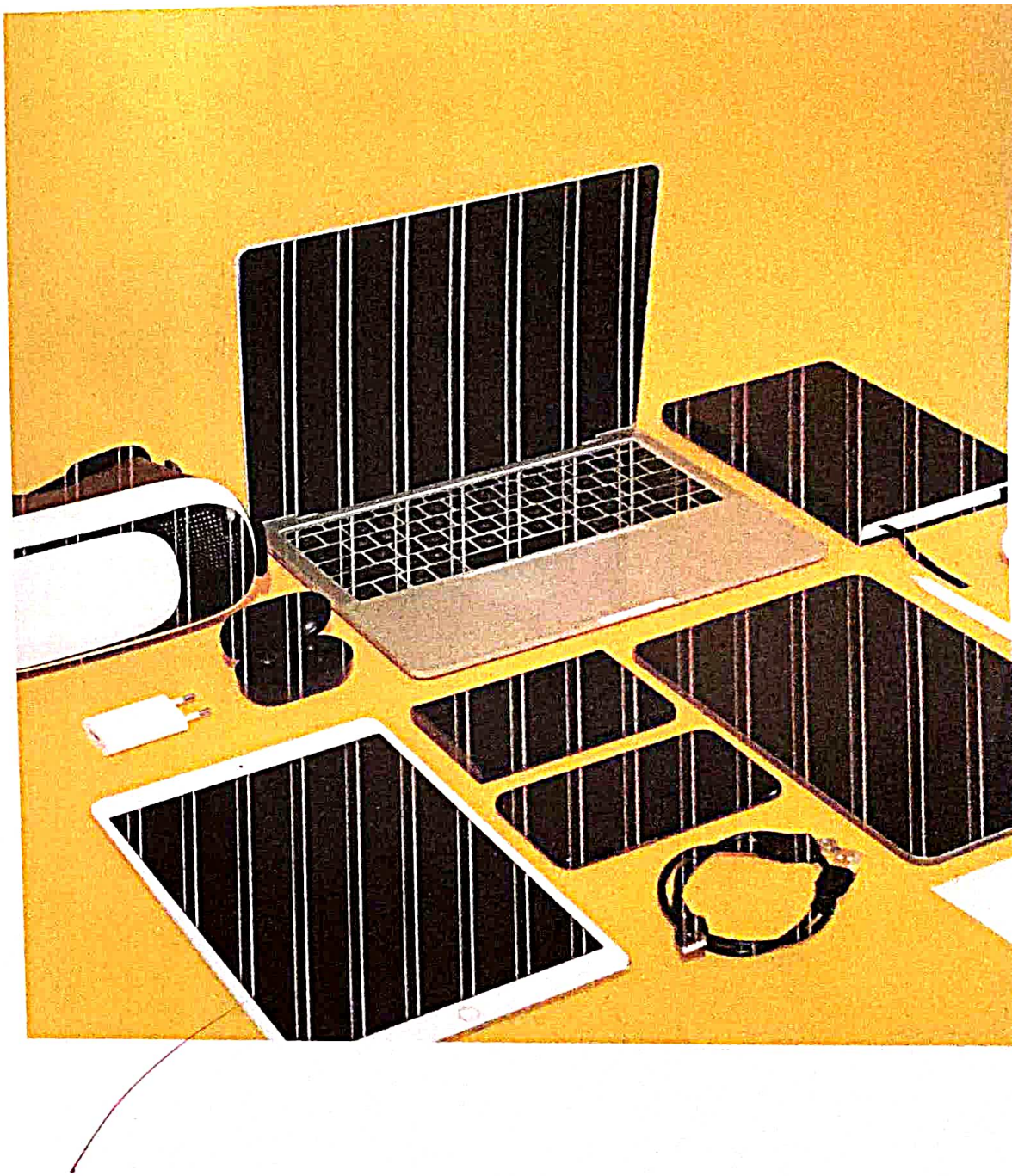


Quantum Tunneling

Quantum tunneling plays a crucial role in the behavior of electrons in periodic potentials. It allows electrons to pass through energy barriers, leading to phenomena such as **tunnel diodes** and **quantum wells**.

Applications

Understanding the behavior of electrons in periodic potentials has led to various technological applications, including **semiconductor devices**, **quantum dots**, and **photonic crystals**.



NAME : S. SUGAMITHA

CLASS : I - CSE - B

SUBJECT : PHYSICS FOR INFORMATION SCIENCE

TOPIC : COMPETITIVE EXAM QUESTIONIRE

PH3256

ASSIGNMENT - I

40/40

1. What is electron effective mass?

A) The mass of an electron in free space

B) The mass of an electron in a crystal lattice

C) The mass of an electron in a magnetic field

D) The mass of an electron in a vacuum

Ans: B) The mass of an electron in a crystal lattice

2. In a crystal lattice, the effective mass of an electron is influenced by:

A) The size of the crystal

B) The temperature of the crystal

C) The presence of impurities

D) All of the above

Ans: D) All of the above

3. Effective mass is a measure of:

A) The actual mass of an electron

B) The mass of an electron in motion

C) The mass of an electron under the influence of external forces

D) The mass of an electron as it interacts with its surroundings

Ans: B) The mass of an electron in motion

4. Which of the following is true regarding the effective mass of an electron in a crystal lattice?

A) It is always equal to the mass of a free electron

B) It can be greater than or less than the mass of a free electron

C) It is independent of the crystal structure

D) It decreases as the temperature increases

Ans: B) It can be greater than or less than the mass of a free electron

5. The effective mass of an electron in a crystal lattice can be understood as:

A) The mass an electron would have if it were freely moving

B) The mass an electron would have if it were subjected to crystal's force

C) The mass an electron would have if it were stationary

D) The mass an electron would have if it were in a vacuum

Ans: B) The mass an electron would have if it were subjected to crystal's force

6. Which of the following factors affect the effective mass of an electron in a crystal lattice?

A) Crystal structure

B) Temperature

C) Presence of impurities

D) All of the above

Ans: D) All of the above

7. In a crystal lattice, the effective mass of an electron is:

A) Always greater than the mass of a free electron

B) Always less than the mass of a free electron

C) Equal to the mass of a free electron

D) Unrelated to the mass of a free electron

Ans: B) Always less than the mass of a free electron

8. The effective mass of an electron in a crystal lattice affects its:

A) Momentum

B) Velocity

C) Acceleration

D) All of the above

Ans: D) All of the above

9. Which of the following statements about effective mass is correct?

A) It is a constant value for all electrons

B) It varies depending on the direction of motion

C) It remains the same regardless of temperature

D) It is not influenced by impurities

Ans: B) It varies depending on the direction of motion

10. The concept of effective mass is particularly important in the study of:

A) Classical mechanics

B) Quantum mechanics

C) Relativistic mechanics

D) Statistical mechanics

Ans: B) Quantum mechanics

11. In a crystal lattice, the effective mass of an electron is often:

A) Independent of its momentum

B) Proportional to its momentum

C) Inversely proportional to its momentum

D) Unrelated to its momentum

Ans: B) Proportional to its momentum

12. The effective mass of an electron in a crystal lattice affects its:

A) Energy levels

B) Charge

C) Spin

Ans: A) Energy levels

13. The effective mass of an electron in a crystal lattice can be determined experimentally through:

A) X-ray diffraction

B) Electron microscopy

C) Transport measurements

D) Atomic force microscopy

Ans: C) Transport measurements

14. Which of the following materials would likely have a lower effective mass for electrons?

A) Semiconductors

B) Insulators

C) Metals

D) Superconductors

Ans: A) Semiconductors

15. The effective mass of an electron in a crystal lattice is a measure of its:

A) Inertia

B) Gravitational force

C) Electromagnetic charge

D) None of the above

Ans: A) Inertia

16. The effective mass of an electron in a crystal lattice can be influenced by:

A) Pressure

B) Magnetic field

C) Electric field

D) All of the above

Ans: D) All of the above

17. The concept of effective mass is used to describe the behavior of electrons in materials:

A) At low temperatures

B) At high temperatures

C) Under extreme pressures

D) Under the influence of external fields

Ans: D) Under the influence of external fields

18. Which of the following statements about effective mass is true?

A) It is always greater than the mass of a free electron

B) It is always less than the mass of a free electron

C) It can be greater than or less than the mass of a free electron

D) It is equal to the mass of a proton

Ans: C) It can be greater than or less than the mass of a free electron

19. The effective mass of an electron in a crystal lattice is affected by:

A) Its energy

B) Its position in the lattice

C) Its momentum

D) All of the above

Ans: D) All of the above

20. Effective mass is a concept used to simplify the description of electron behavior in materials by treating electrons as if they were:

