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BASIC ELECTRONICS LAB ECE 176B LABORATORY

NAME RIDHI MULCHANDANI

M.E./B.E. (1st YEAR) SECTION D-4/EE/10 E1

ROLL NO. - 24UFIA1411

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Date.....Experiment No.....P.No.....

Name Ridhi M. Faculty No.....Class.....Batch.....

S.No.	Experiment	Date	Page No.	Sign
1.(a)	Study of passive components:- Resistors, Capacitors and Inductors	6/2/24.	1 – 16	
2.	Study of V & I characteristics of diode in forward bias.	14/2/24	17 – 19	
3.	Study of V & I characteristics of diode in reverse bias.	14/2/24	20 – 21	
4.	Study of the V & I characteristics of diode in L.E.D.	14/2/24	22 – 24	
5.	Study the V & I characteristics of Zener diode.	14/2/24.	25 – 26	

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S.No.	Experiment	Page No.	Date	Sign
6.	Study the characteristics of B.J.T.	27 - 29	21/2/24	
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8.	Study the characteristics of S.C.R.	32 - 35	28/2/24	
9.	Study of C.R.O and its operations	36 - 41	6/3/24	
10.	Study the characteristics of have wave rectifier.	42 - 45	6/3/24	
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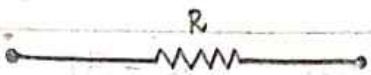
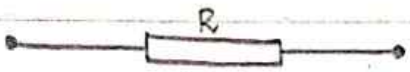
12.	Study the characteristics of bridge rectifier using diodes and transformer without centre tap.	50 - 53	13/3/24.	

Date ..... Experiment No. ..... P.No. .....

Name ..... Faculty No. ..... Class .....





Fixed Resistor

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Date 6/2/24 Experiment No. 1-(A) P.No. 1

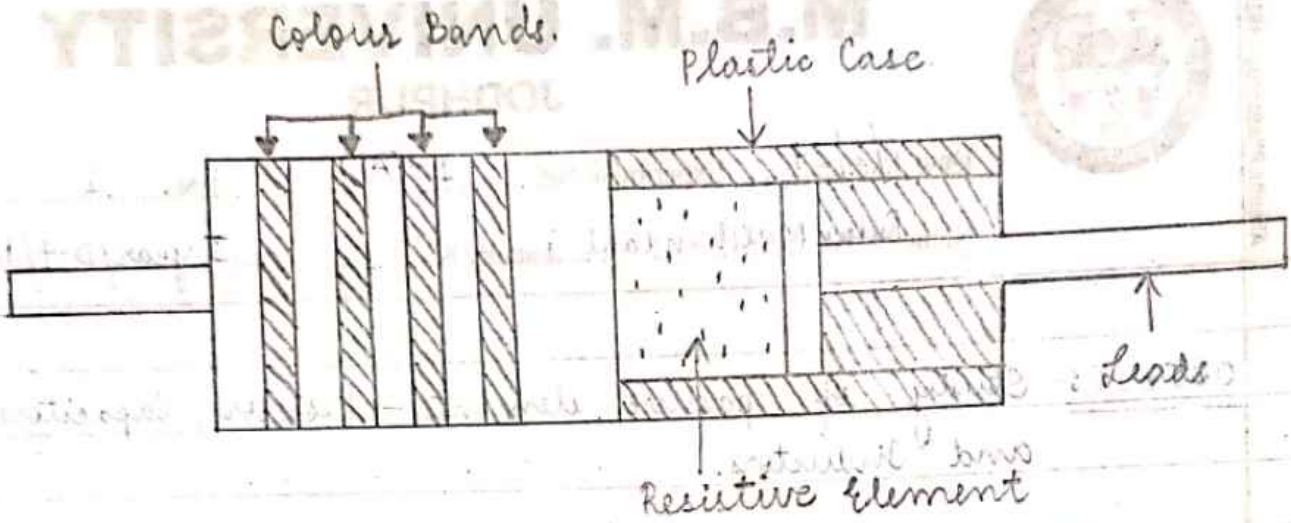
Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

OBJECT:- Study of passive elements – Resistors, Capacitors and Inductors.

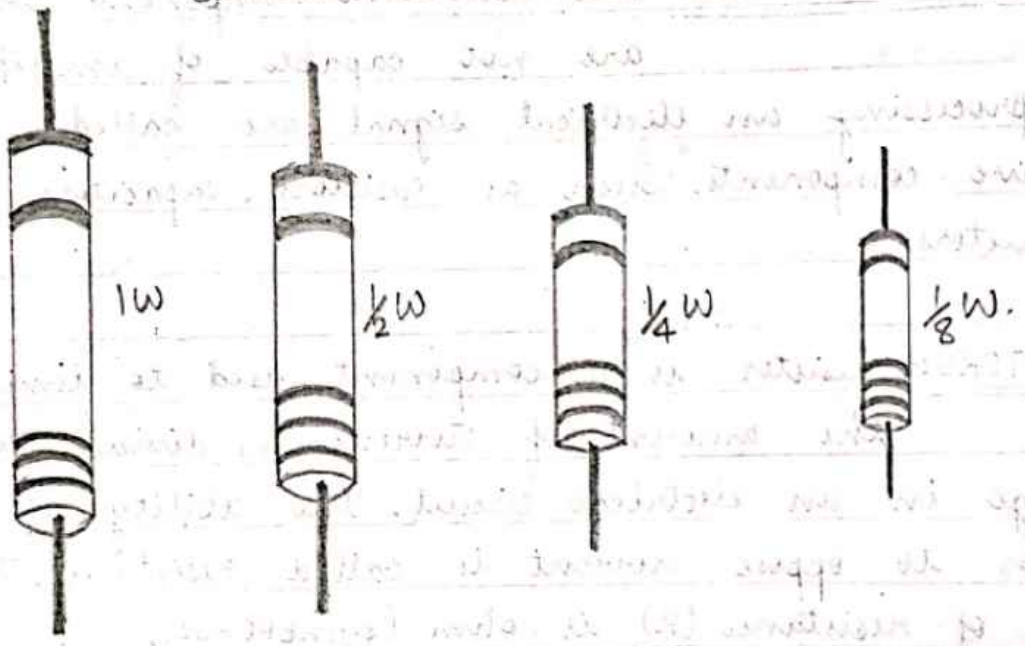
PASSIVE COMPONENTS:- The electronic components which are not capable of amplifying or processing an electrical signal are called passive components. Such as resistors, capacitors and Inductors.

RESISTORS:- Resistor is a component used to limit the amount of current or divide the voltage in an electrical circuit. The ability of a resistor to oppose current is called resistance. The unit of resistance (R) is ohm (symbol - Ω).

TYPES OF RESISTORS:- The resistors having wide range of resistance of resistance are available, the power rating may be 1/10 W to as high as several hundred watts. The voltage R selected to obtain a desired current I and voltage drop IR in the circuit. At the same time wattage of the resistor



CARBON COMPOSITION RESISTOR.



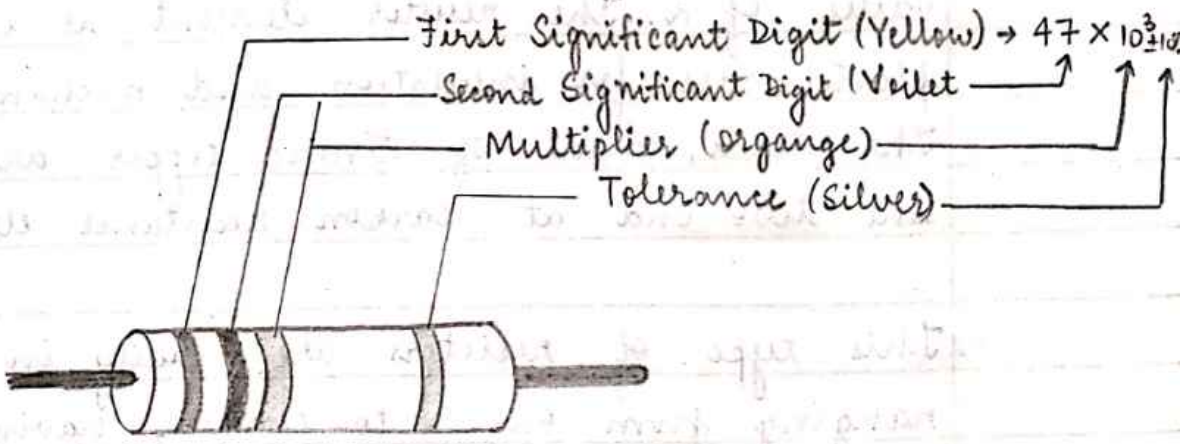
is selected so that it can dissipate the heat losses without overheating itself. Too much heat may burn the resistor.

FIXED RESISTORS :- The resistors which have fixed value of resistance are called fixed resistor. These may be of two types:

1. CARBON-COMPOSITION RESISTORS :- Most common in electric circuits are carbon resistors with a low power rating (2W or less). This type of resistor is made of carbon or graphite and clay. The two materials are mixed needed for the desired value of R. The resistor element is enclosed in a plastic case for insulation and mechanical strength. The leads, made of tinned copper are joined to the two end at carbon resistance element.

This type of resistors are readily in values ranging from one Ω to 22 mΩ, having a tolerance range of 5 to 20%. The power rating is generally

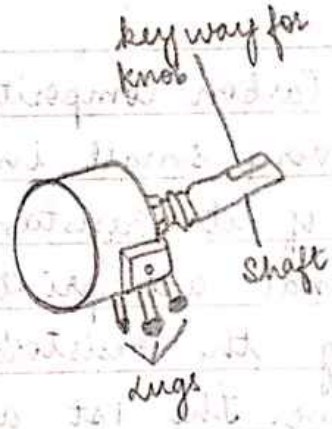
Colour	Significant digits	Multiplier	Tolerance
Black	0	$10^0 = 1$	–
Brown	1	$10^1 = 10$	–
Red	2	$10^2 = 100$	–
Orange	3	$10^3 = 1000$	–
Yellow	4	$10^4 = 1000$	–
Green	5	$10^5 = 10000$	–
Blue	6	$10^6 = 1000000$	–
Voilet	7	$10^7 = 10000000$	–
Gray	8	$10^8 = 100000000$	–
White	9	$10^9 = 1000000000$	–
Gold	–	$10^{-1} = 0.1$	± 5%
Silver	–	$10^{-2} = 0.01$	± 10%
No colour	–	–	± 20%



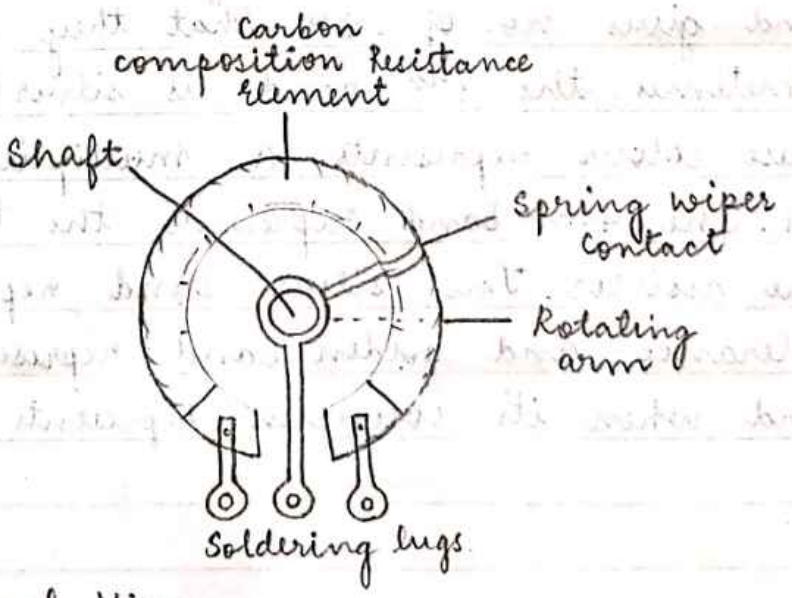
Arrangement of colour coding band.

1/8, 1/4, 1/2 or 1 W. The relative size of resistors with higher wattage increases, the other variety of carbon composition resistors is film type resistors.

RESISTOR COLOUR CODING:- Carbon Composition resistors are very small in size so print and read the value of its resistance is very difficult, so colour bands are printed on it. This system of representing the resistor's resistance is known as colour coding. The 1st and 2nd band represents the 1st and 2nd significant digits of the resistance value respectively. The 3rd band is multiplier and gives no. of zeros that they follow 2nd digits. Sometimes the 3rd band is silver/golden than these colour represents a multiplier factor of 0.01 and 0.1. The 4th band represents the tolerance and of the resistor. The silver band represents - 5 ± 10%. tolerance and golden band represents 5% tolerance and when it's colourless represents ± 20% tolerance.



(a) External View



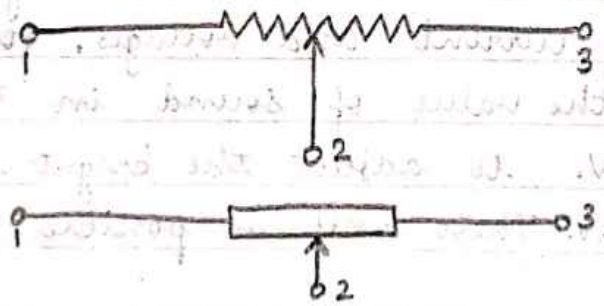
(b) Internal View

In wire wound resistors, the 1st band is of double the width as compared to the rest of the bands. For the wounded resistors with redial , the colour coding system used is called body - end - dot system.

VARIABLE RESISTORS:- Sometimes in electronic circuits it becomes necessary to adjust the value of current and voltages, for example to change the value of sound in transistor. radio at T.V. to adjust the brightness and contrast of T.V. These will be possible by variable resistors.

1. CARBON COMPOSITION RESISTORS:- A thin carbon coating on pressed paper or a molded carbon disc constitutes the carbon composition resistance element. The two ends of

(a) Wire-wound variable resistance



(b) Symbol of variable resistor

the disc are joined to the external soldering terminals 1 & 3. The middle terminal is connected to the variable arm that connects the resistor element by metal spring wiper. As the shaft of the control is turned, the variable are moves the wiper to make contact at different points on the resistor element which changes the value of resistance ~~and~~ inserted in the circuit.

The carbon-composition variable resistors are available with 1000 Ω to 5 MΩ approximately having power rating of usually ½ to 2 W. A carbon control (resistor) is often combined with a power on-off switch.

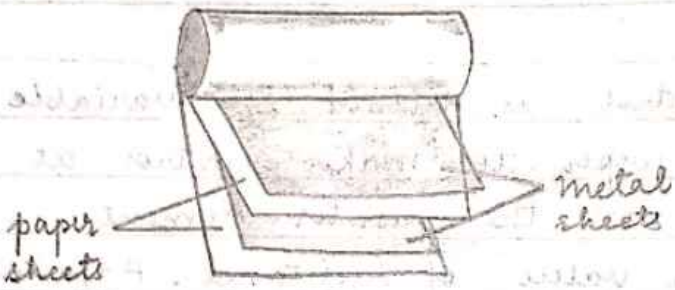
2. WIRE-WOUND VARIABLE RESISTOR :- In these resistors a resistance wire is wound over a dough shaped case (Bakelite or Ceramic). The connecting system in this is like that a carbon resistor. As the

Band Color	Digit A	Digit B	Multiplier D	Tolerance (T) > 10 pF	Tolerance (T) < 10 pF	Temperature Coefficient (TC)
Black	0	0	× 1	± 20%	± 2.0 pF	
Brown	1	1	× 10	± 1%	± 0.1 pF	-33×10^{-6}
Red	2	2	× 100	± 2%	± 0.25 pF	-75×10^{-6}
Orange	3	3	× 1000	± 3%		-150×10^{-6}
Yellow	4	4	× 1000	± 4%		-220×10^{-6}
Green	5	5	× 10000	± 5%	± 0.5 pF	-330×10^{-6}
Blue	6	6	× 1000000			-470×10^{-6}
Voilet	7	7				-750×10^{-6}
Grey	8	8	× 0.02	+ 80%, -20%		
White	9	9	× 0.01	± 10%		
Gold			× 0.1	± 5%		
Silver			× 0.1	± 10%		

Colour coding of capacitance

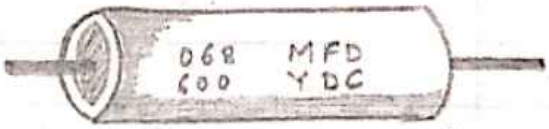
shaft of the control is turned the variable arm moves the wiper to make control at different point on the resistor element which changes the value of resistance. Adjustable wire wound resistance will be varied with them. Adjustable slides moved along an enclosed position of that winding.

CAPACITORS:- The two conducting plates separated by an insulating material forms a capacitor. The capacity to store charge per unit potential difference is called its capacitance. The unit of a capacitor is Farad (F). A capacitor is a component which offers low impedance to AC but high to DC voltage but pass the AC voltage signal by means charging and discharging.

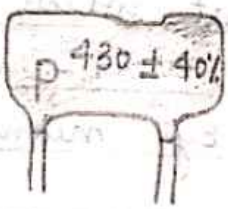


(a) Metal foils & paper sheets rolled into cylindrical shape.

(b) Internal construction of paper capacitor.



(c) Tubular capacitor



(d) 430 PF Encapsulated type capacitor

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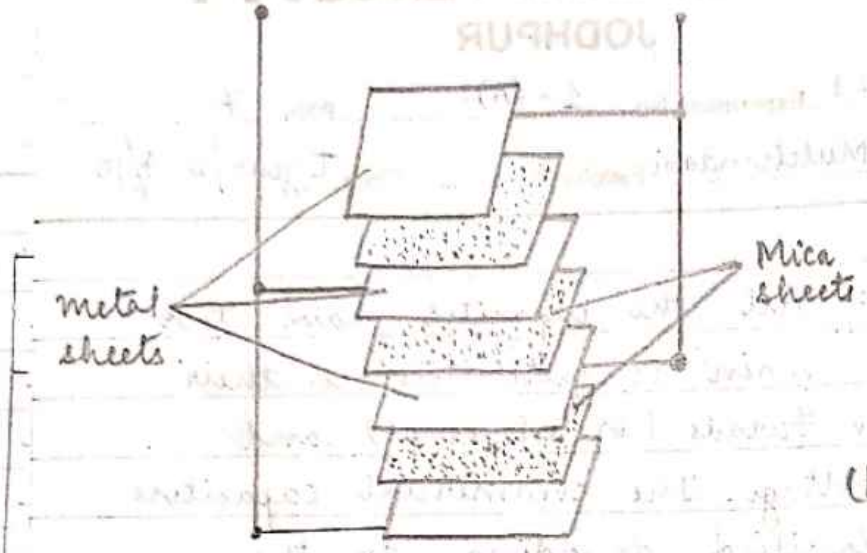
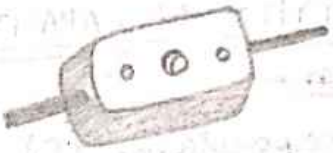
Date 6/2/24 Experiment No. 1 - (A) P.No. 7

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

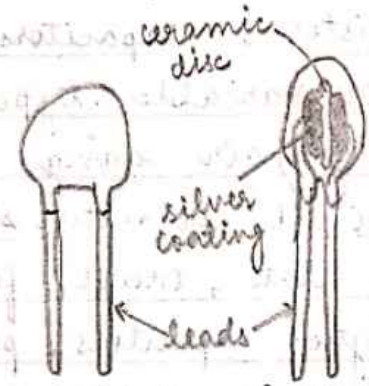
TYPES OF CAPACITORS:- All the capacitor have two main characteristics i.e. their capacitance (C) in Farads (or uF or pF) and their operating voltage. The commercial capacitors are generally classified according to the dielectric element. Some of the most commonly used capacitors are paper, mica, ceramic electrolytic and air. Like resistors, capacitors can also either be fixed or variable type. The variable resistors are mostly air gang capacitors. There is no required polarity, since either side can be made +ve plate, except for electrolytic capacitor. In electrolytic capacitors, polarity is marked which indicates the side which must be considered as positive. It maintains the internal electrolytic action that produces the dielectric (a thin oxide film) required to form the capacitor.