A) Moving freely

B) Stationary

C) Independent particles

D) Interacting with photons

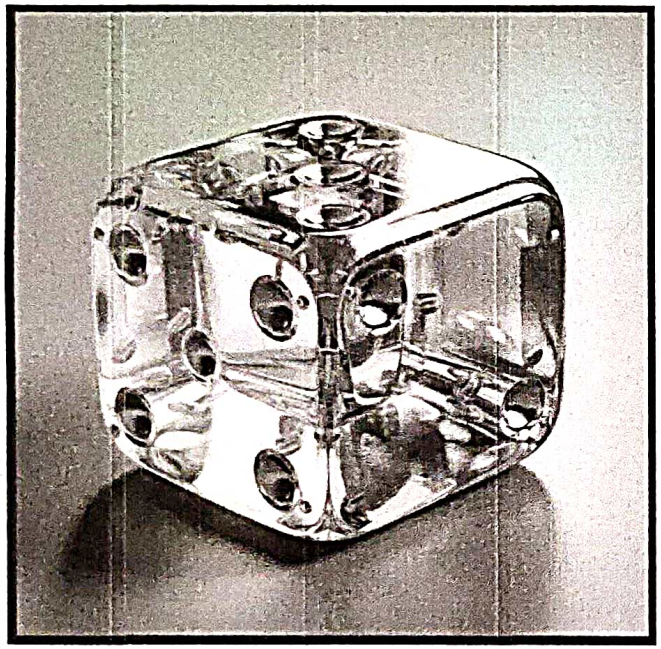
Ans: A) Moving freely

Extrinsic Semiconductors

42/40

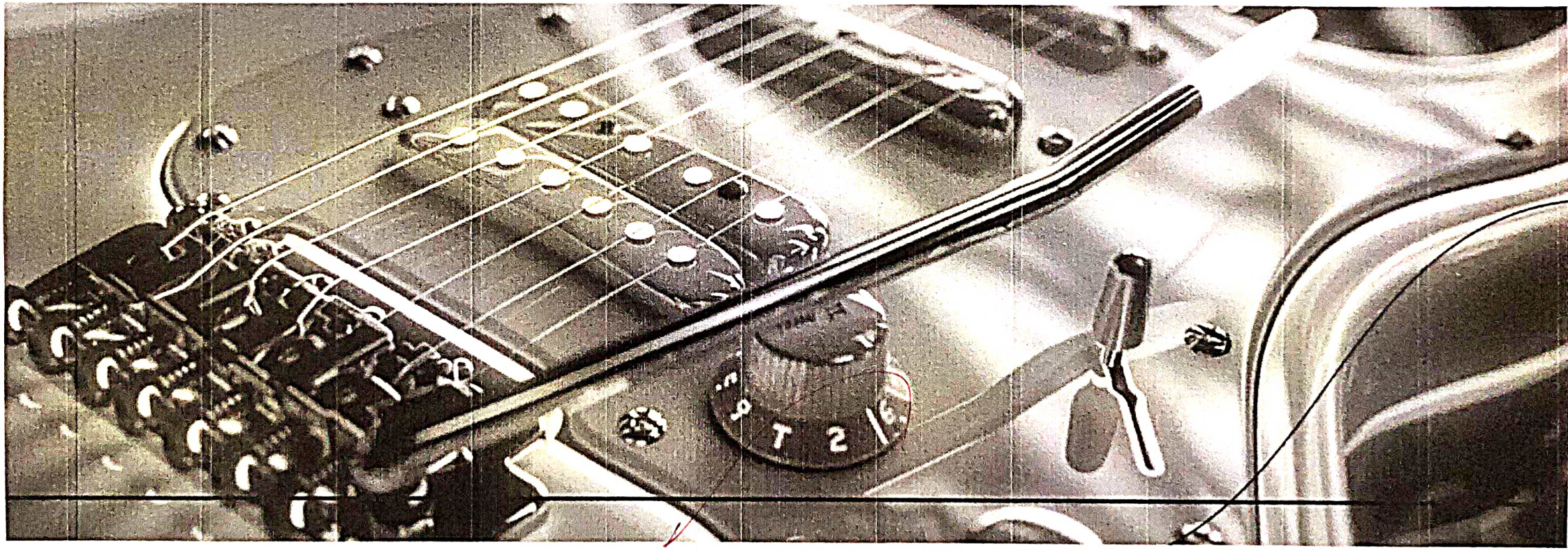
MAHESHWARAN
23CSA47

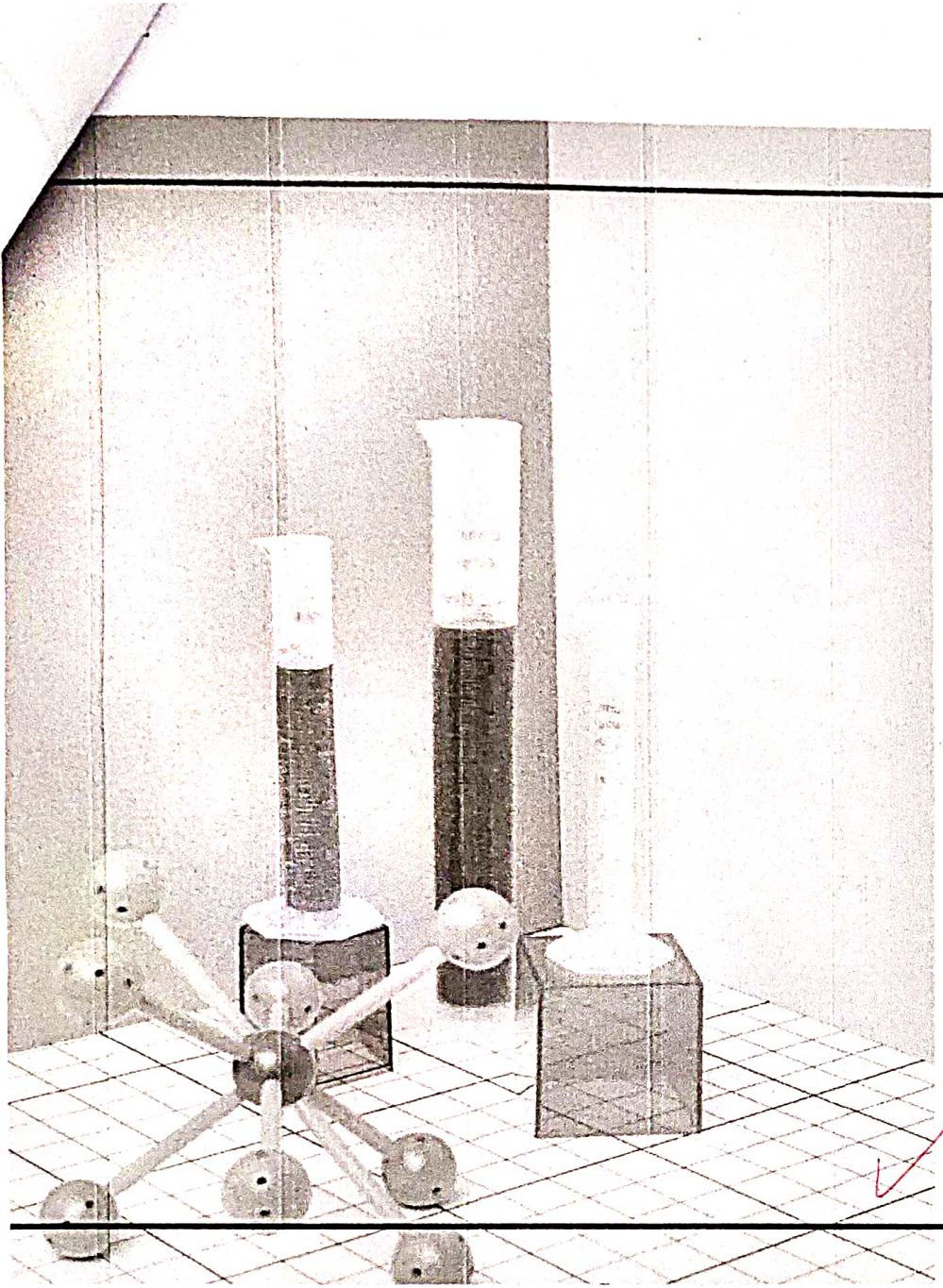
Introduction



Intrinsic **semiconductors** have limited conductivity. Extrinsic semiconductors are doped with *impurities* to enhance conductivity. This presentation explores the impact of doping on semiconductor conductivity.

Doping introduces **donor** or *acceptor* impurities into the semiconductor crystal lattice. Donor impurities create excess *electrons*, while acceptor impurities generate *holes* in the crystal structure.



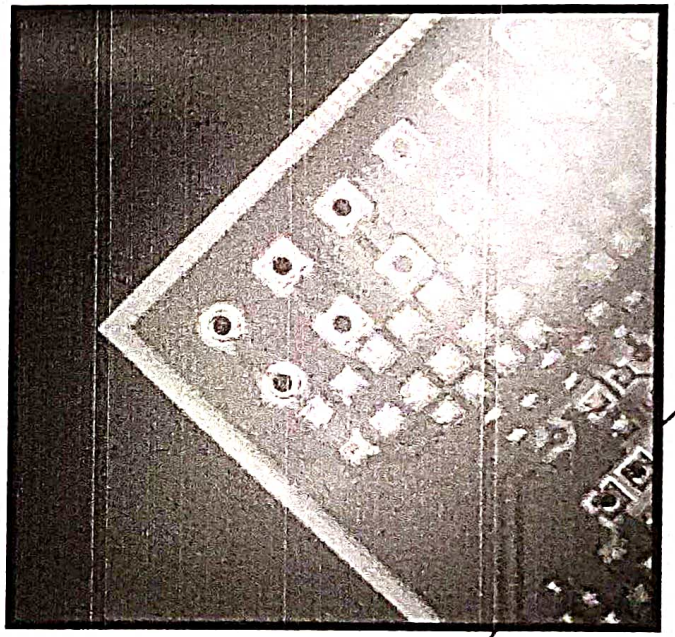


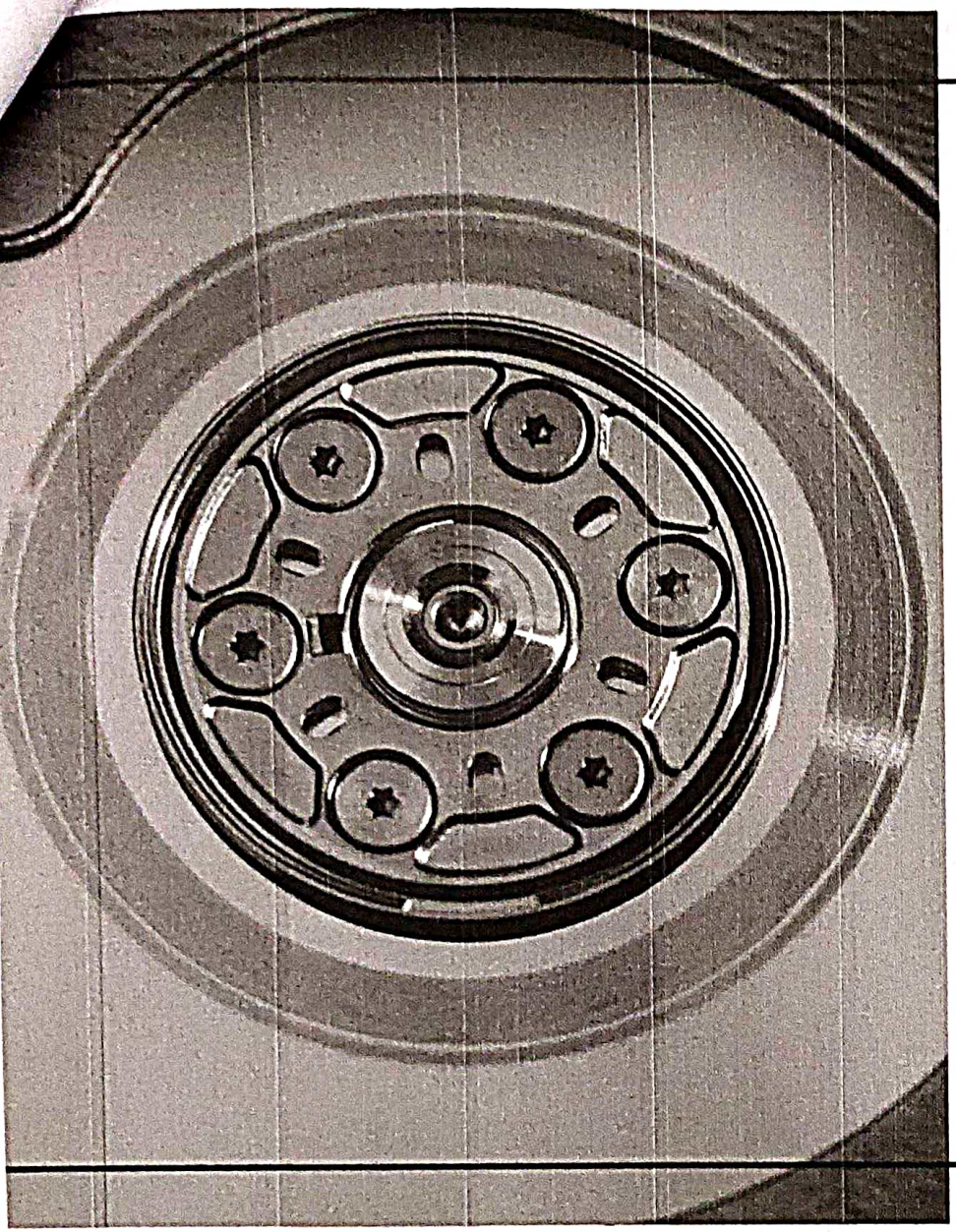
Conductivity Enhancement

Doping increases the **density** of charge carriers in the semiconductor, leading to enhanced *conductivity*. The type and concentration of impurities determine the conductivity type and level in the doped semiconductor.

N-Type Semiconductors

Donor-doped semiconductors create an excess of *electrons*, resulting in an *n-type* conductivity. The presence of free electrons allows for efficient *electron flow* in the material.



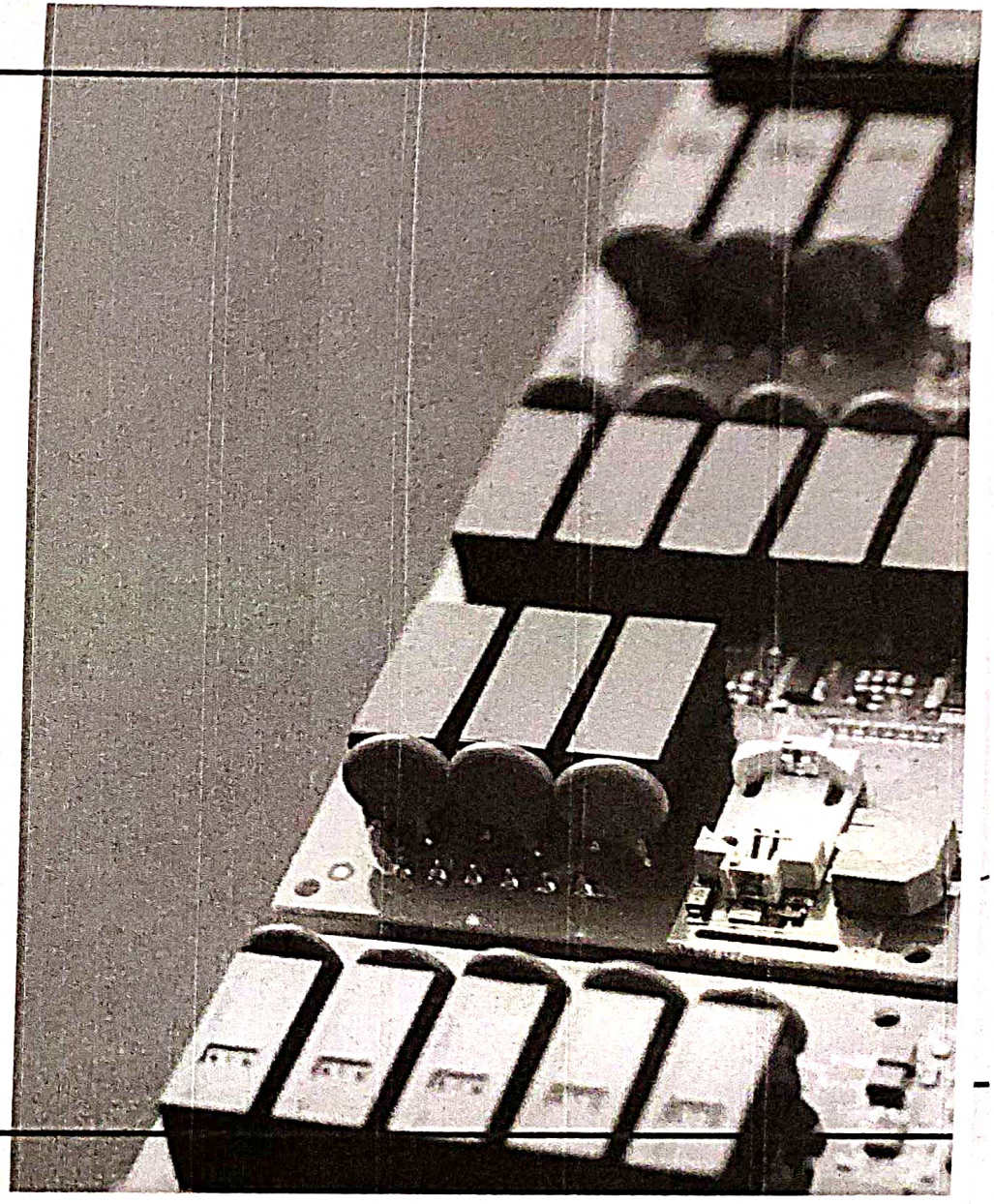


P-Type Semiconductors

Acceptor-doped semiconductors generate *holes* in the crystal lattice, leading to *p-type* conductivity. The movement of holes facilitates the flow of *positive charge* in the material.