(a) Internal construction of Mica Capacitors

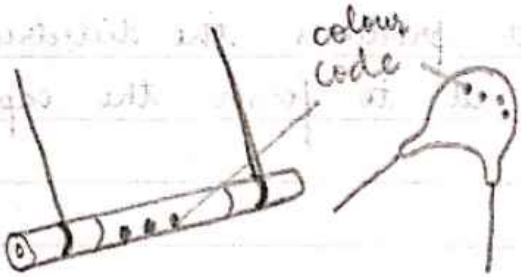


(b) Fixed Mica Capacitor

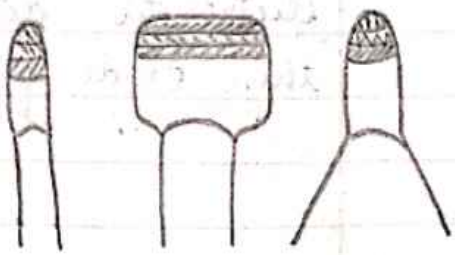


(a) Internal wires (b)

(c) Internal view



(d) Tubular Type Capacitor



(e) Disc & other shapes of capacitor

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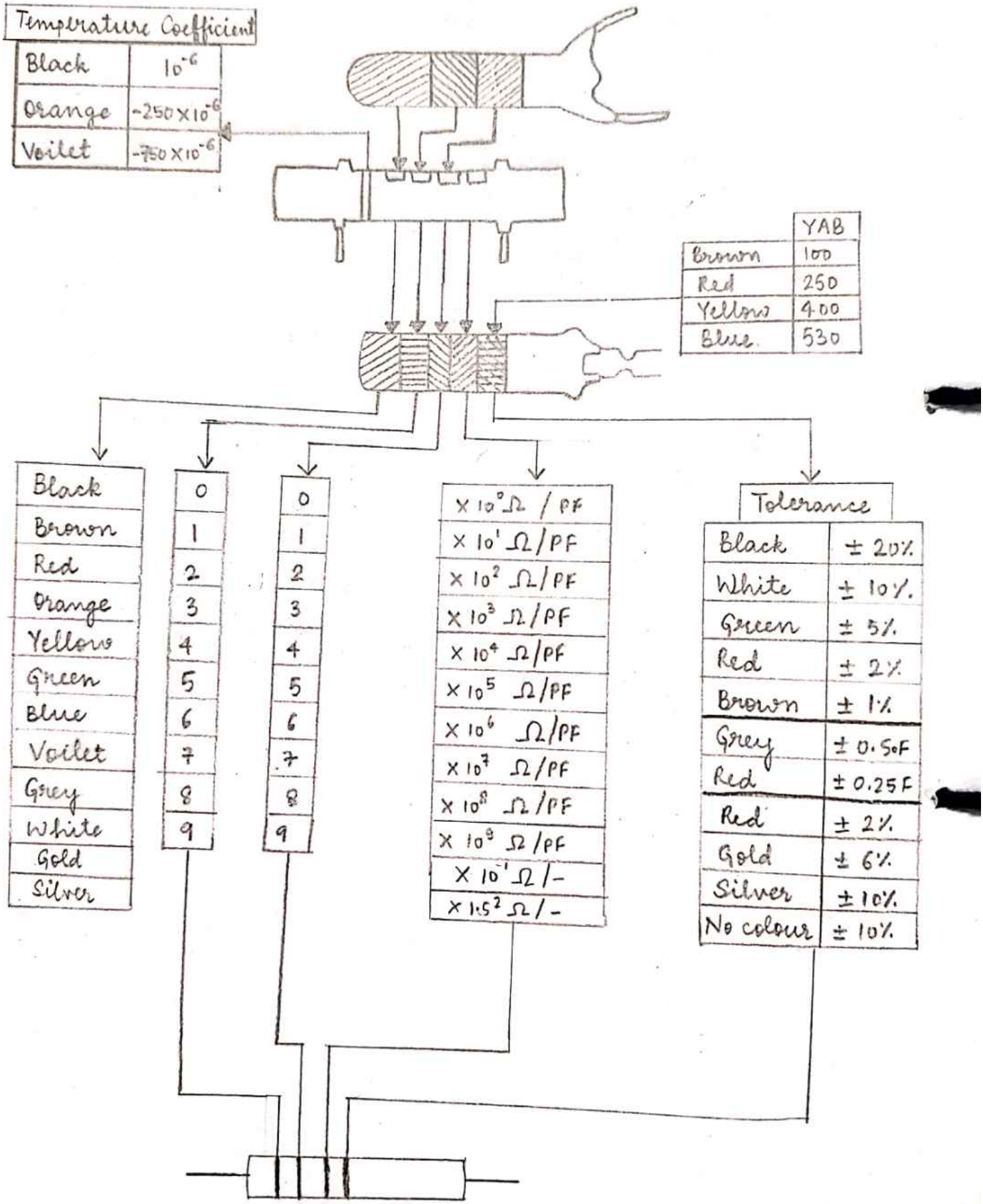
Date 6/2/24 Experiment No. 1-(A) P.No. 8

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

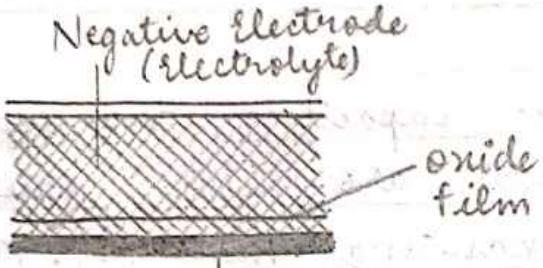
1) PAPER CAPACITOR :- It is the most common of all capacitors for all construction of those capacitors. Two metal (Al or tin) separated by paper impregnated with a dielectric material. Such as wax, plastic or oil are rolled into a complete cylinder. The entire cylinder is generally placed in a cardboard coated with wax or ~~extended~~ enclosed in plastic. The value of capacitance of these capacitors is 0.0001 μF to 0.1 μF having tolerance of ± 10%. Their leakage resistance is of the order of 100 mΩ.

2) MICA CAPACITOR :- These capacitors consists of alternate thin sheets of metal (al or tin) foils separated by thin Mica sheets. Alternate metal sheets are connected together and brought out as one terminal for one set of plates, while opposite terminal connects to the other set of plates. The entire unit is generally encased in a plastic housing or moulded in bakelite

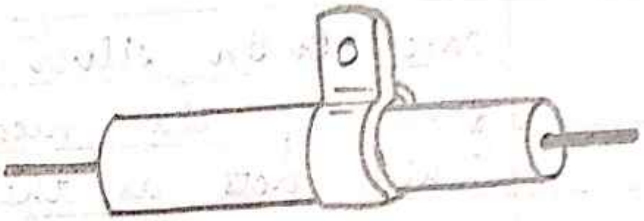


case. In silver - mica capacitors, the opposite faces of the mica sheets are silver coated (which acts as the conducting material). Mica capacitors are often used for small capacitance values ranging 50 to 500 pF, having tolerance of ±2 to ±20%. usually, with voltage rating ranging from 200 to 1000 V. The leakage resistance of mica capacitors is of the order of 1000 MΩ that is why their leakage current is very small, these capacitors are very small in size (10mm - length, 3mm - thickness).

3.) CERAMIC CAPACITORS :- The ceramic is a dielectric material made from earth fired under extreme heat. Titanium oxide or several other types of silicates are used to obtain very high value of dielectric constant of ceramic material. The capacitors may be of disc type or tubular type. In the disc type, a ceramic disc is coated on two sides with a

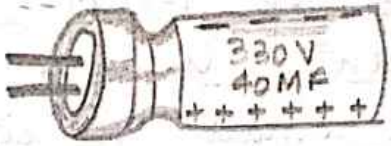


(a) Internal View

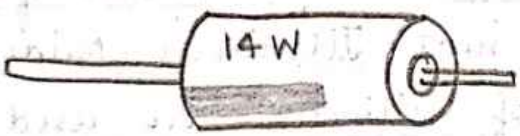


tubular capacitor

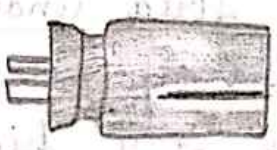
(b) Electrolytic capacitors.



(c)



(a) With Axial leads



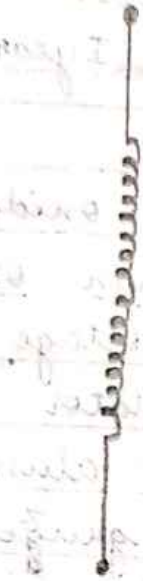
(b) Capacitor with Radial leads.

metal (silver or copper). Tinned copper wire leads are attached to each ~~e~~ coating which act as electrodes or plates. Then the entire unit is encapsulated in a protective coating (positive) & marked with its capacitance value, either using numerals or a colour code. The colour coding is similar to that used for resistances. The capacitor colour coding is described. Disc ceramics capacitors are commonly available in capacitance values ranging from 47 pf to 0.05 uF having tolerance of ± 2 to ± 20%, with voltage ratings ranging from 200 to 1000 V. Tubular ceramic capacitors are available in capacitance values ranging from 1 to 500 uF.

4.) ELECTROLYTIC CAPACITORS :- It contains two aluminium electrodes, between the 2 electrodes, absorbent gauge soaks up electrolyte (borax, phosphate or carbonate) to provide the

required electrolysis that produces an oxide film (a molecular - thin layer of Aluminium oxide) at the positive electrode when d.c. voltage is applied. The oxide film acts as insulator & forms a capacitance between the +ve aluminium electrode and the electrolyte in the gauze separator. The -ve aluminium electrode simply provides a connection to the electrolyte.

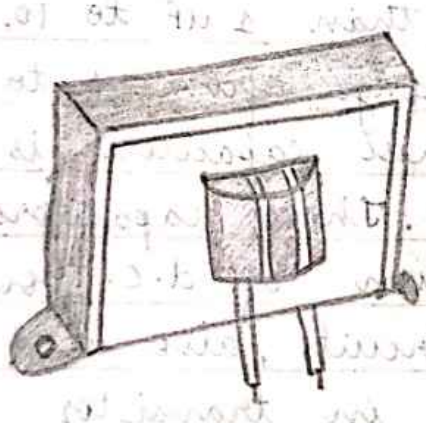
These capacitors are available in capacitance values ranging from less than 1 uF to 10,000 uF or more. Common voltage range from 1 to 700 volts. The leakage current of these capacitors is as high as 0.1 to 0.5 mA/uF. These capacitors are used in the filter section of d.c. power supplies and resistor circuits, also used as audio coupling capacitors in transistor amplifier.



(a) Fixed inductor

(b) Variable inductor

(c) Schematic diagram of choke



(A) Filter

(B) Schematic diagram of filter choke

(c) Variable inductor

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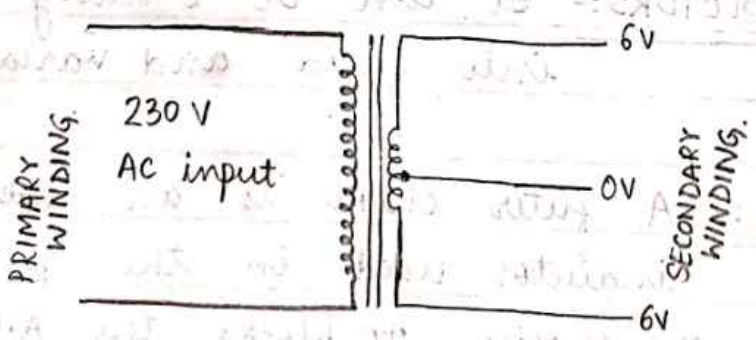
Date 6/2/24 Experiment No. 1-(A) P.No. 12

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

INDUCTORS:- The electric component which oppose the charge at circuit is called an Inductor. The ability of coil or inductor due to which it ~~moves~~ oppose the change of current flowing through it is known as its inductance. The unit of inductance is Henry. An inductance is a component which offers high impedance to A.C. but very low impedence to D.C. These variable inductor are used in turning circuit for radio frequency. (It is also called chokes).

TYPES OF INDUCTORS:- It can be broadly classified into fixed and variable Inductors.

1) **FILTER CHOKES:-** A filter choke is an ~~indicator~~ inductor used in the filter section of a D.C. power supply. It blocks the A.C signal and allow d.c. signal. The two major rating of a filter choke are inductance and current rating filter choke. (1 Henry-50H & current upto 1.5A).

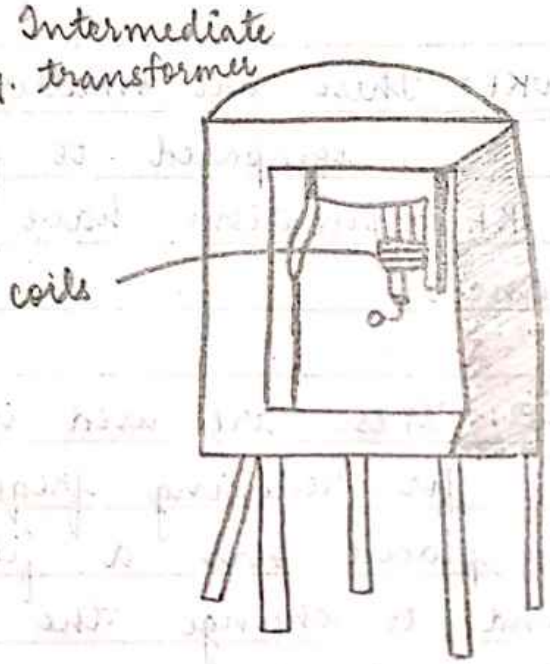


STEP DOWN CENTRE TAPPED TRANSFORMER.

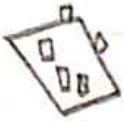
2.) RADIO FREQUENCY CHOKE:- These are smaller in size as compared to filter chokes air-core coil for RF applications have very small value of inductance.

VARIABLE INDUCTANCE:- These are used in circuits for reducing frequencies. The winding is placed over a fibre or ceramic former and to change the inductance a ferrite core is employed.

TRANSFORMER:- A transformer is similar in appearance to an inductor. Basically it consists two inductors having the same core. The coil to which supply is connected is called primary winding and coil to which load is connected is called secondary winding. A transformer may be step up or step down and transformer have many parts like that which are generally known as



Yellow



Green

White

as power, output and input mediate frequency transformer.

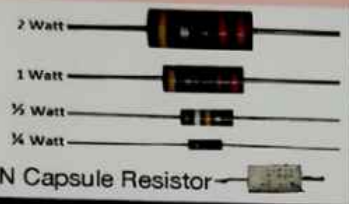
1.) POWER TRANSFORMER :- Power transformer are used to step up and step down the supply voltage as per requirement in vaccum tube circuit.

2.) OUTPUT TRANSFORMER :- These are used in the radio recievers at the output stage for impedence machine D.C. at the output stage of power amplifier.

3.) INTERMEDIATE FREQUENCY TRANSFORMER :- These transformers are used in the intermediate frequency amplifier section of radio and T.V. recievers. It consists of two windings both the primary and secondary winding are turned to the operating frequency by mica capacitor.

STUDY OF PASSIVE COMPONENT

Resistance (Carbon Composition)



step down center tapped transformer

Resistance Wire Wound

Electrolytic Capacitor

Preset (Variable Resistance)

INDUCTOR Air core

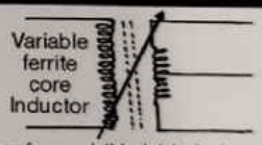
Carbon Composition (Variable Potentiometer)

Ferrite Coil

Coil

Wire Wound POT (Potentiometer)

Yellow Green White

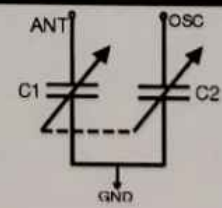


IFT 455KHz (Intermediate Frequency Transformer) (Variable Inductor)

PAPER CAPACITOR

Ceramic Capacitor

DISK CAPACITOR



Variable Capacitor

Gang Capacitor (Air Core)

Trimmer (Mica)

Guided By :- C.S. Srivastava Sir
D4 BE 1st Year 2023-24

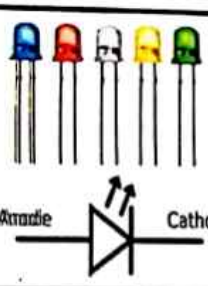
STUDY OF ACTIVE CO NENTS

PN Junction Silicon Diode

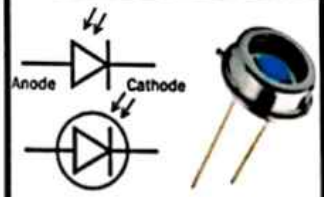
Germanium Diode

(OA 79/80/81)

CRYSTAL DIODE
Detector Diode

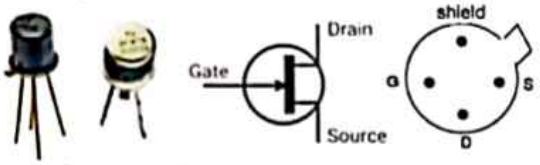


Light Emitting Diode (LED)



PhotoDiode

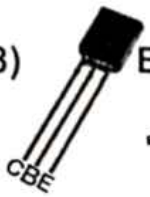
FET (Field Effect Transistor)



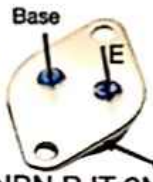
n channel(BFW10/11)

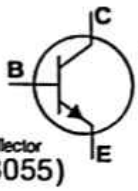
p channel (BFW60/61)

BJT (BC548)



BJT (BC558)

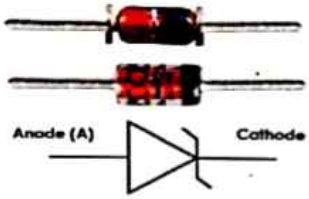




Power Transistor

(NPN BJT 2N3055)

SCR (BT44H)



Zener Diode

5.2V / 400mW

Guided By :- C.S. Srivastava Sir
D4 BE 1st Year 2023-24

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Date 6/2/24 Experiment No. 1-(B) P.No. 15.

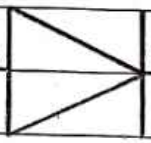
Name Ridhi Mulchandani Faculty No. Class I year / D-4/10.

OBJECT :- Study of active components.

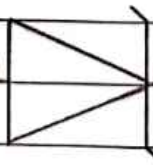
ACTIVE COMPONENTS :- The electronic components which are capable of amplifying an electrical signal are called Active components. Such as vaccum, tubes, gas tubes and semiconductor (solid state devices).

SEMICONDUCTOR DEVICES :-

1.) JUNCTION DIODE :- It is used as rectifier, detector and switch.



2.) ZENER DIODE :- It is used as voltage regulator.