Conclusion

Doping plays a crucial role in modulating the conductivity of semiconductors. By controlling the type and concentration of impurities, engineers can tailor the electrical properties of semiconductors for various applications.



NAME : NITHISHKUMAR. S.

CLASS : CSE-A

ROLL NO : 23CSA61

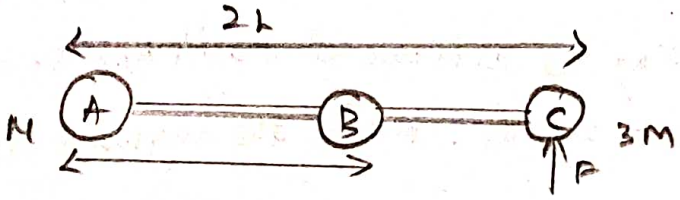
SUB CODE : PH3151

SUB NAME : ENGINEERING PHYSICS

TOPIC : ROTATIONAL DYNAMICS.

40/40

Three point masses lying on a flat frictionless surface are connected by massless rod. Determine the angular acceleration of the body (a) about an axis through point mass A and out of the surface and (b) about an axis through point mass B. Express your Answer in term of F, L and M. You will need to calculate the moment of inertia in each case.



First we will calculate the moment of inertia. Since these are point masses we use the formula,

$$I = \sum m_i (r_i)^2:$$

a) $I_A = M(0)^2 + 2M(L)^2 + 3M(2L)^2 = 14ML^2.$

b) $I_b = M(L)^2 + 2M(0)^2 + 3M(L^2)^2 = 4ML^2$

The angular acceleration is governed by the rotational from of Newton's Second law, $\Sigma \tau_z = I_z \alpha_z$, where z is out of the paper in this problem and τ_z, I_z and α_z are all determined relative to same axis.

	AXIS A	AXIS B
τ_z	$2LF$	LF
I_z	$14ML^2$	$4ML^2$
$\Sigma \tau_z = I_z \alpha_z$	$2LF = 14ML^2 \alpha_A$	$LF = 4ML^2 \alpha_B$

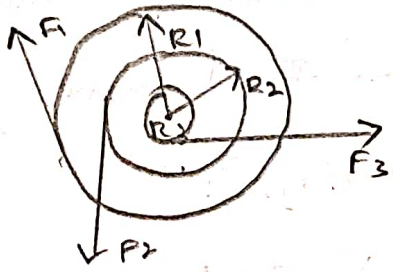
So the acceleration about axis A is

$$\alpha_A = F / 7ML.$$

and the acceleration about axis B is

$$\alpha_B = F / 4ML.$$

2. The object in the diagram below is on a fixed frictionless axle. It has a moment of inertia of $I = 50\ kg - m^2$. The forces acting on the object are $F_1 = 100N$, $F_2 = 200N$ and $F_3 = 250\ N$ acting at different radii $R_1 = 60cm$, $R_2 = 42cm$, and $R_3 = 28cm$. Find the angular acceleration of the object.



Since the axle is fixed we only need to consider the torques and use $\Sigma \tau_z = I_z \alpha_z$ Each of the forces is tangential to the object, ie, R and F are at 90° to one another. Recall that clockwise torques are negative or into the paper in this case.

$$\Sigma \tau_z = I_z \alpha_z.$$

$$-R_1F_1 + R_2F_2 + R_3F_3 = I\alpha$$

So our equation for the acceleration is

$$\alpha = [-R_1F_1 + R_2F_2 + R_3F_3] / I.$$

Sub in the given values, $\alpha = 1.88\ rad/s^2$

A rope is wrapped around a solid cylindrical drum. The drum has a fixed frictionless axle. The mass of the drum is 125 kg and it has a radius of $R = 50.0$ cm. The other end of the rope is tied to a block, $M = 10.0$ kg. What is the angular acceleration of the drum? what is the their linear acceleration of the block? What is the tension in the hope? Assume that the rope does not slip.

Since the problem wants acceleration and forces, and one object rotates. that suggests we must use both the linear and rotations versions of Newton's second Law. Since the drum has a fixed

Since the drum has a fixed axle we need only consider the torques acting on it. once the diagrams are drawn. we use $\Sigma F_x = ma_x$, $\Sigma F_y = ma_y$, and $\Sigma \tau_z = I_z \alpha_z$ to get a set of equations.

The forces acting directing on the block are weight and tension. Presumably the block will accelerate downwards. the only force directly acting on the drum which creates a torque is tension.

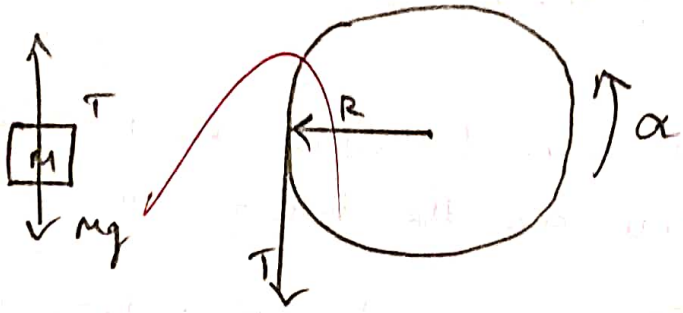
$$\Sigma F_y = ma_y \qquad \Sigma_z \Sigma \tau_z = I_{zz}$$

$$T - mg = -Ma \qquad RT = I$$

Since the rope is wrapped around the drum, we also have the relationship $a = R\alpha$

Referring to the table of Moments of Inertia, we find that $I = \frac{1}{2}MR^2$ for a solid cylinder. So our first equation is $T = Mg - Ma$. Our second is $RT = \frac{1}{2}MR^2\alpha$ or when we simplify $T = \frac{1}{2}Ma$. Putting this result into the first equation yields $a = mg/M + \frac{1}{2}m$ $1.353\ m/s^2$. Thus $\alpha = a/R = 2.706\ rad/s^2$. As well

$$T = \frac{1}{2}ma = \frac{1}{2}Mg\left[M + \frac{1}{2}M\right] = 84.56\ N$$



APPLICATION OF CENTRE OF MASS

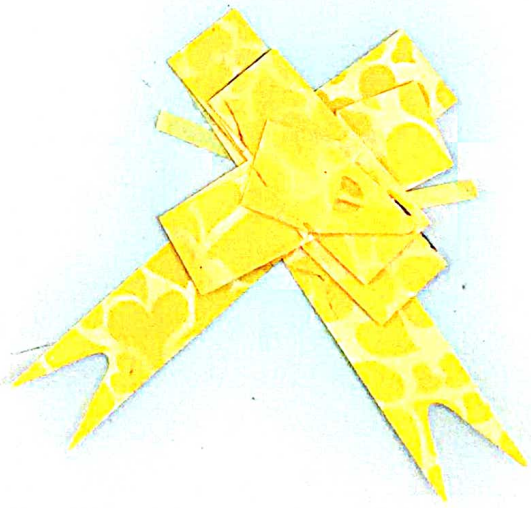
Roll no : 23CSA28

Presented by : M.Hamsavarthini

Class : CSE 'A' - I

Subject : Engineering physics

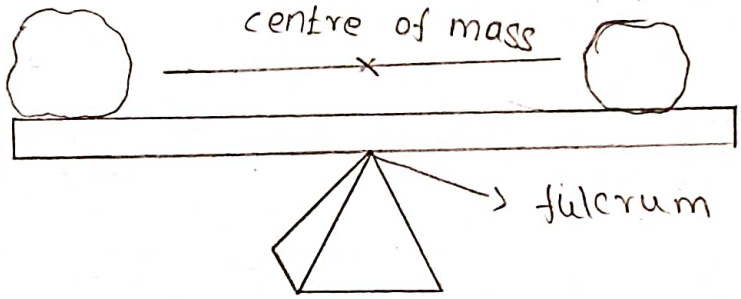
Submited to :



Center of mass

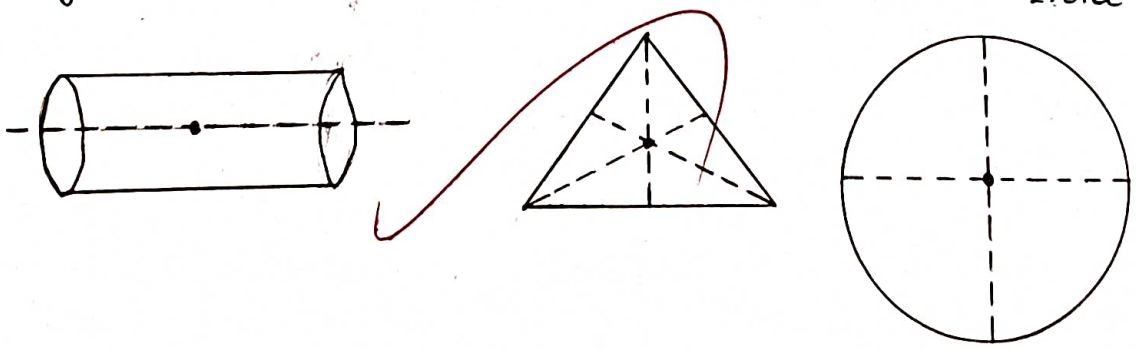
If the mass of the entired particlel of the system is concentrated at a particular point then the point is called centre of mass of the system.

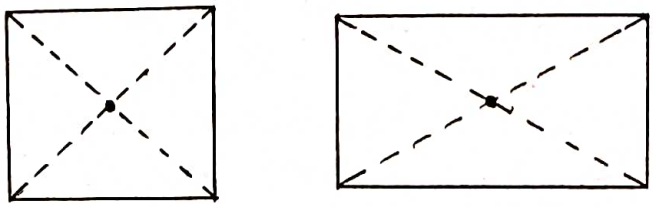
Eg:



FOr simple geometric shapes:

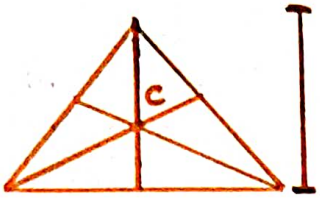
FOr simple rigid objects with uniform density, the centre of mass is located at the centroid.



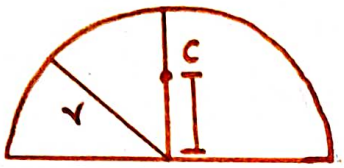


- centre of mass

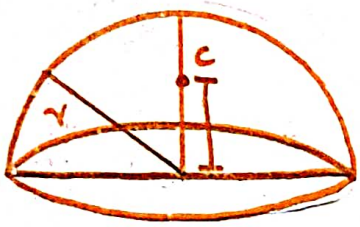
FORMULA OF CETRE OF MASS



$= h/3$



$= 4r/3\pi$



$= r/2$

Position, Velocity and acceleration of Centre of mass

$$x_{cm} = \frac{1}{M} \sum m_n x_n$$

$$v_{cm} = \frac{1}{M} \sum m_n v_n$$

$$a_{cm} = \frac{1}{M} \sum m_n a_n$$

APPLICATIONS OF CENTRE OF MASS

The centre of mass has numerous practical applications. Here are some example:

Stability: Centre of mass is taken into consideration while making physical structures in the real world. For example, to make a tall tower or a building its centre of mass needs to be closer to the ground for that building to sustain itself.

Motion: The motion of an object can be understood with the help of the centre of mass as in many art forms and sports, performer shift their centre of mass to achelve the results.

Engineering: Engineers use the centre of mass to build structures like buildings and machines like automobile, that are stable and safe. For example, cranes or bridges are the best examples of machines made by engineers using the centre of mass.

Astronomy: In the study of the celestial bodies centre of mass play a crucial role.

Properties of centre of mass

i) The location of the centre of mass is the weighted average of the locations of the particles of the system.

ii) centre of mass moves as if the external force acts on the entire mass concentr-ated at the point.

iii) In the absence of any external force, the centre of mass moves with a constant velocity.

iv) For bodies of normal dimensions, centre of mass and centre of gravity coincide.

KINGS COLLEGE OF ENGINEERING
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DEPARTMENT OF MATHEMATICS

ACADEMIC YEAR - 2023-2024

PROFESSIONAL CAREER ENHANCEMENT SKILLS

S.NO	NAME OF ACTIVITY
1.	POWER POINT PRESENTATION
2.	QUIZ
3.	APPLICATION OF CONCEPT
4.	MIND MAP
5.	POSTER PRESENTATION
6.	THINK BREAK EXERCISE

KINGS COLLEGE OF ENGINEERING

A.AGNES
1ST YEAR
ELECTRONICS COMMUNICATION ENGINEERING

MA3251 - STATISTICS AND NUMERICAL METHODS

ASSIGNMENT - II.

40/40

18/5/24

CONTENTS :--

- *Introduction*
- *Completely Randomized Design (CRD)*
- *Advantages of CRD*
- *Disadvantages of CRD*
- *Uses of CRD*
- *Statistical Analysis of CRD*
- *ANOVA Table for CRD*
- *Conclusion*
- *Reference*

INTRODUCTION

Designing an experiment means deciding how the observations or measurement should be taken to answer a particular question in a valid , efficient and economical way. A well design experiment helps the workers to properly partition the variation of the data into respective component in order to draw valid conclusion.

COMPLETELY RANDOMIZED DESIGN

The Completely Randomized Design(CRD) is the most simplest of all the design based on randomization and replication. In CRD, all treatments are randomly allocated among all experimental subjects.

This allows every experimental unit; i.e.; plot, animal, soil sample etc., to have an equal probability of receiving a treatment .

ADVANTAGES OF CRD

- CRD has several advantages it is easy to layout the design.
- There is complete flexibility in the number of treatments and number of replication which may very from treatment to treatment.
- The no. of replication need not to be same for each treatment.
- The CRD provides maximum d.f. for the experiment of experimental error.

DISADVANTAGE OF CRD

The main objection against the CRD is that the principle of local control has not been used in this design. So that the experimental error is inflated by the presents of the entire variation among experimental units.

USES OF CRD

- *Under conditions where the experimental material is homogenous e.g. in physics, chemistry in chemical and in biological experiment in some green house studies.*
- *In small experiments where there is a small number of d.f.*
- *CRD is may be used in a chemical or baking experiment where the experimental units are the part of the thoroughly mixed chemical or powder.*

STATISTICAL ANALYSIS OF CRD

Linear model of CRD is

$$Y_{ij} = \mu + \varphi_i + \epsilon_{ij} \quad ; i=1,2,3.....t,\ j=1,2,3.....r_i$$

Where Y_{ij} = an observation

μ = the experimental mean or general mean

φ_i = the treatment effect

ϵ_{ij} = the experimental error

After analysis it becomes-

Total SS= SS due to treatment + SS due to error

$$S_T^2 = S_t^2 + S_E^2$$

ANOVA TABLE FOR CRD

Source of variance	Degrees of Freedom d.f.	Sum of Square S.S.	Mean Sum of Square M.S.S	Variation Ratio F
Treatment	t-1	S_t^2	$s_t^2 = \frac{S_t^2}{t-1}$	$F_t = \frac{s_t^2}{s_E^2}$
error	n-t	S_E^2	$s_E^2 = \frac{S_E^2}{n-t}$	
total	n-1	S_T^2		

CONCLUSION

A completely randomized design relies on randomization to control for the effect of extraneous variables. CRDs are for the studying the effect on the primary factor without the need to take other nuisance variables into account.


Thank
you!

P. JAYALAKSHMI

23ECA32

ECE - A

MATHS ASSIGNMENT - II

QUIZ QUESTIONS

40/40

28/5/24

QUIZ

A researcher wants to test if the avarge height of a certain planet species in 150 cm. Which hypothesis should be tested?

a) ($H_0: \mu = 150$)

b) ($H_0: \mu \neq 150$)

c) ($H_0: \mu > 150$)

d) ($H_0: \mu < 150$)

answer: a) ($H_0: \mu = 150$)

A sample of 100 students has an average test score of 75 with a standard deviation of 10. What is the 95% confidence interval for the mean score?

a) (73, 77)

b) (74, 76)

c) (74.04, 75.96)

d) (73.04, 76.96)

answer: d) (73.04, 76.96)

3) Which of the following is true about the t - distribution?

a) It is used when the population variance is known.

b) It is symmetric and bell - shaped.

c) It is used only for large sample sizes.

d) It is skewed to the right.

answer : b) It is symmetric and bell shaped

If the sample proportion of defective items is 0.1 in a sample of 800 items, what is the standard error of the proporation?

a) 0.021 b) 0.045 c) 0.031 d) 0.010

answer : a) 0.021

The sample mean is an unbaised estimator of the

a) sample variance b) population mean

c) sample poporation d) populaton proporation.

answer : b) population mean

What is the z-score for the a sample mean of 78, given a population mean of 80, standard deviation of 10 and a sample size of 25 ?

a) -1.00 b) -2.00 c) -0.50 d) 1.00

answer : b) -8.00

In hypothesis testing, the p-value is :

a) the probability of rejecting the null hypothesis when it is true.

b) the probability of failing to reject the null hypothesis when it is false.

c) the probability of observing a test statistic as extreme as the one obtained.

d) the significance level of the test

answer : c) the probability of observing a test statistic as extreme as the one obtained

Which test would you use to compare the means of two independent groups?

a) paired t-test b) chi-square test

c) Independent t-test d) ANOVA

answer: c) Independent t-test

A confidence interval the difference between two means does not include zero. What can be concluded?

a) the means are equal b) There is no significant difference between the means. c) There is a significant difference between the means.

d) The sample sizes are too small.

answer: c) There is a significant difference between the means.