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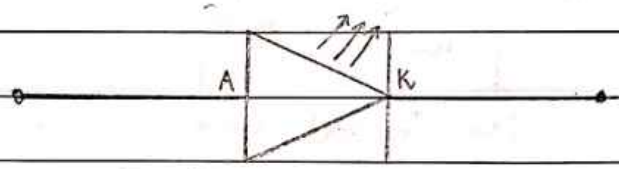
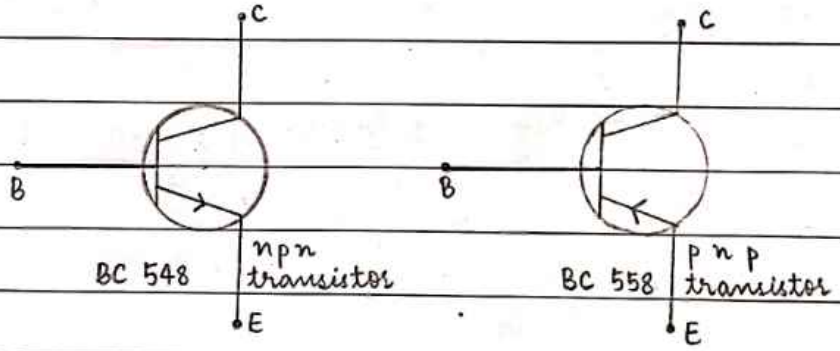
Date 6/2/24 Experiment No. 1 - (B) P.No. 16

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

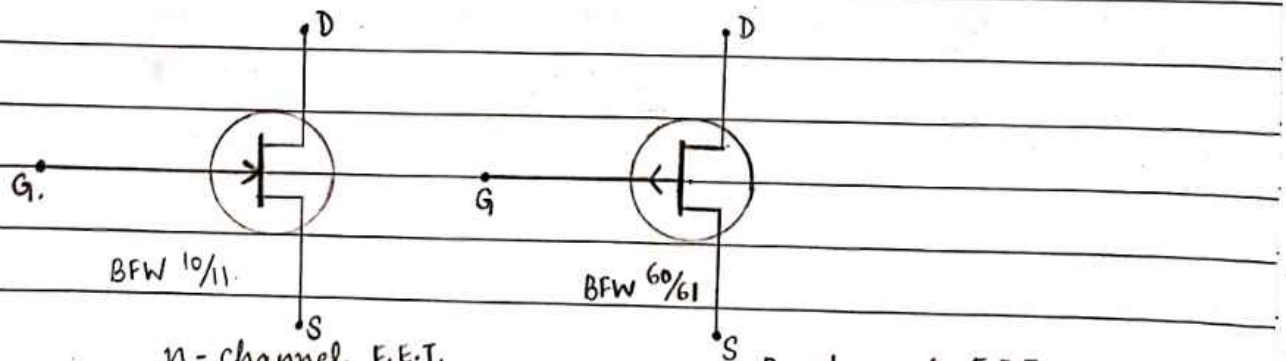
3.) LIGHT EMITTING DIODE :- It emits visible light and is in instrument display, calculators etc.



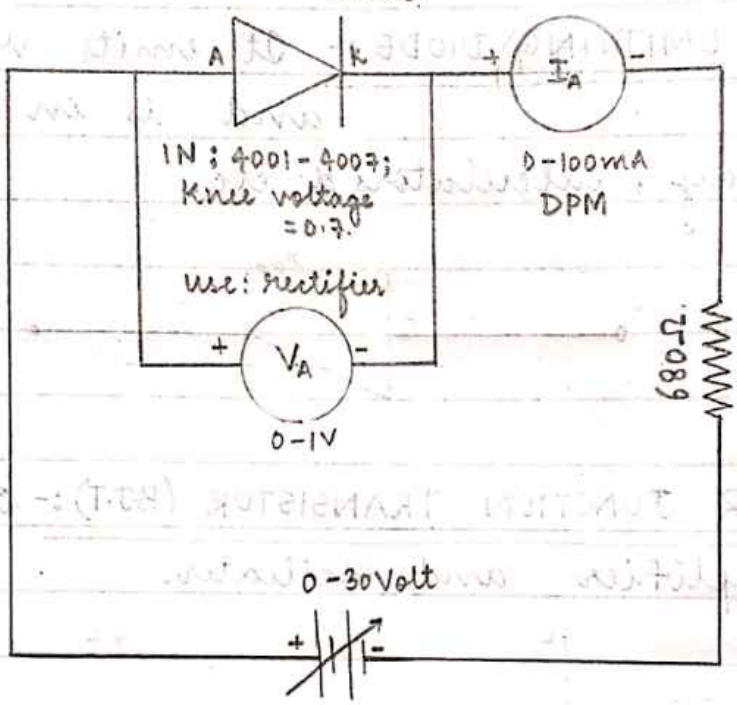
4.) BIPOLAR JUNCTION TRANSISTOR (BJT) :- It is used as amplifier and oscillater.



5.) Field effect TRANSISTOR (F.E.T.) :- It is used as amplifier and oscillator.



p-n junction semiconductor (silicon diode)



Regulated Power Supply

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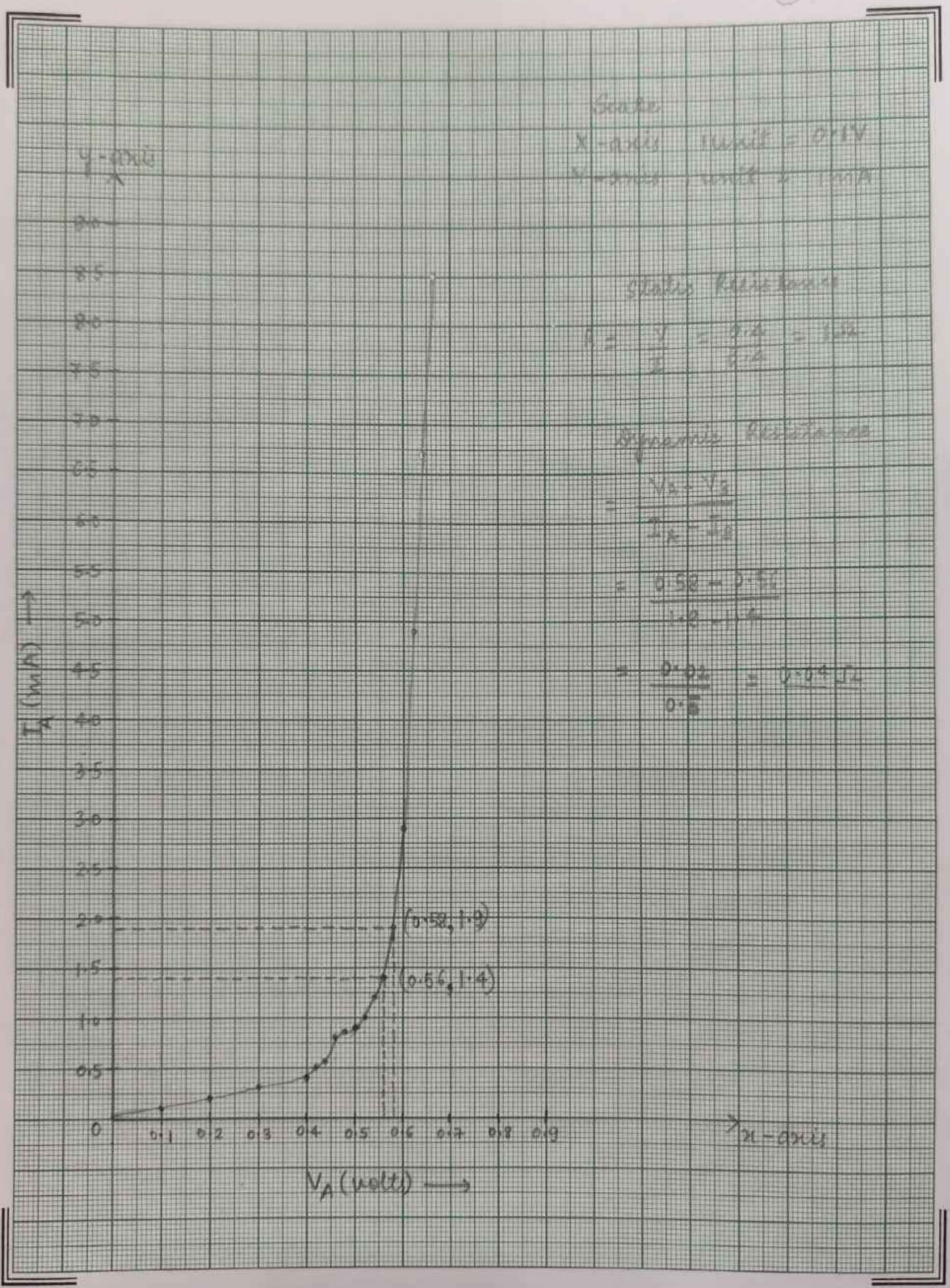
Date 14/2/24 Experiment No. 2 P.No. 17

Name Ridhi Mulchandani Faculty No. Class. D-4/10/I year

OBJECT :- Study of V and I characteristics of diode in forward bias and calculate the static and dynamic resistance.

MATERIALS REQUIRED :- Silicon P-N junction diode, Voltmeter (0-1V); resistance (680Ω) Ammeter (0-100mA); D.p.m. (Digital Panel meter).

THEORY :- When an external voltage (V) is applied across a semiconductor diode such that P-side is connected to the positive terminal of the battery and n-side is connected to the negative terminal is said to be in forward bias.
In this case the applied forward potential acts in such a way that it establishes an $\vec{E}$ which reduces the field due to potential barrier. Thus, the barrier potential at the junction is reduced. Since, the potential



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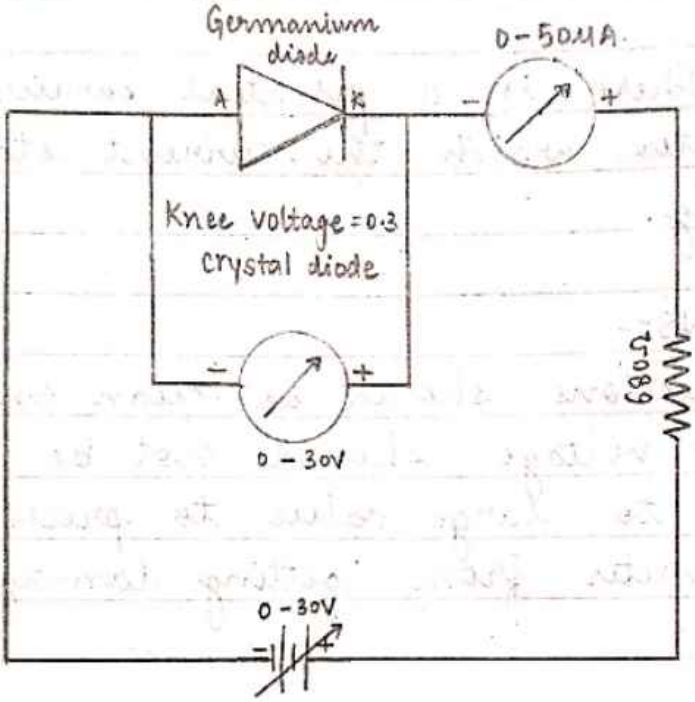
Date 14/2/24 Experiment No. 2 P.No. 18

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

barrier voltages is very small, a small forward voltage is sufficient to completely eliminated by the forward voltage, a large current starts flowing. This current is called forward current.

OBSERVATION TABLE :-

S.No.	V (volt)	I (mA)	S.No.	V (volt)	I (mA)
1.	0	0	11.	0.52	1
2.	0.1	~~0.1~~	12.	0.54	~~4.2~~
3.	0.2	~~0.2~~	13.	0.56	1.4
4.	0.3	~~0.3~~	14.	0.58	1.9
5.	0.4	~~0.4~~	15.	0.60	~~0.7 2.9~~
6.	0.42	0.5	16.	0.62	4.9
7.	0.44	~~0.55~~	17.	0.64	6.7
8.	0.46	~~0.7~~	18.	0.66	8.5
9.	0.48	~~0.75~~	19.	0.68	14.3
10.	0.50	~~0.8~~	20.	0.70	31.1



Regulated Power Supply.

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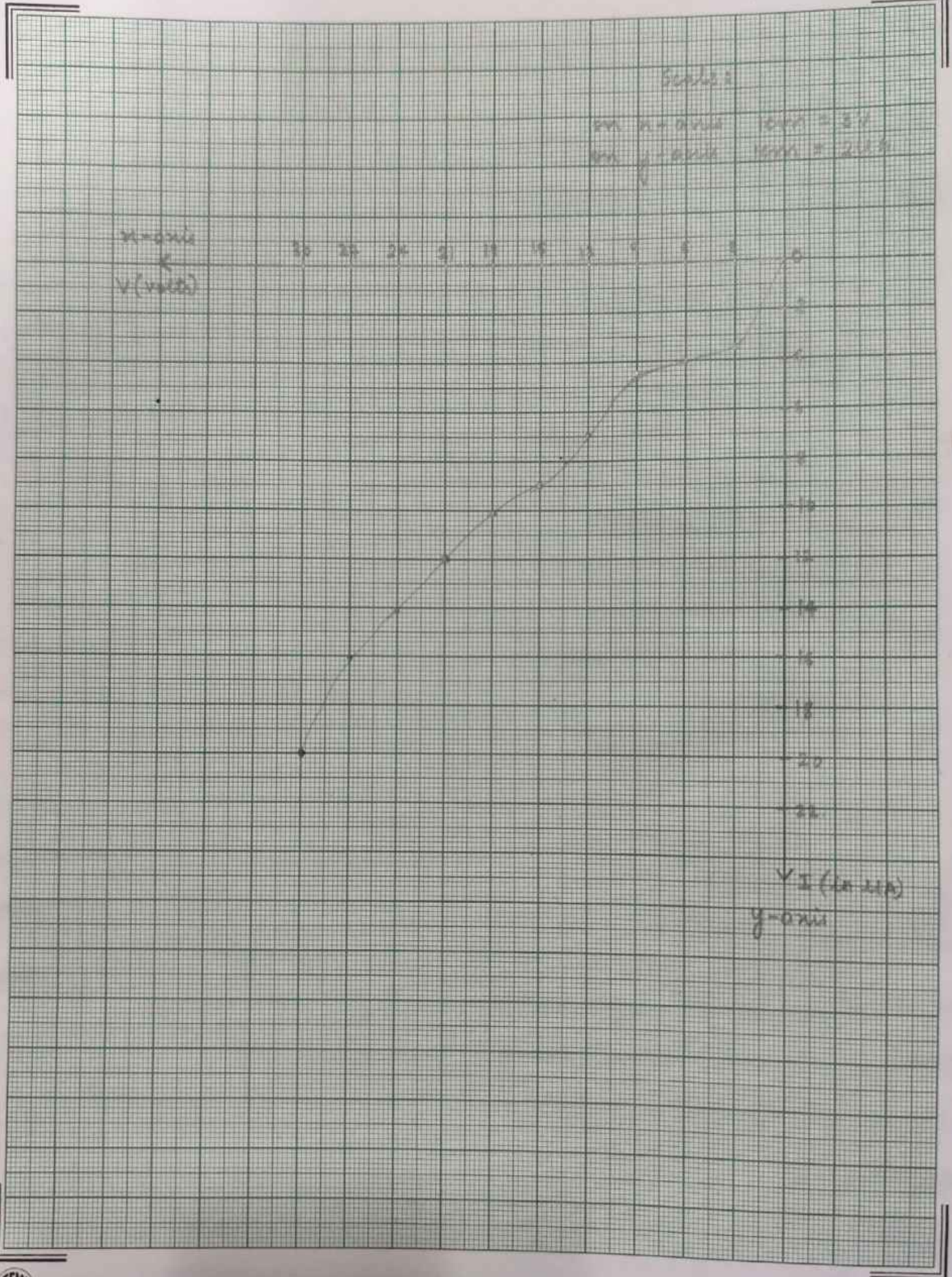
Date 14/2/24 Experiment No. 3 P.No. 20.

Name Ridhi Mulchandani Faculty No. Class I year / D-4/10

OBJECT:- Study of V and I characteristics of diode in reverse bias.

MATERIALS REQUIRED:- A p-N junction diode maintained on a board, an ammeter (0-50 μA); a voltmeter (0-30V) and two terminal variables, D.C. power supply, a resistor of resistance (680 Ω) and connecting wire.

THEORY:- When the positive terminal of D.C. source as battery is connected to n-type and negative terminal is connected to p-type semiconductor of p-n junction, the function is said to be in reverse biasing. The external voltage applied to p-n junction that strengthened. The potential biasing and prevented the flow of the current through it is called reverse biasing.



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Date 14/2/24 Experiment No. 3 P.No. 21

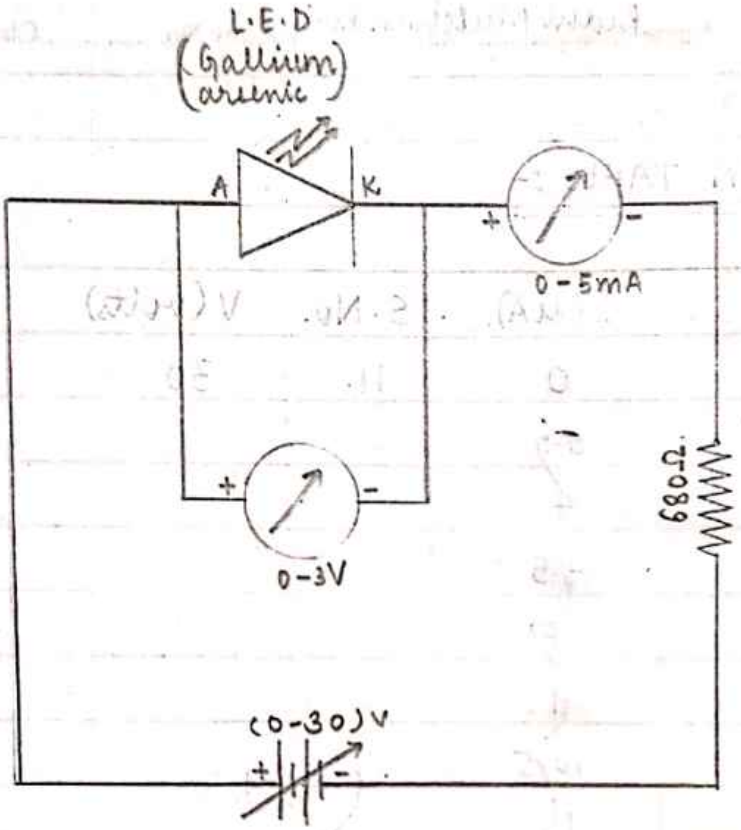
Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

OBSERVATION TABLE :-

S.No.	V (volts)	I (μA).	S.No.	V (volts)	I (μA)
1.	0	0	11.	30.	~~2~~ 20
2.	3	~~3.5~~			
3.	6	4			
4.	9	4.5			
5.	12	~~7~~			
6.	15	9			
7.	18	10.5			
8.	21	12			
9.	24	~~14.5~~			
10.	27	~~16.5~~			

RESULT: We found that current continously with increasing voltage, it means the characteristic is V α I.

PRECAUTIONS:- 1.) Wiring connections should be tight. 2.) Reading should be taken from voltmeter not from power supply and measure amount of current from ammeter.