What is the critical value of t for a two-tailed test with a 95% confidence level and 80 degrees of freedom?

a) 1.96 b) 2.086 c) 2.093 d) 1.645

b) 2.086

A survey finds that 60% of a sample of 150 people prefer chocolate ice cream. What is the margin of error at a 95% confidence level?

a) 0.04 b) 0.05 c) 0.08 d) 0.09

answer: b) 0.05

When comparing two sample proportions, the pooled proportion is calculated because:

a) It provides a better estimate of the population proportion.

b) It reduces the standard error.

c) It is reduces the sample size.

d) It simplifies hypothesis testing.

answer: a) It provides a better estimate of the population proportion.

If the value is less than the significance level you:

a) fail to reject the null hypothesis.

b) reject the null hypothesis

c) Accepting a false null hypothesis.

d) Failing to reject a false null hypothesis.

answer: b) reject the null hypothesis.

What does a type I error mean in hypothesis testing?

a) Accepting a true null hypothesis.

b) Rejecting a true null hypothesis.

c) Accepting a false null hypothesis

d) Failing to reject a false null hypothesis.

answer: b) Rejecting a true null hypothesis.

A 90% confidence interval for a mean is given as (10, 20). What is the margin of error.

a) 5 b) 10 c) 2.5 d) 15

answer. a) 5

What test would you use to compare the proportions of two independent samples?

a) paired t-test b) Z-test for proportions.

c) chi-square test d) ANOVA

Answer: b) Z-test for proportion

In a hypothesis test, the null hypothesis is

a) always true b) never true c) a statement of effect or no difference. d) statement that we want to prove.

answer: c) a statement of effect or no difference.

The test statistic for comparing two means when variances are equal is based on

a) Z-distribution b) chi-square distribution

c) t-distribution d) F-distribution.

answer: c) t-distribution

A sample of 30 people has a mean weight of 70 kg with a standard deviation of 5 kg. What is the 99% confidence interval for the mean weight?

a) (68.42, 71.58) b) (67.43, 72.57)

c) (66.80, 73.80) d) (69.14, 70.86)

answer: c) (66.80, 73.80)

If the sample size increases, the margin of error.

a) increases b) decreases c) stays the same

d) can increase or decrease.

answer: b) decreases.

M. Gokila

23ECA21

MA3251

Assignment - II

Application of concept

40/40

28/5/24

MILNE'S PREDICTOR-CORRECTOR METHOD

- Predictor Corrector Methods form the basis of the most successful codes for the solution of initial value problems of ordinary differential equations.

- Briefly, these methods have been successful because they occur in naturally arising families covering a range of orders, they have reasonable stability properties, and they allow for easy error control via suitable step size/order changing policies and techniques.

MILNE'S PREDICTOR-CORRECTOR METHOD

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- Briefly, these methods have been successful because they occur in naturally arising families covering a range of orders, they have reasonable stability properties, and they allow for easy error control via suitable step size/order changing policies and techniques.

MILNE'S PREDICTOR-CORRECTOR METHOD

- Consider the implicit linear multistep method

$$\sum_{j=0}^{k} \alpha_j y_{n+j} = h \sum_{j=0}^{k} \beta_j f_{n+j}.$$

- A possible way of solving the nonlinear system (1) is via the fixed point iteration

$$y_{n+k}^{[v+1]} = h\beta_k f\left(x_{n+k}, y_{n+k}^{[v]}\right) - \sum_{j=0}^{k-1} \alpha_j y_{n+j} + h \sum_{j=0}^{k-1} \beta_j f_{n+j}, \quad v = 0, 1, \cdots.$$

- where $y_{n+k}^{[0]}$ is given. This iteration will converge to the unique solution of (1) provided . $|h\beta_k L| < 1$

MILNE'S PREDICTOR-CORRECTOR METHOD

- where L is the Lipschitz constant of f. Thus it converges for sufficiently small h.

- The basic idea of predictor corrector methods is to compute the initial approximation idea of predictor corrector methods is to compute the initial approximation $y_{n+k}^{[0]}$ by an explicit linear multistep method (the predictor) and then run the iteration (2) for a predetermined number of steps.

- The implicit method (1) is called the corrector.

Given : $x_0 = 0, x_1 = 0.1, x_2 = 0.2, \quad x_3 = 0.3, x_4 = 0.4$

$y_0 = 1, y_1 = 1.06, y_2 = 1.12, y_3 = 1.21$

$h = 0.1$

To find $y(0.4)$:

Given : $y' = \frac{1}{2}(1 + x^2) y^2$

$y_0' = \frac{1}{2}(1 + x_0^2) y_0^2 = \frac{1}{2}(1 + 0)(1) = \frac{1}{2} = 0.5$

$y_1' = \frac{1}{2}(1 + x_1^2) y_1^2 = \frac{1}{2}[1 + (0.1)^2][1.06]^2 = 0.5674$

$y_2' = \frac{1}{2}[1 + x_2^2] y_2^2 = \frac{1}{2}[1 + (0.2)^2][1.12]^2 = 0.6522$

$y_3' = \frac{1}{2}[1 + x_3^2] y_3^2 = \frac{1}{2}[1 + (0.3)^2][1.21]^2 = 0.7979$

By Milne's method

$y_{4,p} = y_0 + \frac{4h}{3}[2y_1' - y_2' + 2y_3']$

$= 1 + \frac{4(0.1)}{3}[(2)(0.5764) - (0.6522) + (2)(0.7979)] = 1.2771$

$\therefore \boxed{y_{4,p} = 1.2771}$

$y_4' = \frac{1}{2}[1 + x_4^2] y_4^2 = \frac{1}{2}[1 + (0.4)^2][1.2771]^2$

$= \frac{1}{2}(1.16)(1.631) = 0.9460$

By corrector method

$y_{4,c} = y_2 + \frac{h}{3}[y_2' + 4y_3' + y_4']$

$= 1.12 + \frac{0.1}{3}[0.6522 + 4(0.7979) + 0.9460] = 1.2797$

$\Rightarrow \boxed{y_{4,c} = 1.2797} \quad \therefore \boxed{y(0.4) = 1.2797}$

K. Lakshmi priya

23ECA42

MA3251

Assignment - II

Mind map - test for single variance

TEST FOR SINGLE VARIENCE

Defination:

TO test variability, use the chi-square test of a single varience. The test may be left-, righ- or two-tailed, and its hypotheses are always expressed in terms of the varianc (or standard deviation)

FORMULA:

$$\chi^2 = \frac{ns^2}{\sigma}$$

n = the total number of data
s^2 = sample variation
σ^2 = population variation

Degrees of freedom:

$n-1$

Example - 1

A random sample of size 25 from a population gives the sample standard deviation 9.5 test the hypothesis that the population standard deviation is 10

Solution

given : $n = 25$, $s = 9.5$, $\sigma = 10$

Null hypotheses

H_0 ; $\sigma^2 = 100$

Alternative hypothesis

H_1 ; $\sigma^2 \neq 100$

Level of significance

$\alpha = 5\%$

Degrees of freedom

$n-1 = 25-1 = 24$

Table value :

36.415

40/40

Maths Assignment

Name : M. Deepika

Roll No : 23ECE13

Class : ECE-A

Ass No : 02

Subject code : MA3251

Topic : Adams - Bash Forth predictor - Corrector Method (Think Break Exercise)

40/40

28/5/24

ADAMS - BASH FORTH PREDICTOR - CORRECTOR METHOD:

Formula:

Predictor formula is

$$y_{n+1}.P = y_n + \frac{h}{24}\left[55y'_n - 59y'_{n-1} + 37y_{n-2}' - 9y_{n-3}'\right]$$

Corrector formula is

$$y_{n+1}.C = y_n + \frac{h}{24}\left[9'y_{n+1} + 19y'_n - 5y'_{n-1} + y_{n-2}'\right]$$

Given $\frac{dy}{dx} = x^2(1+y)$, $y(1) = 1$, $y(1.1) = 1.233$ $y(1.2) = 1.548$, $y(1.3) = 1.979$, evaluate $y(1.4)$ by adam's bash fourth method.