DC Regulated Power Supply

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Date 14/2/24 Experiment No. 4. P.No. 22

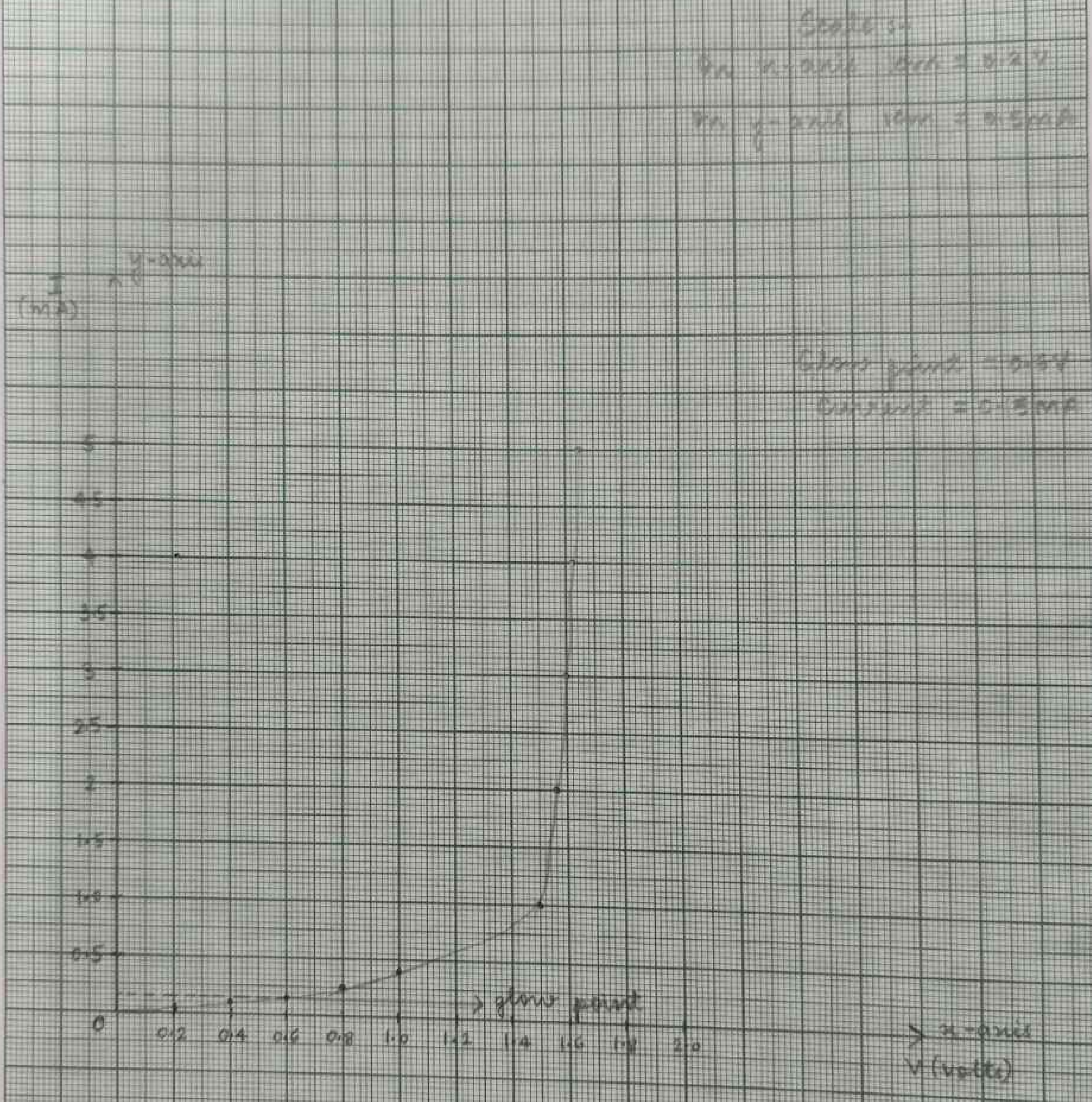
Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

OBJECT:- Study the V and I characteristics of diode in L.E.D.

MATERIALS REQUIRED:- Regulated power supply (0-30V); voltmeter (0-3V); ammeter, resistance (1KΩ); connecting wires.

THEORY:- The conduction band free electrons from n-region crosses the barrier and enter the p region, the electron fall into the holes lying in the valence band hence they fall from a higher energy level to a lower energy level. In the ordinary diodes this energy radiates in the form of heat as these diods are made of silicon or germanium which are opaque material and block the passes of light.

The L.E.D's are different. These are made from gallium arsenic (GaAs), gallium arsenide phosphide (GaAsP)


Scale :-
On x-axis 1cm = 0.2 V
On y-axis 1cm = 0.5 mA
I (mA)
y-axis
5
4.5
4
3.5
3
2.5
2
1.5
1.0
0.5
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
glow point
x-axis
V (volts)

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Date 14/2/22 Experiment No. 4 P.No. 23

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

and gallium phospide (GaP). In L.E.D.s, the energy is radiated in the form of light and hence they glow.

OBSERVATION TABLE :-

S.No.	V (volts)	I (MA)	S.No.	V (volts)	I (mA)
1.	0	0	11.	1.65	5
2.	0.2	0.05			
3.	0.4	0.1			
4.	0.6	0.15		→ Glow point	
5.	0.8	0.25			
6.	1	0.43			
7.	1.5	1			
8.	1.58	2			
9.	1.61	3			
10.	1.62	4			

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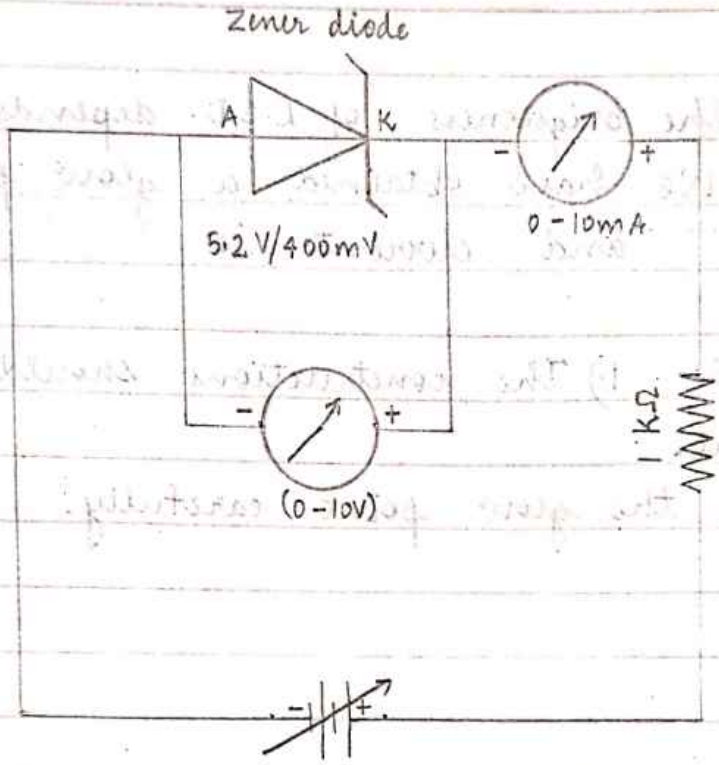
Date 14/2/24 Experiment No. 4 P.No. 24.

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

RESULT :- The brightness of L.E.D. depends upon the current. We have obtained a glow point at voltage and current is

PRECAUTIONS:- 1) The constructions should be clean and tight.

2) Observe the glow point carefully.



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Date 14/2/24 Experiment No. 5 P.No. 25

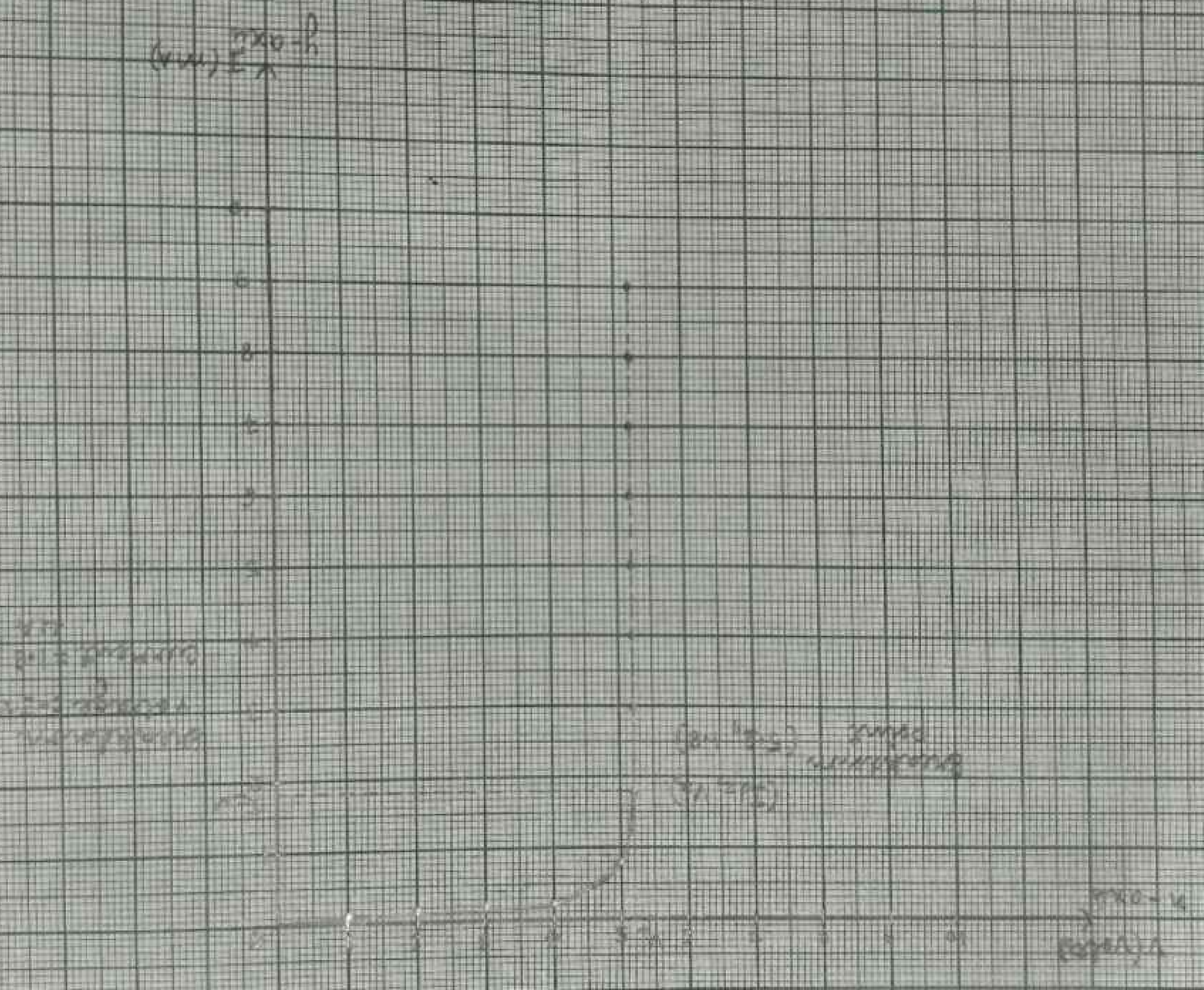
Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

OBJECT: Study the V-I characteristics of zener diode.

MATERIALS REQUIRED:- Zener diode, Voltmeter (0-10V); Ammeter (0-10mA); resistance (1KΩ); DC source; Regulated power supply (0-30V); connecting wires.

THEORY:- A special designed silicon diode which is optimised to operate in the breakdown region is known as Zener diode. By varying the doping level of silicon diode we make Zener diode. 2 to 200V If reverse potential on a p-n junction have a limit of is increased beyond a certain value, the current will increase rapidly. All p-n junction have a limit of allowable maximum reverse bias voltage.

The p-n junction have two types of breakdown i.e. zener breakdown and avalanche breakdown. In zener ~~bread~~ breakdown it becomes possible for some $\bar{e}$ to



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Date 14/2/24 Experiment No. 5 P.No. 26

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

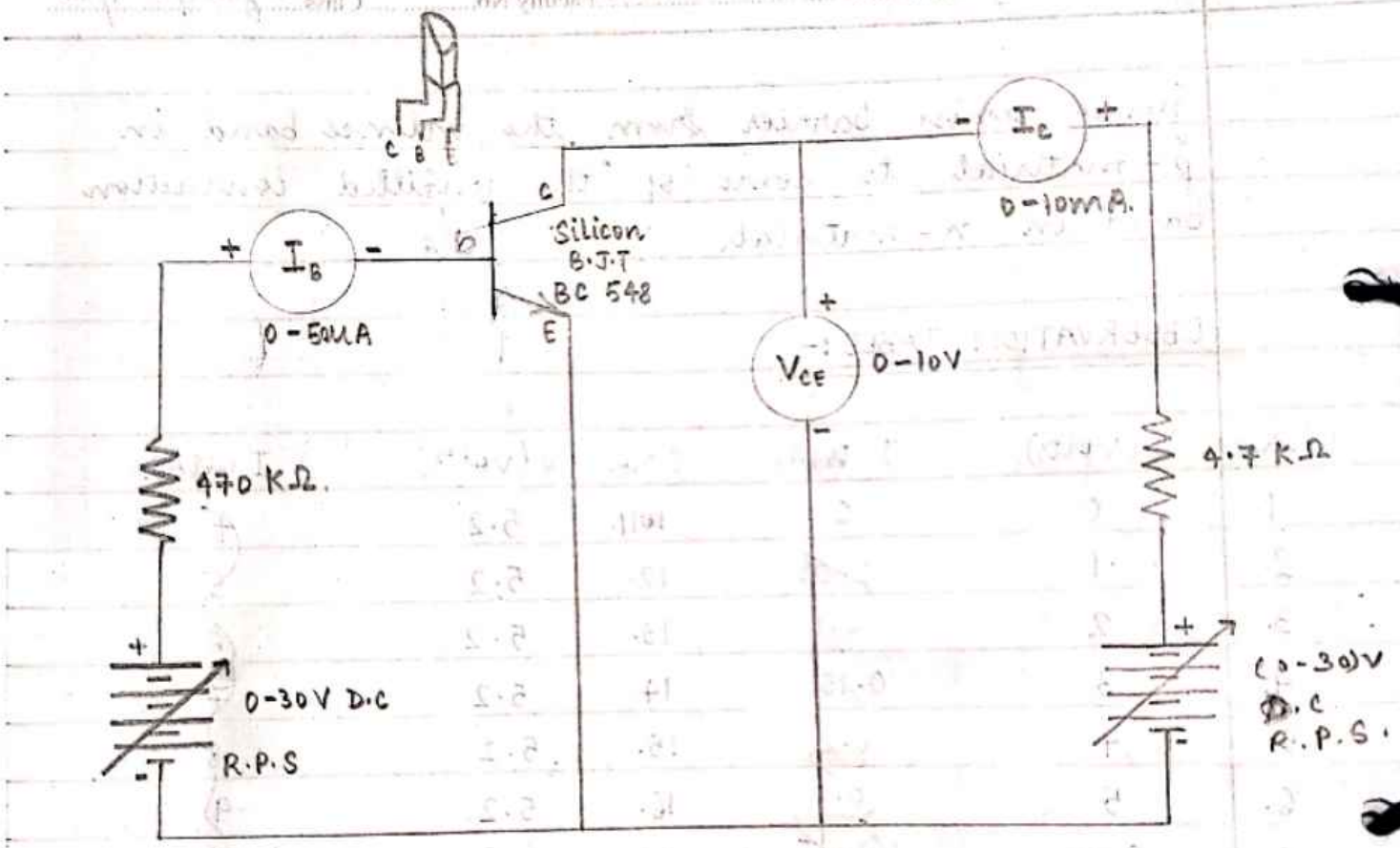
jump across barrier from the valence band in p-material to some of the unfilled conduction band in n-material.

OBSERVATION TABLE :-

S.No.	V (volts)	I (mA)	S.No.	V (volts)	I (mA).
1.	0	0	11.	5.2	4
2.	1	0.05	12.	5.2	5
3.	2	0.1	13.	5.2	6
4.	3	0.15	14.	5.2	7
5.	4	0.2	15.	5.2	8
6.	5	0.8	16.	5.2.	9
7.	BDV. 5.2	1.8 → I_{zm}	17.	5-2	10
8.	5.2	2			
9.	5.2	3			
10.					

RESULT :- The breakdown voltage of Zener diode is and current (I_{zm}) is 1.8 μA.

PRECAUTIONS :- 1) The connections should be tight.
2) Avoid long time continously flow of current in the circuit.


C B E
C
B
E
Silicon
B.J.T
BC 548
I_B
0 - 50μA
I_C
0 - 10mA.
V_{CE}
0 - 10V
470 KΩ.
4.7 KΩ
0-30V D.C
R.P.S
0-30V
D.C
R.P.S.

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Date 21/2/24 Experiment No. 6 P.No. 27

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

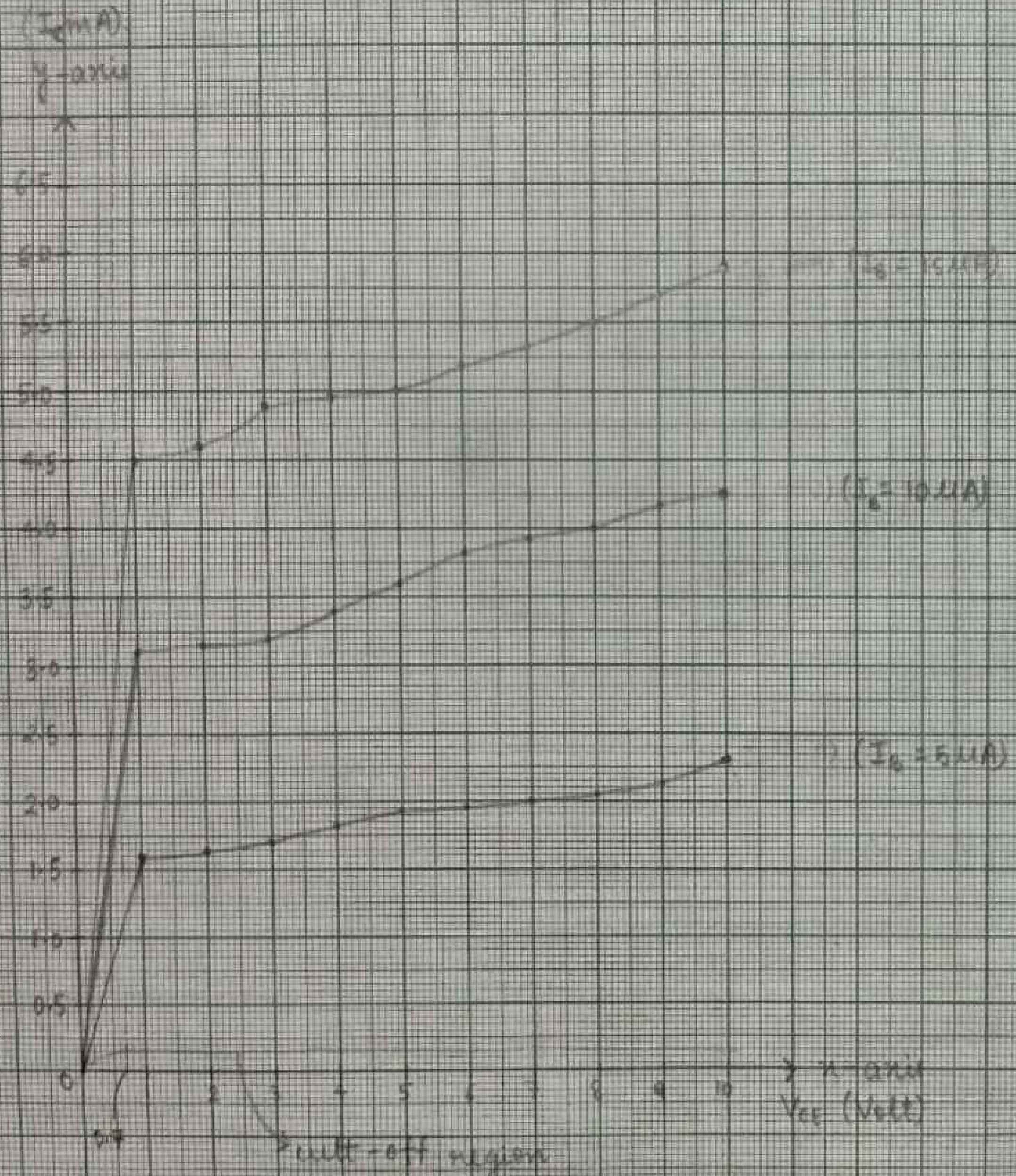
OBJECT:- Study the characteristics of B.J.T. (Bipolar Junction Transistor).