Predictor and Corrector formula is

$$y_{n+1}.P = y_n + \frac{h}{24}\left[55y'_n - 59y'_{n-1} + 37y_{n-2}' - 9y_{n-3}'\right]$$

$$y_{n+1}.C = y_n + \frac{h}{24}\left[9'y_{n+1} + 19y'_n - 5y'_{n-1} + y_{n-2}'\right]$$

Given $y' = x^2(1+y)$

$x_0 = 1$ $y_0 = 1$ $h = 0.1$

$x_1 = 1.1$ $y_1 = 1.233$

$x_2 = 1.2$ $y_2 = 1.548$

$x_3 = 1.3$ $y_3 = 1.979$

$x_4 = 1.4$ $y_4 = ?$

Put $n=3$ in equation (1)

$$y_{4,P} = y_3 + \frac{h}{24}\left[55y_3' - 59y_2' + 37y_1' - 9y_0'\right]$$

$y' = x^2(1+y)$ $\qquad$ $y_0' = 1(1+1) = 2$

$y_0' = x_0^2(1+y_0)'$ $\qquad$ $y_1' = (1.1)^2(1+1.233) = 2.7019$

$y_1' = x_1^2(1+y_1)$ $\qquad$ $y_2' = 3.6691$

$y_2' = x_2^2(1+y_2)$ $\qquad$ $y_3' = 5.0345$

$y_3' = x_3^2(1+y_3)$

$$y_{4,P} = 1.979 + \frac{0.1}{24}\left[276.8975 - 216.4769 + 99.9703 - 18\right]$$

$$\boxed{y_{4,P} = 2.5723}$$

Put $n=3$ in equation (1)

$$y_{4,C} = y_3 + \frac{h}{24}\left[9y_4' + 19y_3' - 5y_2' + y_1'\right]$$

$y_4' = x_4^2(1+y_4) = (1.4)^2(1+2.5723)$

$= 7.0017$

$$= 1.979 + \frac{0.1}{24}\left[63.0153 + 95.6555 - 18.3455 + 2.7019\right]$$

$$\boxed{y_{4,C} = 2.5749}$$

2) Find $y(0.1)$, $y(0.2)$, $y(0.3)$ form $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$ by using RK Method and hence obtain $y(0.4)$ using Adam's Method?

$f(x,y) = xy + y^2$, $x_0 = 0$, $x_1 = 0.1$, $x_2 = 0.2$, $x_3 = 0.4$, $x_4 = 0.4$,

$y_0 = 1$, $h = 0.1$

i) To Find $y(0.1)$:

$K_1 = hf(x_0, y_0) = (0.1)f(0,1) = (0.1)1 = 0.1$

$K_2 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{K_1}{2}\right) = (0.1)f(0.05, 1.05)$

$= (0.1)\left[(0.05)(1.05) + (1.05)^2\right]$

$$\boxed{= 0.1155}$$

$$k_3 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{k_2}{2}\right) = (0.1) f\ (0.05, 1.0578)$$

$$= (0.1)\left[(0.05)(1.0578) + (1.0578)^2\right] = 0.1172$$

$$k = hf(x_0 + h; y_0 + k_3)$$

$$= (0.1)\ f(0.1, 1.1172)$$

$$= (0.1)\left[(0.1)(1.1172) + (1.1172)^2\right] = 0.13598$$

$$y_1 = y_0 + \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4] = 1.1169$$

$$y(0.1) = 1.1169$$

$$y(0.2) = 1.2774$$

$$y(0.3) = 1.5041$$

Now, we use Adam's predictor formula

$$y_{4,P} = y_3 + \frac{h}{24}[55y_3' - 59y_2' + 37y_1' - 9y_0']$$

$$y_0' = x_0 y_0 + y_0^2 = 1$$

$$y_1' = x_1 y_1 + y_1^2 = 1.3592$$

$$y_2' = x_2 y_2 + y_2^2 = 1.8872$$

$$y_3' = x_3 y_3 + y_3^2 = 2.7135$$

$$y_{4,P} = 1.5041 + \frac{0.1}{24}[55(2.7135) - 59(1.8872) + 37(1.3592) - 9(1)]$$

$$= 1.8341$$

$$y_4', P = x_4 y_4 + y_4^2 = (0.4)(1.8341) + (1.8341)^2 = 4.0976$$

$$\boxed{y_{4,P} = 4.0976}$$

Adam's Corrector formula is

$$y_{4,C} = y_3 + \frac{h}{24}[9y_4' + 19y_3' - 5y_2' + y_1']$$

$$= 1.5041 + \frac{0.1}{24}[9(4.0976) + 19(2.7135) - 5(1.8872) + 1.3592]$$

$$= 1.8389 \qquad \boxed{y_{4,C} = 1.8389}$$

3) Using Adams-Bashforth method, find $y(4.4)$ given $5xy' + y^2 = 2$ $y(4) = 1$, $y(4.1) = 1.0049$, $y(4.2) = 1.0097$ and $y(4.3) = 1.0143$

Given: $y' = \frac{2-y^2}{5x}$ Let $h = 0.1$

Given: $x_0 = 4$, $y_0 = 1$, $x_1 = 4.1$, $y_1 = 1.0049$, $x_2 = 4.2$, $y_2 = 1.0097$

$x_3 = 4.3$, $y_3 = 1.0143$

Adam's predictor formula is

$$y_{n+1,P} = y_n + \frac{h}{24}[55y'_n - 59y'_{n-1} + 37y'_{n-2} - 9y'_{n-3}]$$

Putting $n = 3$, we have

$$y_4 = y_3 + \frac{h}{24}(55y_3' - 59y_2' + 37y_1' - 9y_0') \quad \rightarrow (1)$$

$$y_0' = (y')_{(x_0,y_0)} = \frac{2-y_0^2}{5x_0} = 0.05$$

$$y_1' = (y')_{(x_1,y_1)} = \frac{2-y_1^2}{5x_1} = 0.0483$$

$$y_2' = (y')_{(x_2,y_2)} = \frac{2-y_2^2}{5x_2} = 0.0467$$

$$y_3' = (y')_{(x_3,y_3)} = \frac{2-y_3^2}{5x_3} = 0.0452$$

using these values in (1), we get

$$y_{4,P} = 1.0143 + \frac{0.1}{24}[55(0.0452) - 59(0.0467) + 37(0.0483) - 9(0.05)]$$

$$= 1.01413 + \frac{0.1}{24}(4.2731 - 3.2053) = 1.0186$$

$y(4.4) = 1.0186$

Adam's corrector formula is

$$y_{n+1,C} = y_n + \frac{h}{24}(9y'_{n+1} + 19y_n' - 5y'_{n-1} + y'_{n-2})$$

Putting $n=3$, we get

$$y_{4,C} = y_3 + \frac{h}{24}[9y_4' + 19y_3' - 5y_2' + y_1']$$

Now, $y_4' = (y')_{(x_4, y_4)} = \frac{2 - y_4^2}{5x_4} = 0.0437 \rightarrow (2)$

$\therefore$ (2) becomes

$$y_{4,C} = 1.0143 + \frac{0.1}{24}[9(0.0437) + 19(0.0452) - 5(0.0467) + 0.0483]$$

$$= 1.0143 + \frac{0.1}{24} \times 1.0669 = 1.0187$$

$\therefore y(4.4) = 1.0187$

Find $y(0.1)$, $y(0.2)$ and $y(0.3)$ using R.K Method of fourth order given $\frac{dy}{dx} = \frac{1}{2}(1+x)y^2$, $y(0) = 1$

Continue your Calculations to find $y(0.4)$, using Adam's method.

$f(x,y) = \frac{1}{2}(1+x)y^2$, $y(0) = 1$, $h = 0.1$

Here, $x_0 = 0$ $x_1 = 0.1$, $x_2 = 0.2$ $x_3 = 0.3$ $x_4 = 0.4$, $y_0 = 1$

i) To Find $y(0.1)$:

$k_1 = hf(x_0, y_0) = (0.1)f(0,1) = (0,1)\left[\frac{1}{2}\right] = 0.05$

$k_2 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2}\right) = (0.1)f(0.05, 1.025)$

$= (0.1)\left[\frac{1}{2}(1+0.05)(1.025)^2\right] = 0.0552$

$k_3 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{k_2}{2}\right) = (0.1)f(0.05, 1.0276)$