APPARATUS REQUIRED:- NPN (BC (#548)) transistor, Voltmeter (0-10V); ammeter (0-10mA); resistor (470 KΩ, 47 KΩ); DC source (0-30V); connecting wires.

THEORY:- A semiconductor device consisting of 2 p-n junction formed by semiconducting either p-type or n-type semiconductor between a pair of opposite type is known as a bipolar junction transistor (B.J.T.).

1) There are two junctions, one between emitter and base and other between base and ~~collection~~ collector.
2) The depletion layer of emitter junction is quite small as compared to deflection region at the collector region.

Name .... Class .... Roll No. .... Teacher Signature ....



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Date 22/2/24 Experiment No. 6 P.No. 28

Name Ridhi Mulchandani Faculty No. Class. D-4/I year/10

3.) The resistance of emitter junction is very small (as in forward bias) ~~whee~~ whereas the resistance of collector junction is very large (as in reverse bias) output resistance $r_o = \frac{\Delta V_{CE}}{\Delta I_C}$

OBSERVATION TABLE:-

S.No.	V_{CE}	I_C(mA) (I_B = 5 μA)	I_C(mA) (I_B = 10 μA)	I_C(mA) (I_B = 15 μA)
1.	0	0	0	0
2.	1	1.6	3.17	4.5
3.	2	1.65	3.15	4.6
4.	3	1.7	3.2	4.9
5.	4	1.8	3.4	4.45
6.	5	1.9	3.6	5
7.	6	1.95	3.8	5.2
8.	7	2	3.9	5.3
9.	8	2.05	4	5.5
10.	9	2.15	4.2	5.7
11.	10	2.3	4.25	5.9

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Date 21/2/24 Experiment No. 6 P.No. 29

Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

RESULT :- The value of saturation current of collector (I_c) increases as the current at base (I_b) increases.

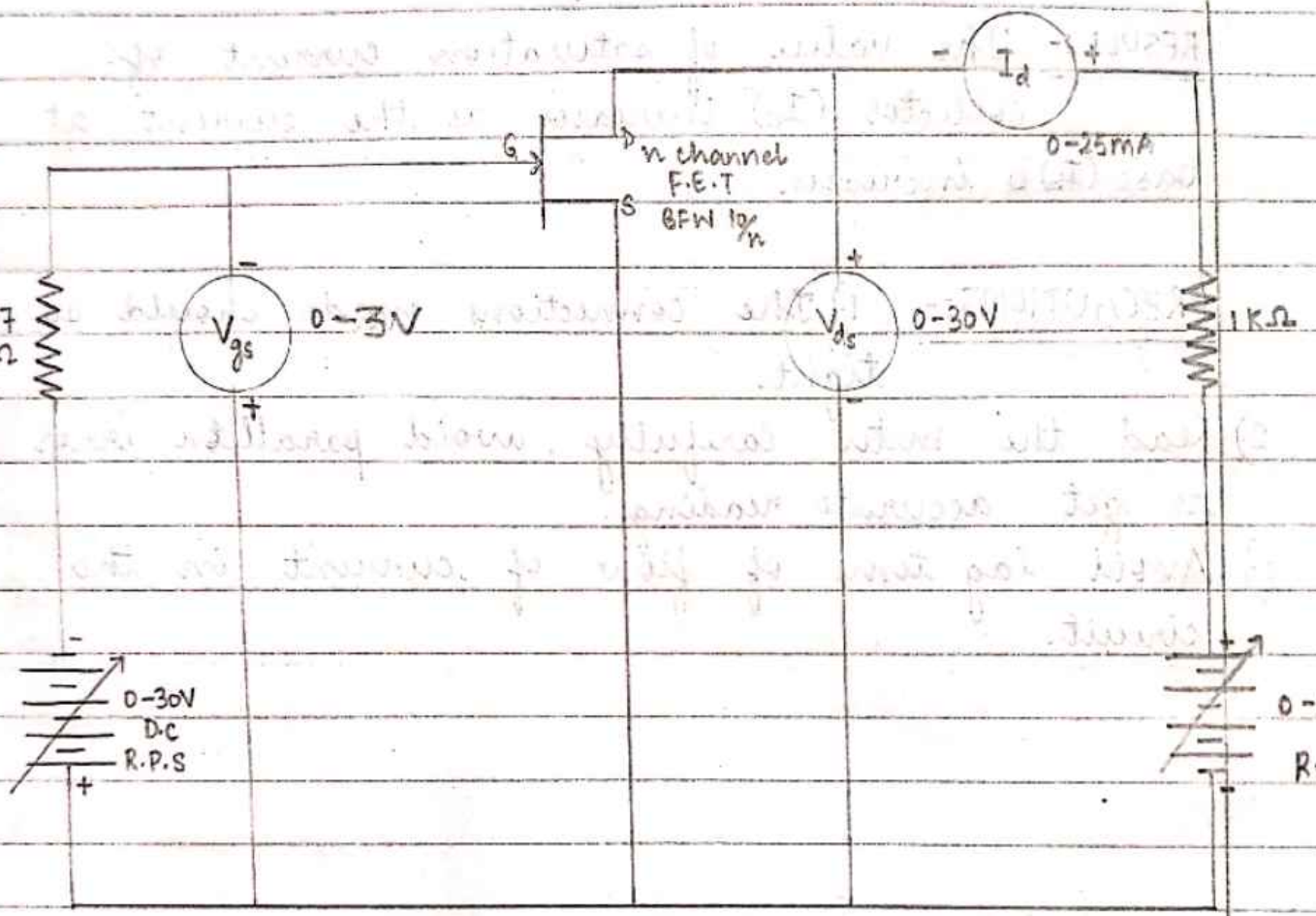
PRECAUTIONS:- 1) The connections made should be tight.

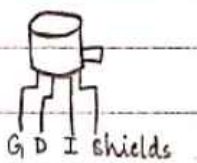
2) Read the meter carefully, avoid parallax error to get accurate readings.

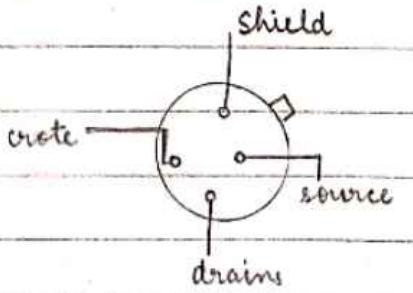
3) Avoid lag time of flow of current in the circuit.

Date ..... Experiment No. ..... P.No. .....

Name ..... Faculty No. ..... Class .....







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Date 21/2/24 Experiment No. 7 P.No. 30

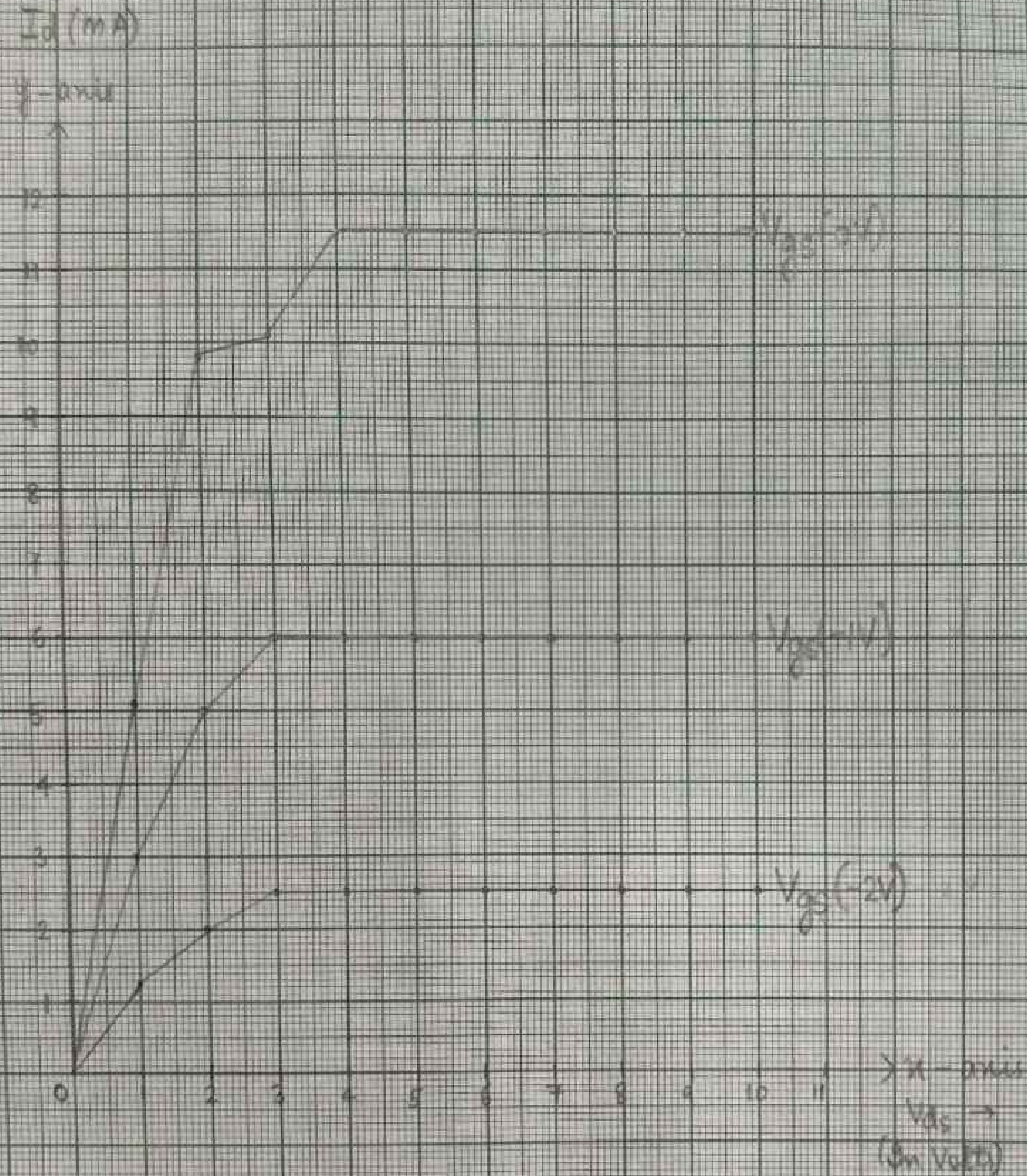
Name Ridhi Mulchandani Faculty No. Class I year/D-4/10

OBJECT:- Study the characteristics of F.E.T. (Field effective transistor).

APPARATUS REQUIRED:- Two D.C. power source (0-30V); D.C. power supply (10V); voltmeter (3V); n channel F.E.T (field effective transistor); Ammeter (0-25 mA); resistance (1KΩ, 4KΩ, 7KΩ).

THEORY:- A curve between drain current (I) drain source voltage (V_{ds}) of FET of voltage ~~carried~~ constant gate source voltage (V_{gs}) is known as output characteristics of FET. At this initial stage the drain source voltage (V_{ds}) but then become almost constant the drain source voltage above which drain current becomes almost constant is known as pinch off voltage. The reason of the above behaviour of the device is because at the initial stage the n-type or acts as a simple SC,

Name .... Class .... Roll No. .... Teacher Signature ....



resistance and the current. It increases initially with V_{ds}, however with increasing current smaller values of V_{ds}. Thus the maximum values of drain current will be smaller.

PINCH OFF VOLTAGE:- Pinch off voltage is the value of V_{ds} when current reaches constant saturation value.

OBSERVATION TABLE:-

S.No.	V_{dc}	V_{gs} (0V)/I_d	V_{gs} (-1V)/I_d	V_{gs} (-2V)/I_d
1.	0	0	0	0
2.	1	5.05	3	1.25
3.	2	9.85	5	2
4.	3	10.05	6	2.5
5.	4	11.5	6	2.5
6.	5	11.5	6	2.5
7.	6	11.5	6	2.5
8.	7	11.5	6	2.5
9.	8	11.5	6	2.5
10.	9	11.5	6	2.5
11.	10	11.5	6	2.5

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Date 21/2/24 Experiment No. 7 P.No. 31

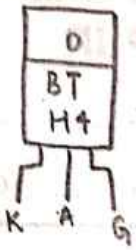
Name Ridhi Mulchandani Faculty No. Class D-4/I year/10

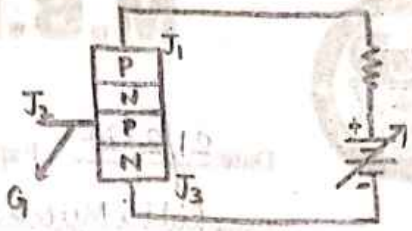
RESULT:- From graph it can be seen that after pinch off voltage the depletion layer almost touch each other and the connecting channel becomes very narrow.

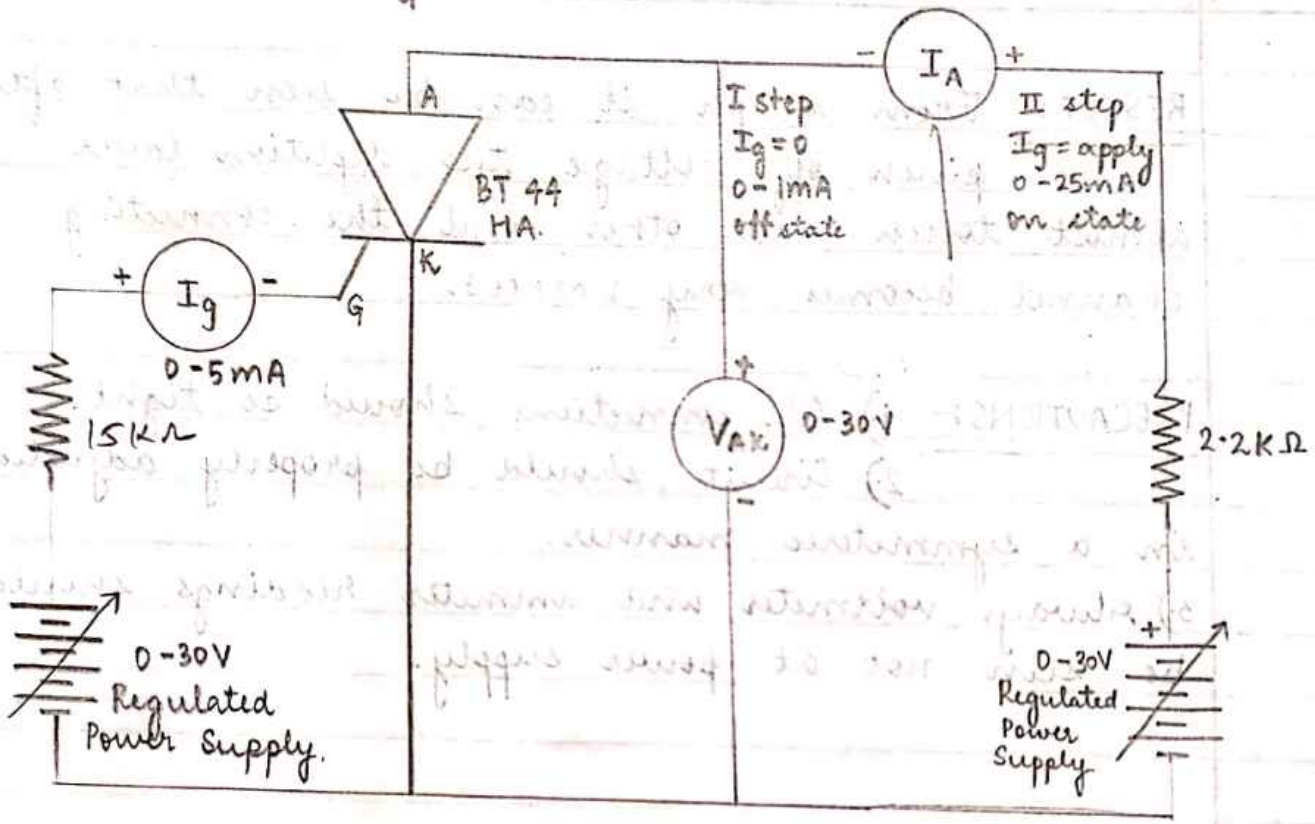
PRECAUTIONS:- 1.) All connections should be tight.

2.) Circuit should be properly adjusted in a symmeteric manner.

3.) Always voltmeter and ammeter readings should be seen not at power supply.


D
BT
H4
K
A
G


P
N
P
N
J1
J2
J3
G


A
K
G
BT 44
HA.
Ig
0-5mA
15KΩ
0-30V
Regulated
Power Supply.
IA
I step
Ig = 0
0 - 1mA
off state
II step
Ig = apply
0 - 25mA
on state
VAK
0-30V
2·2KΩ
0-30V
Regulated
Power
Supply

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Date 28/2/24 Experiment No. 8 P.No. 32

Name Ridhi Mulchandani Faculty No. Class D-4/I year/10

OBJECT:- Study V and I characteristics in S.C.R. (Silicon control rectifier).

APPARATUS REQUIRED:- Ammeter (0-5mA); voltmeter (0-30V); silicon control rectifier (S.C.R.); 0-30V D.C power supply, resistor (45KΩ, 2.2KΩ); connecting wires.

THEORY:- A S.C.R. is a three terminal semiconductor device which can be used as controlled switch to perform various functions, such as rectification inversions and regulations of power flow. A graph is between anode and cathode voltage (V_{AK}) and anode current (I_A) at constant. The current is known as V and I characteristics of S.C.R.

CHARACTERISTICS:- 1.) gate current $I_g = 0$; As power voltage is increased from there. Its a leakage current which flows through

30 div V → 1 → 20 div.

anode. This is due to leakage of minority carrier. However. its value is extremely small (μA) and remains constant as the voltage is increased in other side. The S.C.R. is said to be applied. Now when the power supply voltage reaches the forward break over voltage. S.C.R. at once begines to conductor and the voltage V across the resistor suddenly drops whole induction is reached rapidly under such condition most of power supply voltage appears across the load, as drop across the resistor is hardly 1V as compared to several hundred volts across load.

2.) When gate current flows : the above considered apply for zero gate current i.e. when gate current is open. However when a small gate voltage is applied, the gate current starts flowing.

The flow of gate current helps in making current helps flow across junction i.e, an breaking

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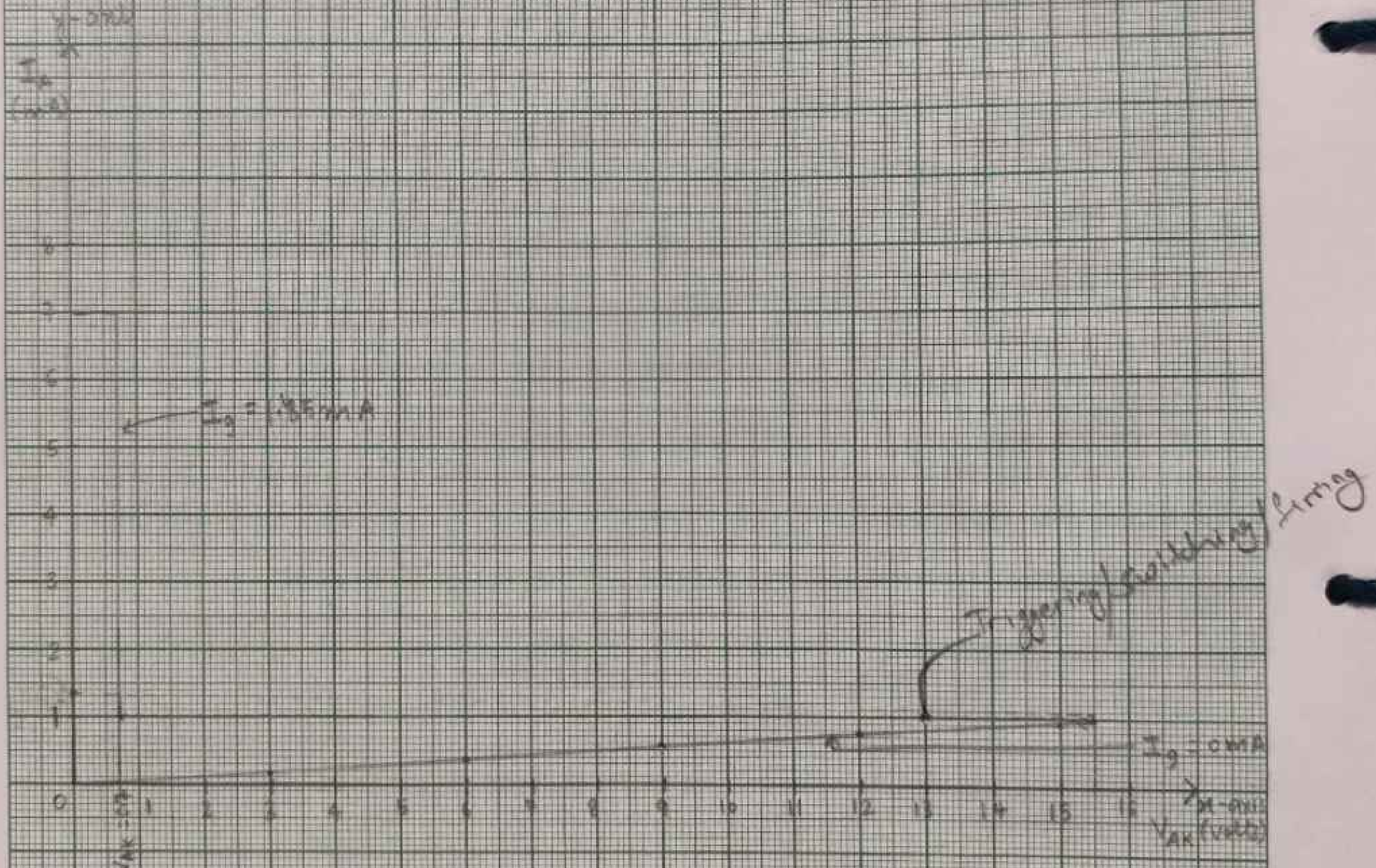

it down, due to high +ve potential on anode side of the junction electrons in n-type materials are vertically pulled into p-type.

I_L → latching current :- The least amount of anode current which is necessary to supply from the anode terminal to the cathode terminal to achieve the S.C.R. of after detaching the gate terminal.

I_H → Holding current :- The smallest amount of current under which anode current has to drop to enter status.

OBSERVATION TABLE :-

S.No.	V_{AK}	I_A (mA) $[I_g = 0]$.
1.	0	0
2.	3	0.18
3.	6	0.36
4.	9	0.56
5.	12	0.69
6.	15	0.94
7.	15.5	1

1.) I step (1mA meter)

2.) II step (0-25mA, II meter).

V_{AK} = ~~0.7V~~

I_g = ~~1.5~~ mA

I_A = ~~7~~ mA

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Date 28/2/24 Experiment No. 8 P.No. 35

Name Ridhi Mulchandani Faculty No. Class D-4/I year/10

After I step power supply must neither decrease nor off replace the 1mA meter to the 25mA meter.

RESULT:- When gate current is 0, the value of leakage current (I_A) is extremely small (uA) and remain ~~fully~~ fairly constant at the voltage is ~~applied~~. increased. So the curve will be horizontal approx a straight line curve.

PRECAUTIONS:-

1) All connections should be tight.
2) Excessive flow of current may damage the S.C.R. device.
3) Current for very long may change the reading.

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Date 28/2/24 Experiment No. 8 P.No. 36

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

OPERATING STEPS:-

1) Connect main chord of C.R.O to the electric board pannel.
2) Power on the front pannel switch and ensure that all pressing switches are upward and ground switch should be press condition.
3) Check the intensity control for 50% intensity of beam/trace.
4) Check the Y-switch for vertical centering of the beam meanwhile the focus of the beam is required.
5) Check the X-switch for horizontal centering of the beam.

CH_1	CH_2	TB	Setting is for H.W and
5V	5V	5mS	F.W Rectifier.

6) Chord: BNC (By Nut Connector) code to crocodile clips, co-crid cable having impedence $Z = 75\Omega$

OPERATING STEPS:-

1) Connect main chord of C.R.O to the electric board panel.
2) Turn on the front panel switch and ensure that all pressing switches are upward and ground switch should be press condition.
3) Check the intensity control for 50% intensity of beam/trace.
4) Check the Y-switch for vertical centering of the beam meanwhile the focus of the beam is required.
5) Check the X-switch for horizontal centering of the beam.

CH1	CH2	TB	Setting is for H.W and
5V	5V	5ms	F.W Rectifier.

6) Wires: BNC (by Nut connector) cable to connect crops, co-axial cable having impedance Z-75Ω.

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Date 28/2/24 Experiment No. 8 P.No. 37

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

Measurement of collitration output signal

CH_1	CH_2	T_B
0.2 V	5V	0.5mS

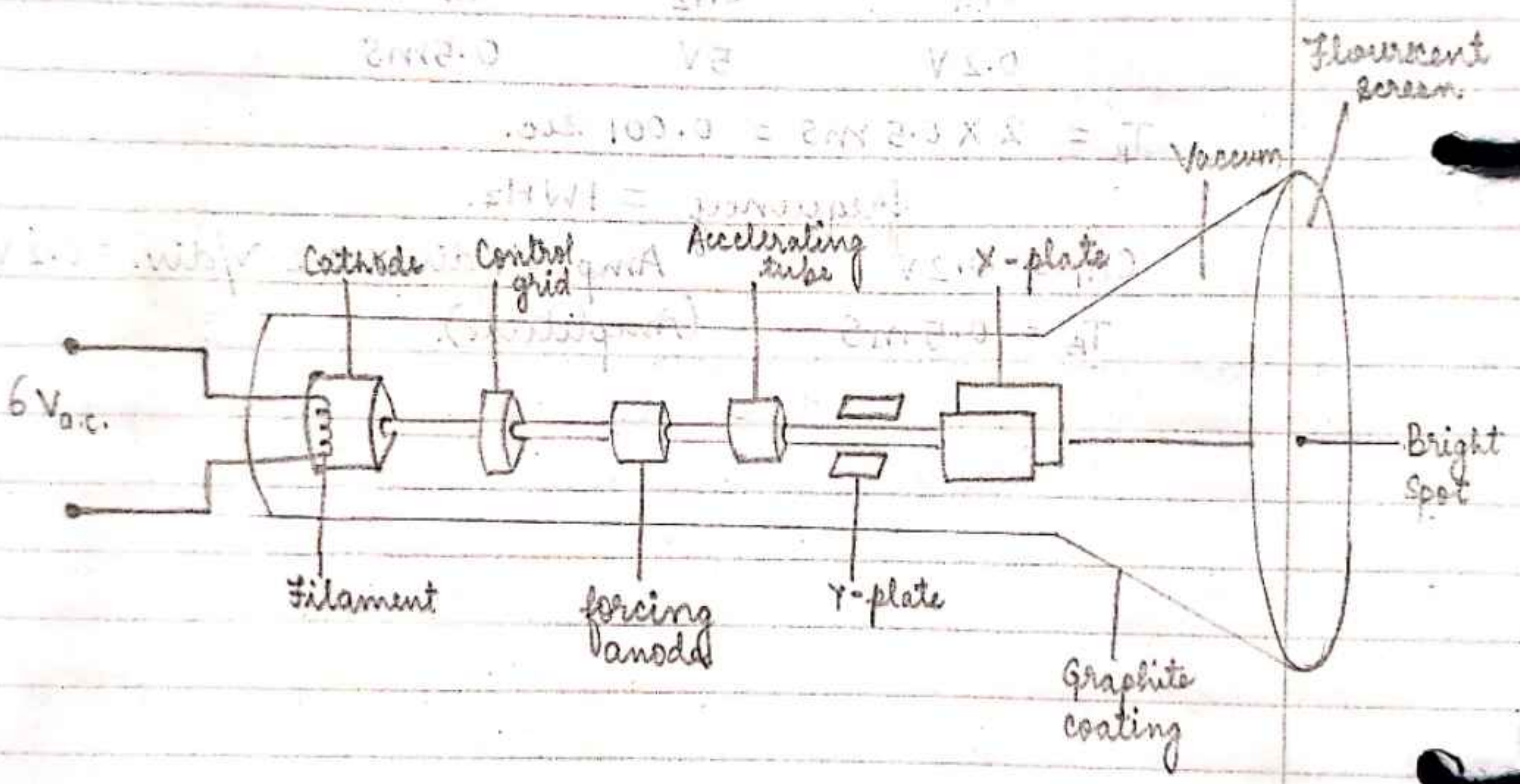
$T_B = 2 \times 0.5\ mS = 0.001$ sec.

frequency = 1WHz.

$CH_1 = 0.2V$

$T_B = 0.5\ mS$

Amp = 1 div. × 0.2 V/div. = 0.2 V (Amplitude).



CATHODE RAY TUBE.

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Date 6/3/24 Experiment No. 9 P.No. 38

Name Ridhi Mulchandani Faculty No. Class D-4/10/I-year

OBJECT :- Study the C.R.O. (Cathode Ray Oscilloscope)

C.R.O :- It's the most important and versatile instrument in laboratories. It gives a visual induction of a signal wave form. It is used for trouble shooting in radio and television recievers and for laboratory measurement. The oscilloscope can measure voltage, amplitude, frequency and phase shift.

BLOCK DIAGRAM :- The figure shows all the sub-systems but there are the minium stage required which are :-

(i) VERTICAL DEFLECTION SYSTEM :- It consists of an input alternator and number of amplifier stages. The gain of amplifier can be controlled with the help of alternator. The wave form to be displayed is connected to and earth.

(7)

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PROJECT :- Study on C.R.O. (Cathode Ray Oscilloscope)

C.R.O :- It is the most important and versatile measurement in laboratory. It gives a visual indication of a signal wave form so it is very useful in showing in radio and television receivers and in laboratory measurement. The oscilloscope can measure voltage, amplitude, frequency and phase shift.

BLOCK DIAGRAM :- The figure shows all the sub-systems but there are the various steps required which are :-

(1) VERTICAL DEFLECTION SYSTEM :- It consists of an input attenuator and amplifier of amplifier stages. The gain of amplifier can be controlled with the help of attenuator. The wave form to be displayed is connected to and ground.

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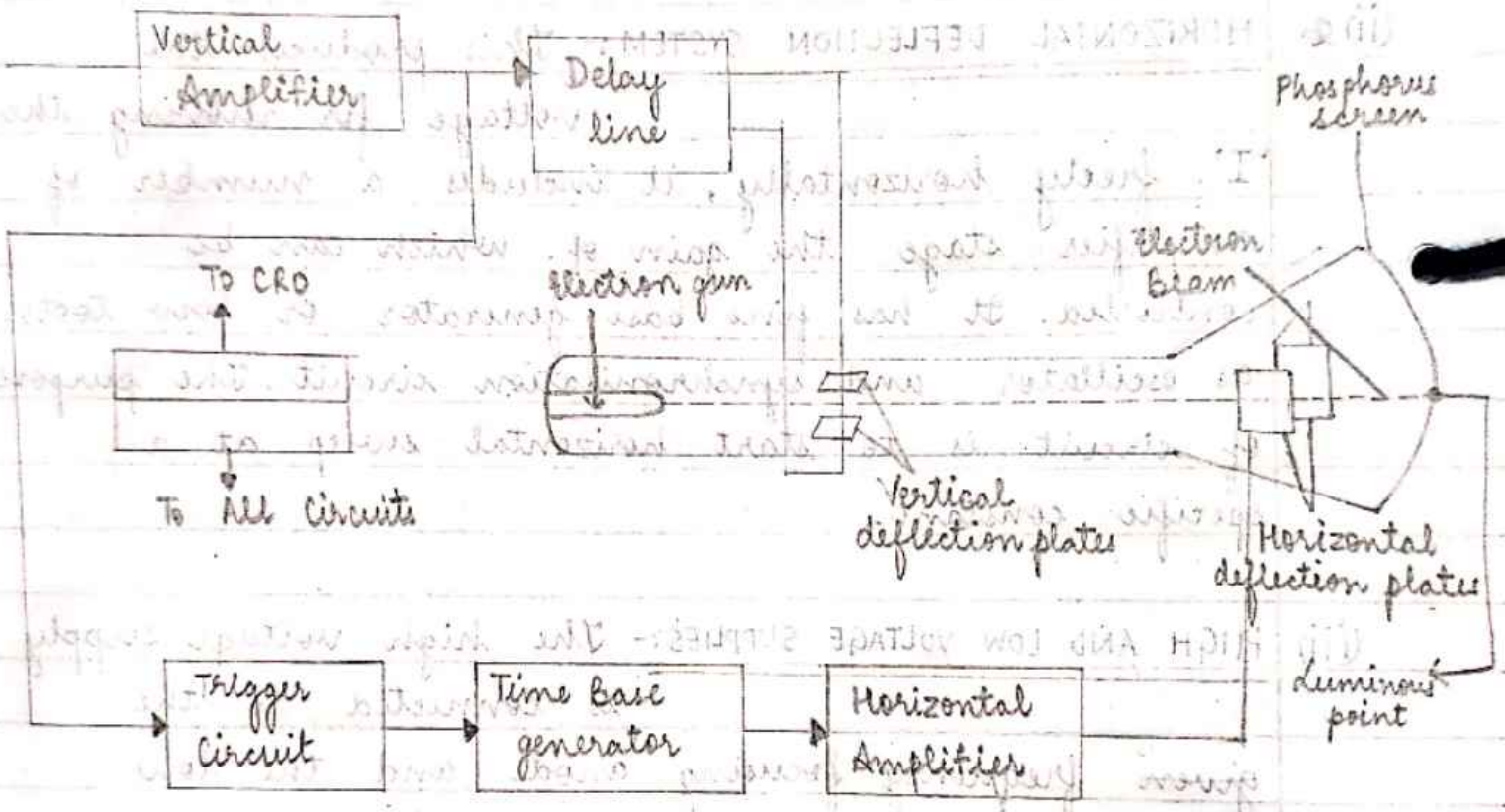
Date 6/3/24 Experiment No. 9 P.No. 39

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

(ii) HORIZONTAL DEFLECTION SYSTEM :- This produces the voltage for moving the 'I' freely horizontally, it includes a number of amplifier stage the gain of which can be controlled. It has fine base generator or low tooth as oscillator and synchronisation circuit. The purpose of circuit is to start horizontal sweep at a specific constant.

(iii) HIGH AND LOW VOLTAGE SUPPLIES:- The high voltage supply is connected to the ~~given~~ frequency focusing anode and the low voltage supply is given to the heater and control grid by varying the potential on focusing anode and cathode guide. The beam can be focusing and its intensity can be controlled.

~~CA~~



BLOCK DIAGRAM OF C.R.O.

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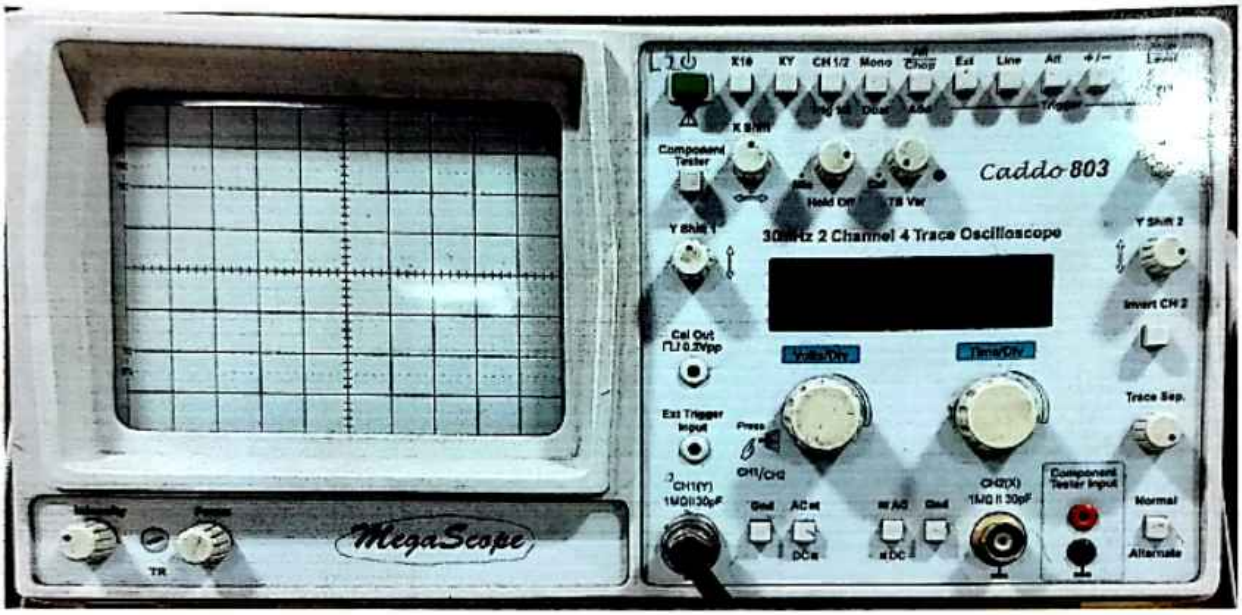
Date 6/3/24 Experiment No. 9 P.No. 40

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

CATHODE RAY TUBE :- C.R.T. is a vaccum tube of special grammetical shape. It converts an electrical signal into visible one. There is a cathode which is heated by a heater to emit electrons with high velocity, finally focused at the screen which is coated with flouroscence material then a spot of light is obtained on screen. The electron beam from cathode is deflected by suitable. As a result, a visual wavelength is obtained ~~on~~ on screen.
The main parts of C.R.T. are:-

1.) GLASS ENVELOPE :- It's a conical highly ~~evolo~~ evoluated glass having and supports the various electrodes. The inner wall of C.R.T. between the map and screen are coated with a conducting material.