$= (0.1)\left[\frac{1}{2}(1+0.05)(1.0276)^2\right] = 0.0554$

$k_4 = hf(x_0 + h, y_0 + k_3) = (0.1)f(0.1, 1.0554)$

$= (0.1)\left[\frac{1}{2}(1+0.1)(1.0554)^2\right] = 0.05625$

$\Delta y = \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4]$

$= \frac{1}{6}[0.05 + 0.1104 + 0.1108 + 0.05625] = 0.054575$

$y(0.1) = y_0 + \Delta y$

$y(0.1) = 1 + 0.054575 = 1.0546 \Rightarrow \boxed{y(0.1) = 1.0546}$

$y(0.2) = 1.1227$

$y(0.3) = 1.2074$

To Find $y(0.4)$ by using adam's predictor method

$$y_{n+1,P} = y_n + \frac{h}{24}\left[55y_n' - 59y_{n-1}' + 37y_{n-2}' - 9y_{n-3}'\right]$$

$$y_{4,P} = y_3 + \frac{h}{24}\left[55y_3' - 59y_2' + 37y_1' - 9y_0'\right]$$

Here $y_0' = \frac{1}{2}(1+x_0)y_0^2 = \frac{1}{2}(1+0)(1)^2 = 0.5$

$y_1' = 0.61171$

$y_2' = 0.7563$

$y_3' = 0.9475$

$$y_{4,P} = 1.2074 + \frac{0.1}{24}\left[52.0245 - 44.6217 + 22.6333 - 4.5\right]$$

$$\boxed{y_{4,P} = 1.3138}$$

By Adam's Corrector formula

$$y_{n+1,C} = y_n + \frac{h}{24}\left[9y'_{n+1} + 19y'_n - 5y'_{n-1} + y'_{n-2}\right]$$

$$y_{4,C} = y_3 + \frac{h}{24}\left[9y_4' + 19y_3' - 5y_2' + y_1'\right]$$

$$y_4' = \frac{1}{2}(1+x_4)y_4^2 = \frac{1}{2}(1+0.4)(1.3127)^2 = 1.2062$$

$$y_{4,C} = 1.2074 + \frac{0.1}{24}\left[10.8558 + 18.0025 - 3.7815 + 0.61171\right] = 1.3144$$

$$\boxed{y_{4,C} = 1.3144}$$

$\therefore y(0.4) = 1.3144$

using the above predictor - corrector equations, evaluate $y(1.4)$.

If y satisfies $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2} \Rightarrow \frac{dy}{dx} = \frac{1}{x^2} - \frac{y}{x} = \frac{1-xy}{x^2}$

and $y(1) = 1$, $y(1.1) = 0.996$, $y(1.2) = 0.986$, $y(1.3) = 0.972$

Here $x_0 = 1$, $y_0 = 1$, $y_1 = 0.996$, $y_2 = 0.986$, $y_3 = 0.972$, $h = 0.1$

$x_1 = 1.1$, $x_2 = 1.2$, $x_3 = 1.3$

The given differential equation is

$$y' = \frac{1}{x^2} - \frac{y}{x} = \frac{1-xy}{x^2} \quad \rightarrow (1)$$

Adam's predictor formula is

$$y_{n+1,p} = y_n + \frac{h}{24}\left(55y_n' - 59y'_{n-1} + 37y'_{n-2} - 9y'_{n-3}\right) \rightarrow (2)$$

Putting $n = 3$ in (2), we have

$$y_{4,p} = y_3 + \frac{h}{24}\left(55y_3' - 59y_2' + 37y_1' - 9y_0'\right)$$

$$y_0' = \left(\frac{1-xy}{x^2}\right)_{x_0, y_0} = \frac{1-1\times 1}{1} = 0$$

$$y_1' = -0.7902$$

$$y_2' = -0.1273$$

$$y_3' = -0.156$$

Putting these value in (3), we get

$$y_{4,p} = 0.972 + \frac{0.1}{24}\left(55\times -0.156 - 59\times -0.1273 + 37\times -0.7902 - 9\times 0\right)$$

$$= 0.972 + \frac{0.1}{24}\left(-8.58 + 7.5107 - 29.2374\right)$$

$$= 0.972 - \frac{0.1\times 30.3067}{24}$$

$$= 0.972 - 0.1263 = 0.8457$$

Adam's Corrector formula is

$$y_{n+1,c} = y_n + \frac{h}{24}(9y'_{n+1} + 19y'_n - 5y'_{n-1} + y'_{n-2}) \rightarrow (4)$$

putting $n=3$ in (4), we get

$$y_{4,c} = y_3 + \frac{h}{24}(9y'_4 + 19y'_3 - 5y'_2 + y'_1) \rightarrow (5)$$

$$y_4' = \left(\frac{1-xy}{x^2}\right)_{x_4, y_4} = \frac{1-1.4 \times 0.8457}{(1.4)^2}$$

$$= -\frac{0.18398}{1.96} = -0.09307$$

$$y_{4,c} = 0.972 + \frac{0.1}{24}(9x - 0.09387 + 19x - 0.156 - 5x - 0.1273 - 0.7902)$$

$$= 0.972 + \frac{0.1}{2}(-0.84183 - 2.964 - 0.8365 - 0.7902)$$

$$= 0.972 + \frac{0.1}{24} \times -5.43553 = 0.972 - 0.02266$$

$$= 0.94934$$

Therefore $y(1.4) = 0.949$ correct to 3 decimal places

ASSIGNMENT - II

POSTER PRESENTATION

NAME : FERDRICK CALWIN.K.R

ROLL NO : 23ECA20

SUB CODE : MA3251

SUB : STATISTICS AND NOMERKAL METHODS

TOPIC : ONE WAY CLASSIFICATION

ONE WAY CLASSIFICATION

COMPLETELY RANDOMISED DESIGN (CRD)
(ONE WAY CLASSIFICATION)

WORKING RULE FOR ONE WAY CLASSIFICATION:

1. H_0: There is no significant difference between the mean of each samples
2. H_1: There is significant difference between the mean of each samples.
3. Level of significance: α
4. Find N, the number of observations
5. Find T, the grand total of observations.
6. Find Correction factor (C.F) = $\frac{T^2}{N}$
7. Calculate the total Sum of Squares

$$TSS = \sum x_1^2 + \sum x_2^2 + \sum x_3^2 + \ldots - \frac{T^2}{N}$$

8. Calculate the sum of Square of Columns

$$SSC = \frac{(\sum x_1)^2}{N_1} + \frac{(\sum x_2)^2}{N_1} + \frac{(\sum x_3)^2}{N_1} + \ldots - \frac{T^2}{N}$$

Where N_1 is the number of elements in each columns

9. Calculated the sum of Squares of Error

$$SSE = TSS - SSC$$

10. Construct the ANNOVA Table Compute calculated F
11. Find the tabulated F using the degrees of freedom and α
12. Conclusion.

ANOVA TABLE for ONE WAY CLASSIFICATION:

SV	SS (1)	DF (2)	MS (3)	Cal F	Tab F for α % dos
Between Columns	SSC	C-1	MSC: $\frac{SSC}{C-1}$	If MSC > MSE, $F = \frac{MSC}{MSE}$ If MSE > MSC, $F = \frac{MSE}{MSC}$	$F_\alpha (c-1, N-c)$ $F_\alpha (N-c, c-1)$
Error	SSE	N-C	MSE: $\frac{SSE}{N-C}$		

EXAMPLE

The following are the Number of mistakes made in five successive days of four technicians working for a Photographic Laboratory

Tech I (x_1)	Tech - II (x_2)	Tech - III (x_3)	Technician-IV (x_4)
6	14	10	9
14	9	12	12
10	12	7	8
8	10	15	10
11	14	11	11

Test at the level of significance $\alpha = 0.01$, weather the difference among the four sample means, can be distributed to Change

Sol Null hypothesis

H_0 : There are no significance difference in technicians

Alternative hypothesis

H_1 : There is significance difference between the technicians

x_1	x_2	x_3	x_4	TOTAL	x_1^2	x_2^2	x_3^2	x_4^2
6	14	10	9	39	36	196	100	81
14	9	12	12	47	196	81	144	144
10	12	7	8	37	100	144	49	64
8	10	15	10	43	64	100	225	100
11	14	11	11	47	121	196	121	121
$\sum x_1$ = 49	$\sum x_2$ = 59	$\sum x_3$ = 55	$\sum x_4$ = 50	213	$\sum x_1^2$ = 517	$\sum x_2^2$ = 717	$\sum x_3^2$ = 639	$\sum x_4^2$ = 510

N = 20

T = 213

$\frac{T^2}{N} = 2268.45$

$TSS = \sum x_1^2 + \sum x_2^2 + \sum x_3^2 + \sum x_4^2 - \frac{T^2}{N}$

TSS = 114.55

$SSC = \frac{(\sum x_1)^2}{N_1} + \frac{(\sum x_2)^2}{N_2} + \frac{(\sum x_3)^2}{N_3} + \frac{(\sum x_4)^2}{N_4} - \frac{T^2}{N}$

$= 480.24 \text{ 696} \cdot 2 + 605.0 + 500 - 2268.45$

SSC = 12.95

SSE = TSS − SSC

= 114.55 − 12.95

SSE = 101.6

ANOVA TABLE

SV	SS (1)	DF (2)	MS (3)	Cal F	Tab F for α, %
Between Columns	SSC = 12.95	C-1 = 4-1 = 3	MSC = 4.32	$F = \frac{MSC}{MSE}$ = 1.47	$(N-C, C-1)$ $(16,3)$ = 26.90
Error	SSE = 101.6	N-C = 16	MSE = 6.35		

CONCLUSION:

Calculated value < Table value

1.47 < 26.90

H_0 is Accepted