2.) THE ELECTRON GUN :- Cathode is an electrode which kept at -ve point of when it is



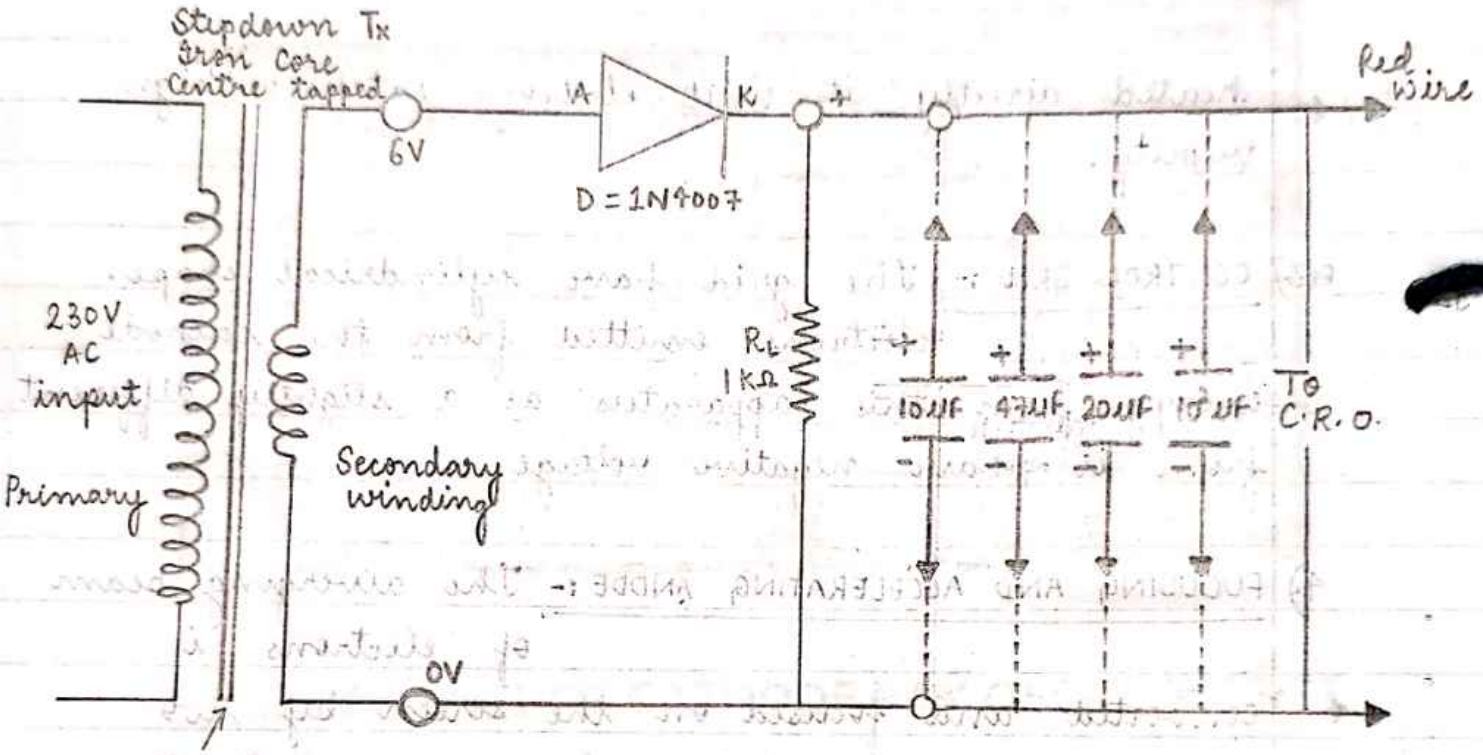
FRONT PANEL OF CATHODE RAY OSCILLOSCOPE (C.R.O.) GUIDED BY C.S. SRIVASTAVA SIR

heated directly its unit electrons catch a high velocity.

3) CONTROL GRID :- The grid have cylindrical shape. Electrons emitted from the cathode energy from this apparatus as a slightly different from it have negative voltage.

4) FOCUSING AND ACCELERATING ANODE :- The diverging beam of electrons is converted and focused on the screen by two accelerating anodes which form an electronic tense. The electronic tense action is controlled by focus control. A potentiometer varies the voltage to the first anode.

5) THE FLUOROSCENT SCREEN :- This is the inside face of tube is coated with some flourscent material such as zincothrace silicate, zinc oxide, phosphorus etc, when a beam of light is projected on it the colour of light depends on the type of material coated on the screen.


Stepdown Tx
Iron Core
Centre tapped
6V
A
K
D = 1N4007
Red wire
230V
AC
Input
Primary
Secondary winding
R_L
1kΩ
10μF
47μF
20μF
10μF
To
C.R.O.
0V
Iron core

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Date 6/3/24 Experiment No. 10 P.No. 42

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

OBJECT:- Study the characteristics of half wave rectifier. (Eff. ⇒ 40.41%).

MATERIAL REQUIRED:- P-N Junction diode, resistance, bridge board, and C.R.O and step down transformer.

THEORY:- A device is capable of converting a horizontal input wave from into a unidirectional input wave ~~with~~ form with non-zero component is called a rectifier.

A particle half wave rectifier with a resistive load is shown in the figure, during the +ve half cycle of input the diode conducts and all the input voltage is dropped across RL. During the -ve half wave cycle the diode is reverse biased and is in state and so the output voltage is zero. The filter is simply a capacitor connected from

Peak Inverse Vol. (PIV) = max. breakdown vol.

the rectifier output to ground, the capacitor quitely charges at the begining of a cycle and slowly discharges through input voltage.

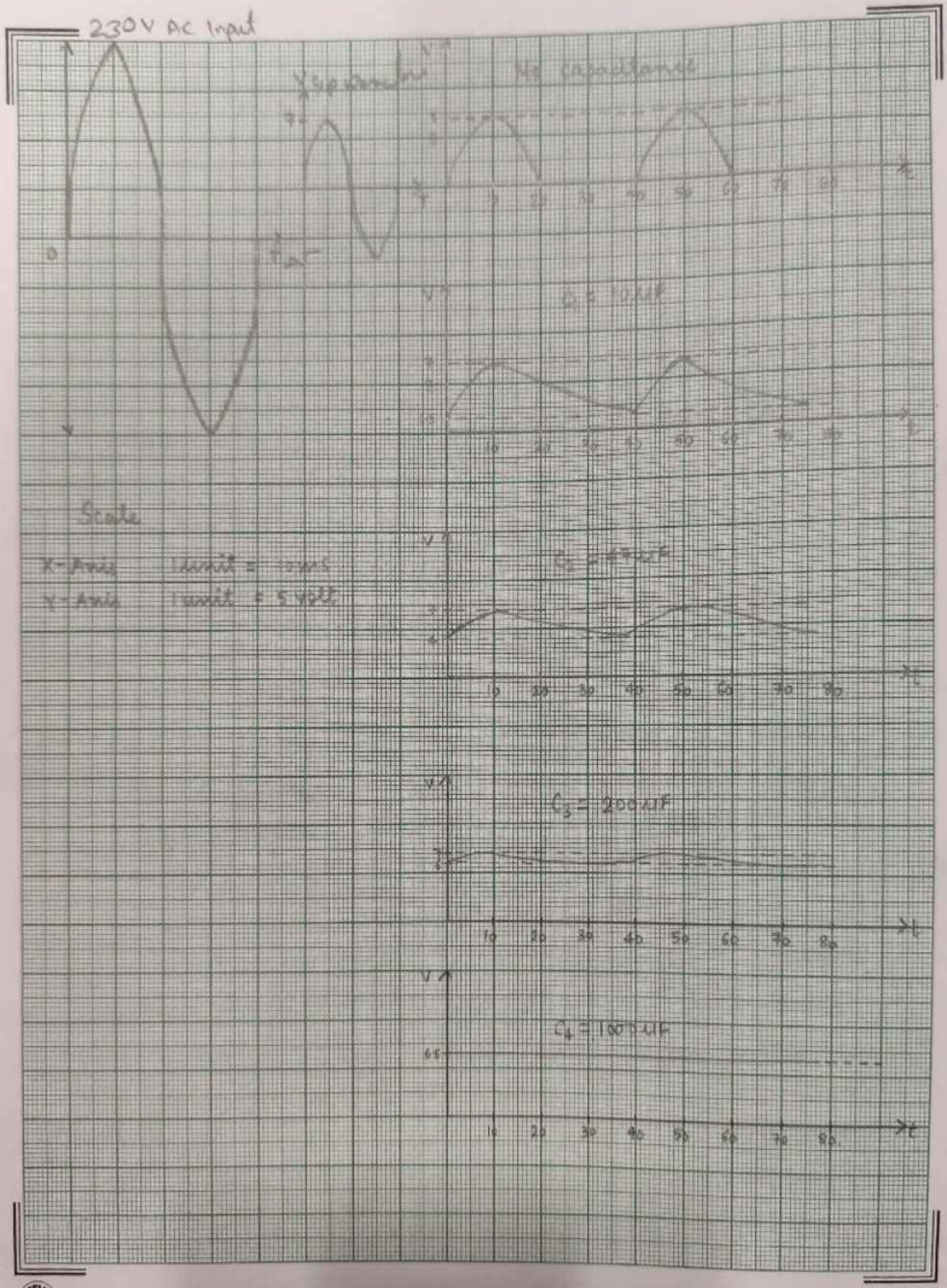
The variations in the capacitor voltage due to charging and discharging is called Ripple voltage. Generating ripple is the smaller ripple better filtering action.

Ripple factor is an indicator of the effectiveness of the filter and is defined as:

$$R = \sqrt{\left(\frac{V_{rms}}{V_{dc}}\right)^2 - 1}$$

V_{rms} = Ripple voltage and V_{dc} = Peak/rectified value of voltage R↓ by increasing the value of the filter capacitor or in load capacitor.

pure AC → pure DC.
Voltage Regulator / zener diode



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Date 6/3/24 Experiment No. 10. P.No. 44

Name Ridhi Mulchandani Faculty No. Class B.Tech/I-year/10

CALCULATION :-

$$T = 4 \text{ div.} \times 5 \text{ ms/div.}$$
$$= 20 \text{ ms}$$

$$F = \frac{1}{T} = \frac{1}{20 \times 10^{-3}} = 50 \text{ Hz.}$$

$$V_{max} = 1.4 \text{ div.} \times 5 \text{ V/div.} = 7.0 \text{ V.}$$

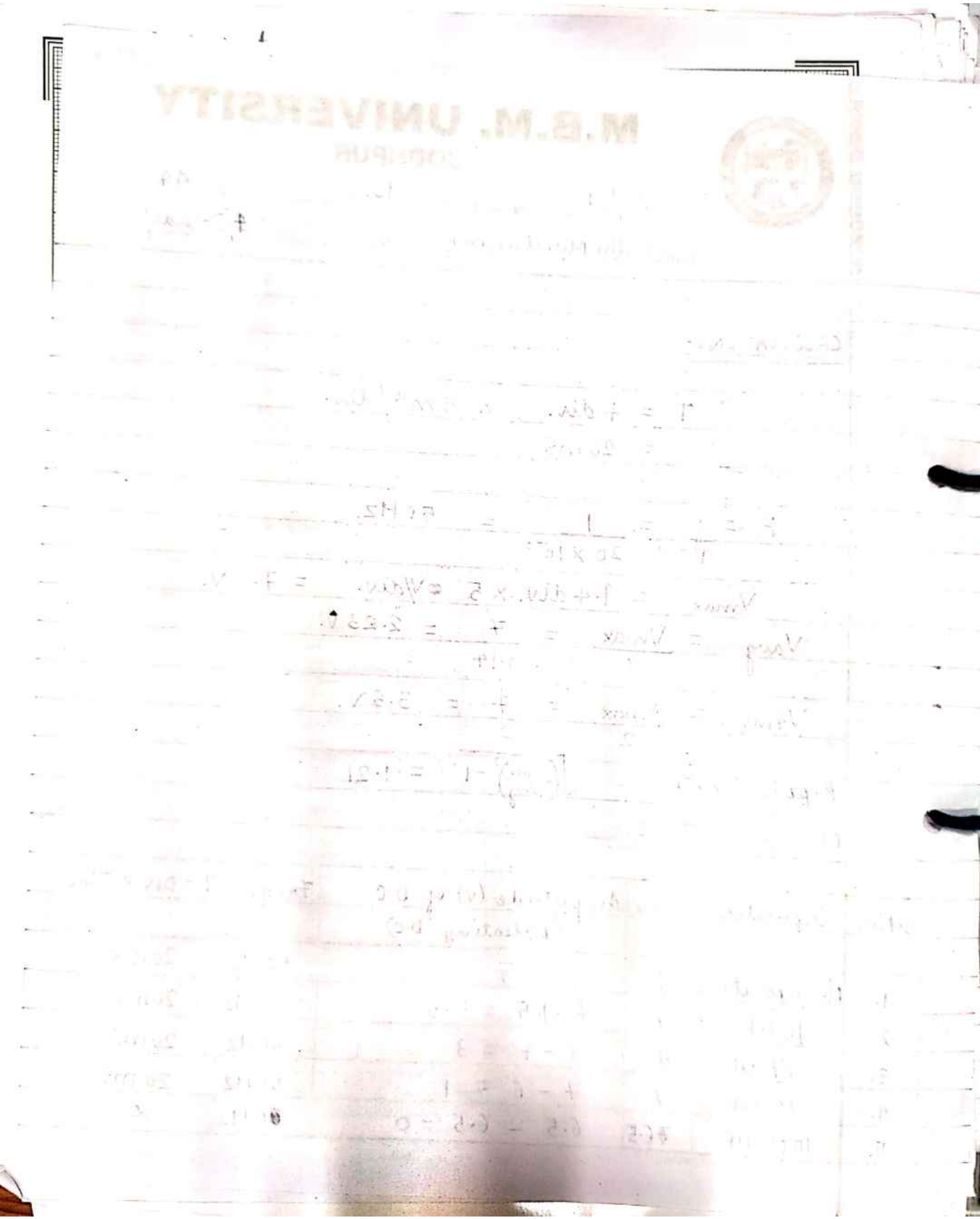
$$V_{avg} = \frac{V_{max}}{\pi} = \frac{7}{3.14} = 2.23 \text{ V.}$$

$$V_{rms} = \frac{V_{max}}{2} = \frac{7}{2} = 3.5 \text{ V.}$$

$$\text{Ripple Factor} = \sqrt{\left(\frac{V_{rms}}{V_{avg}}\right)^2 - 1} = 1.21$$

OBSERVATION TABLE :-

S.No.	Capacitor	Vmax	Amplitude (v) of D.C (pulsating D.C)	Freq.	T = Div x Time
1.	No capacitance	7	7	50 Hz	20 ms
2.	10 μF	7	7 − 1.5 = 5.5	50 Hz	20 ms
3.	47 μF	7	7 − 4 = 3	50 Hz	20 ms
4.	200 μF	7	7 − 6 = 1	50 Hz	20 ms
5.	1000 μF	6.5	6.5 − 6.5 = 0	0 Hz	∞



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Date 6/3/24 Experiment No. 10 P.No. 45

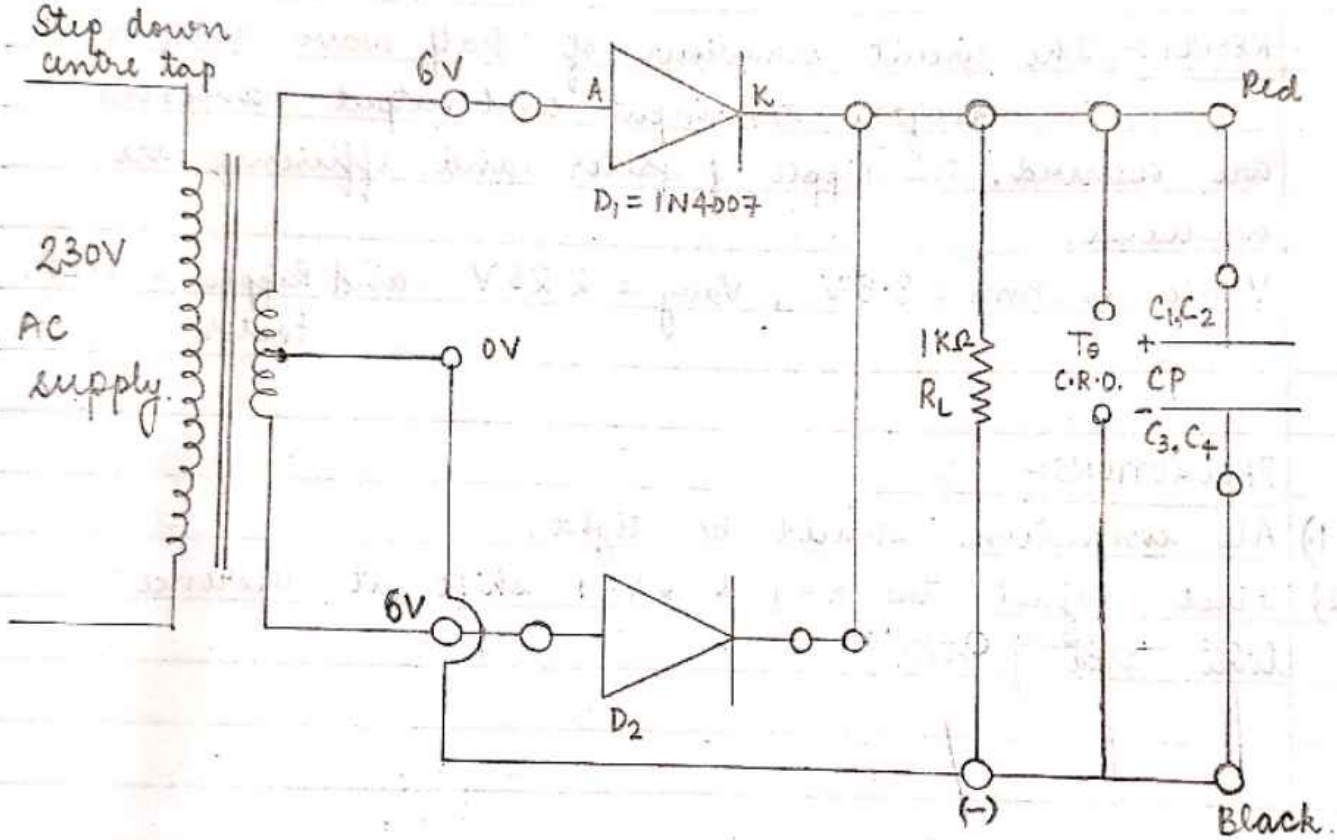
Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

RESULT:- The circuit behaviour of half wave rectifier is analyzed the input and output waveform are observed, the Ripple factor and efficiency are evaluated.

Value of rms = 3.5 V , Vavg = 2.23 V and Ripple factor = 1.21

PRECAUTIONS:-

1) All connections should be tight.
2) First adjust the X-1 & Y-1 shift at reference line and process.


Step down centre tap
230V
AC supply
6V
A
K
D_1 = IN4007
Red
0V
1KΩ
R_L
T_6
C·R·O.
C_1, C_2
+
CP
−
C_3, C_4
6V
D_2
(−)
Black

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Date 6/3/24 Experiment No. 11 P.No. 46

Name Ridhi Mulchandani Faculty No. Class D-4/I year/10

OBJECT:- Study the characteristics at full wave rectifier using two diodes and center tap transformer.

APPARATUS REQUIRED:- Transformer, rectifier, diodes (two), resistors (1 KΩ), capacitors, C.R.O., connecting wires.

THEORY:- In full wave rectifier, when A.C supply is applied at input, during both the half cycles current flow through the load in the same direction.

CENTRE-TAP FULL WAVE RECTIFIER:- A centre-tap full wave rectifier circuit employs a transformer with secondary winding tap at the centre point. The two diodes D_1 and D_2 are connected in the circuit so that each one of them uses half ~~cycles~~ cycles of input ~~and~~ AC voltage.

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Date 6/3/24 Experiment No. 11 P.No. 47

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

When the supply is switched on, attenting voltage appears across the terminal of secondary winding during half positive cycle diode D_1 is in forward biased and D_2 is reverse biased condition so D_1 conduct current during positive half cycle, diode D_2 is in forward bias and D_1 is in reverse bias in negative half cycle, thus D_2 conduct current. It may be observed that the direction of current through load resistance remains the same in both case.

After the rectification the pulsating D C output voltage in shunt capacitor filter higher the value of capacitance more will be D·C component.

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Date 6/3/24 Experiment No. 11 P.No. 48

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

CALCULATIONS:

$T = 2 \text{ div.} \times 5 \text{ ms/div.}$

$= 10 \text{ ms.}$

$\text{freq.} = \frac{1}{T} = \frac{1}{10 \text{ ms}} = 100 \text{ Hz.}$

$V_{max} = 7 \text{ V.}$

$V_{avg.} = \frac{2V_{max}}{\pi} = \frac{2 \times 7}{\pi} = 4.46 \text{ V.}$

$V_{rms} = \frac{V_{max}}{\sqrt{2}} = \frac{7}{\sqrt{2}} = 5 \text{ V.}$

$\text{Ripple factor} = \sqrt{\left(\frac{V_{rms}}{V_{avg}}\right)^2 - 1} = \sqrt{\left(\frac{5}{4.46}\right)^2 - 1}$

$= 0.48$

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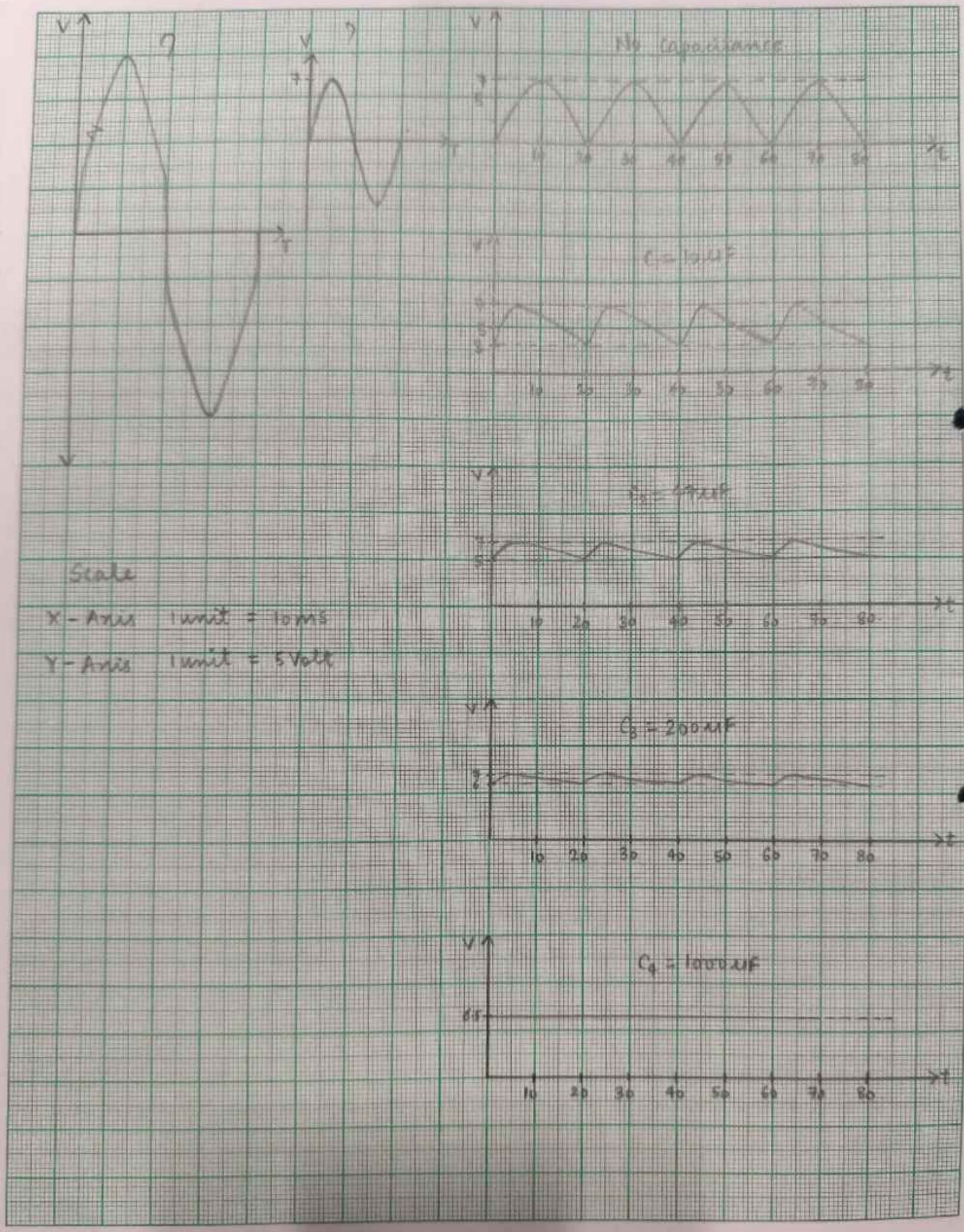
No Capacitance
C = 10 uF
C2 = 47 uF
C3 = 200 uF
C4 = 1000 uF
Scale
X - Axis 1 unit = 10 mS
Y - Axis 1 unit = 5 Volt

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Date 6/3/24 Experiment No. 11 P.No. 49

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

OBSERVATION TABLE:-

S. No.	Capacitor	Vmax	Amplitude (V) of D.C	Freq.	T = Div. x Time
1.	No capacitance	7V	7V	100 Hz	10ms
2.	10 μF	7V	7 - 3 = 4V	100 Hz	5 x 2 = 10ms
3.	47 μF	7V	7 - 5 = 2V	100 Hz	5 x 2 = 10ms
4.	200 μF	7V	7 - 6 = 1V	100 Hz	5 x 2 = 10ms.
5.	1000 μF	~~7V~~ 6.5V	6.5 - 6.5 = 0	0	∞

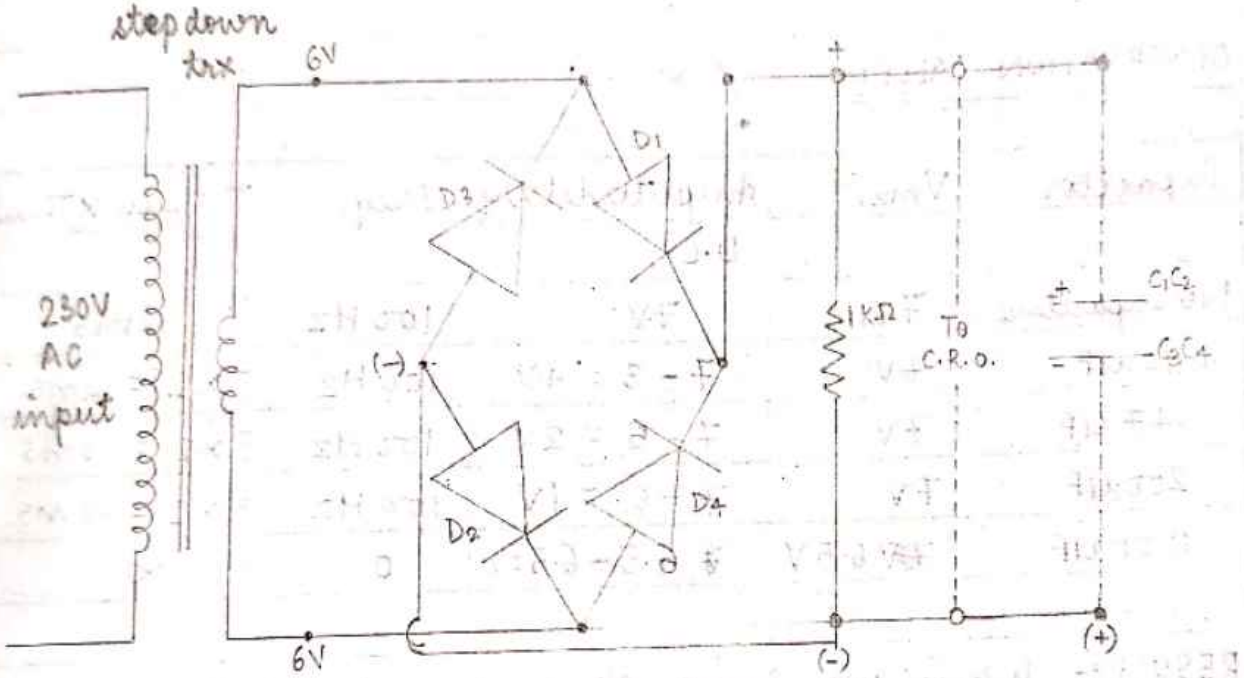
RESULT:- When we input AC voltage in full wave rectifier, we get D.C voltage at output and full cycle at the wave rectifier in it.

The value of V_{rms} = 5V

The value of V_{avg} = 4.46 V.

PRECAUTIONS:-

1) All connections should be tight.
2) First adjust the X-1 & Y-1 shift at reference line and process.


step down trx
6V
230V
AC
input
D1
D3
D2
D4
(-)
+
1 KΩ
To
C.R.O.
C1C2
C3C4
6V
(-)
(+)

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Date 13/2/24 Experiment No. 12. P.No. 50

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

OBJECT :- Study the characteristics of bridge rectifier using four diodes and transformer (T_x) without centre tap.

APPARATUS REQUIRED :- Transformer, four rectifier diodes, resistances (1KΩ), capacitors, input AC voltage supply connecting wire, C.R.O.

THEORY :- In this rectifier on ordinary transformer is used to place of centre tap transformer the circuit containing 4 diodes D_1, D_2, D_3, D_4; connected to form the bridge the AC supply to ~~rectify~~ be rectified is appealed to diagonally opposite of the bridge whereas the load resistance R_c is connected across the remaining two diagonally opposite end of the bridge.
When AC supply is switched on, the alternate voltage appears across the terminal of secondary winding. During +ve half cycles diodes D_1 & D_2

are in forward bias whereas D_3 and D_4 are in reverse bias and D_1 and D_2 diodes conduct current and current flows through load resistive ance.
~~diode D_2 in~~
During negative half cycle D_4 and D_3 are in forward bias and D_1 & D_2 are in reverse biased so D_4 & D_3 conduct while D_1 & D_2 do not conduct current so during whole cycle current flow through load resistance.
After through the rectification, the pulsating DC voltage is passed through filter circuit to obtain pure DC voltage. In shunt capacitor filter higher the values of capacitance more will be the DC component.

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Date 13/2/24 Experiment No. 12 P.No. 52

Name Ridhi Mulchandani Faculty No. Class D-4/I-year/10

CALCULATIONS:-

$T = 2 \text{ Div.} \times 5 \text{ mS/Div.}$

$T = 10 \text{ mS.}$

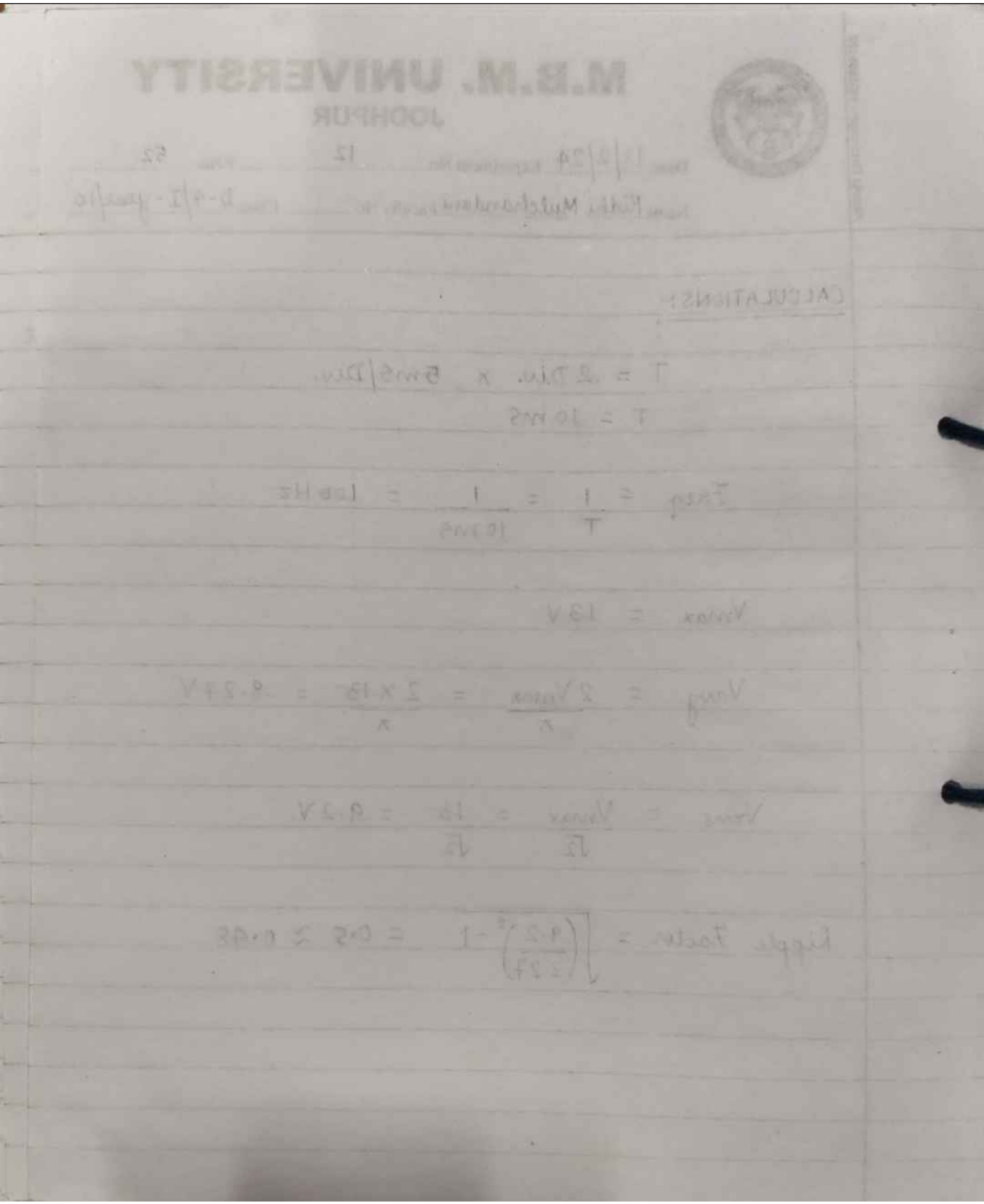
$\text{Freq.} = \frac{1}{T} = \frac{1}{10 \text{ mS}} = 100 \text{ Hz.}$

$V_{max.} = 13 \text{ V}$

$V_{avg.} = \frac{2 V_{max}}{\pi} = \frac{2 \times 13}{\pi} = 8.27 \text{ V.}$

$V_{rms} = \frac{V_{max}}{\sqrt{2}} = \frac{13}{\sqrt{2}} = 9.2 \text{ V.}$

$\text{Ripple Factor} = \sqrt{\left(\frac{9.2}{8.27}\right)^2 - 1} = 0.5 \approx 0.48$



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Scale:-

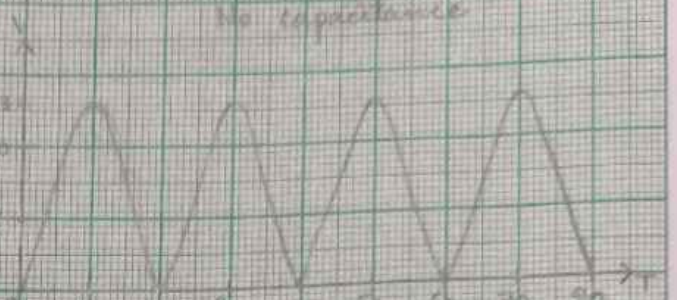
X-Axis = 1 unit = 1ms

Y-Axis = 1 unit = 5Volt

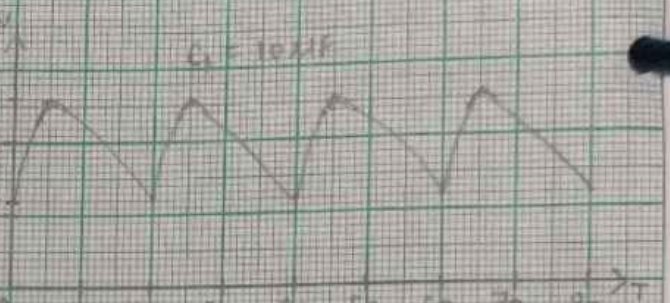
230 V A.C input

output

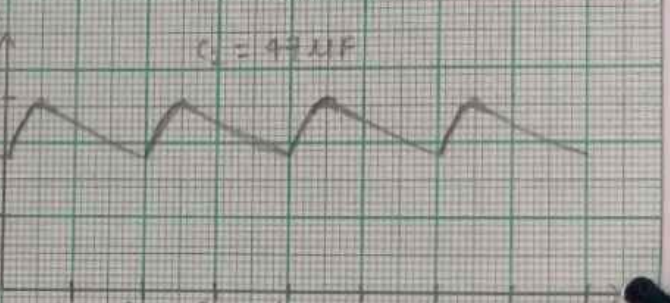
No capacitance



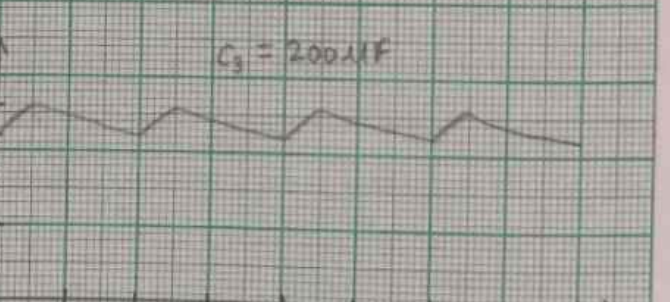
$C_2 = 10\mu F$



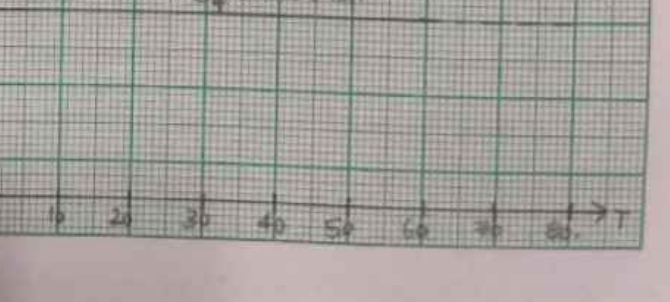
$C_3 = 47\mu F$



$C_4 = 200\mu F$



$C_5 = 1000\mu F$



M.B.M. UNIVERSITY
JODHPUR

Date 13/2/24 Experiment No. 12 P.No. 53.

Name Ridhi Mulchandani Faculty No. Class D-4/I year/10

OBSERVATION TABLE:-

S.No.	Capacitor (μF)	DC pulsating Vmax (volt)	Amplitude of ripple (V)	Time (ms)	Frequency (Hz)
1.	No capacitance	13V	13V	2X5 = 10ms	100 Hz
2.	10 μF	13V	13 - 6 = 7V	2X5 = 10ms	100 Hz
3.	47 μF	13V	13 - 9 = 4V	2X5 = 10ms	100 Hz
4.	200 μF	13V	13 - 11 = 2V	2X5 = 10ms.	100 Hz
5.	1000 μF	12.5V	12.5 - 12.5 = 0	∞	0

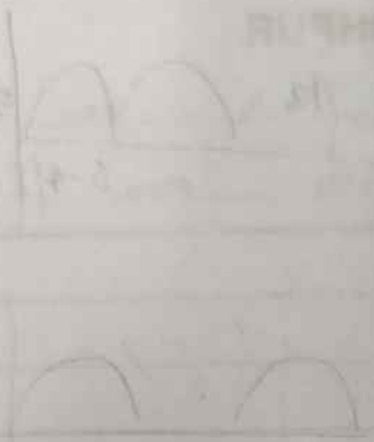
RESULT:- When we input the AC voltage in rectifier we get filtered DC voltage at the output and in this rectifier full wave is rectified.

The value of Vrms = 9.2V

The value of Vavg = 8.27V

PRECAUTIONS:-

1) All connection must be tight.
2) Error should be checked in the calculations.



Pankaj Gulati