EXP NO. 1: Identification and finding values of passive components using color codes, labels

Tabular Column:

(a) Resistor:

Symbol-

Sl. No	Color Band				Calculation Value = [Band1 Band2 * 10 ^{Band3}] ± tolerance	Value with unit
	Band 1	Band 2	Band 3	Band 4		
1						
2						
3						
4						
5						

(b) Capacitor:

1. **Electrolytic capacitor**

Symbol-

Sl. No	Value with unit	Voltage rating
1		
2		
3		
4		

2. **Disc capacitor:**

Symbol-

Sl. No	Digit 1	Digit 2	Digit 3	Calculation C Value = [Digit1 Digit2 * 10^{Digit3}]	Value with unit
1					
2					
3					
4					

EXP NO. 1: Identification and finding values of passive components using color codes, labels

AIM: To identify the passive components and find their values/tolerances

COMPONENTS REQUIRED: Assorted resistors, electrolytic and ceramic capacitors.

PROCEDURE:

(a) Resistor

1. Hold the resistor such that the bands are closer to the left side lead of the resistor.
2. Identify the colors of the bands starting from left.
3. Bands 1 & 2 represent the value of the resistor, band 3 represents multiplier and band 4 represents tolerance.
4. Look up to the resistor color coding table to identify the values corresponding to the colors of band and calculate the value of the resistance.

(b) Capacitor

1. For electrolytic capacitor, hold the capacitor & rotate it until you can see the capacitor value and voltage specification. Note down the values.
2. For disc capacitors, hold the capacitor and observe the numbers & symbols printed on the surface.
3. Look up to the capacitor letter marking table to identify the values corresponding to the numbers and symbols.
4. Calculate the value of the capacitance.

RESULT:

EXPT NO. 2: Identification and finding values of passive components using meters

Tabular Column:

(a) Resistor:

Sl. No	Color band				Calculation Value = [Band1 Band2 * 10 ^{Band3}] ± tolerance	Resistor value with unit using color code	Resistor value using multimeter with unit
	Band 1	Band 2	Band 3	Band 4			
1							
2							
3							
4							

(b) Capacitor:

1. Electrolytic capacitor

Sl. No	Value with unit	Measured value using multimeter	Voltage rating
1			
2			
3			
4			

2. Disc capacitor:

Sl. No	Digit 1	Digit 2	Digit 3	Calculation C Value = [Digit1 Digit2 * 10^{Digit3}]	Value with unit	Measured value using multimeter
1						
2						
3						
4						

EXPT NO. 2: Identification and finding values of passive components using meters

AIM: To verify the values of passive components using multimeter and LCR meter

COMPONENTS REQUIRED: Assorted resistors, electrolytic and ceramic capacitors and inductors

PROCEDURE:

(a) To measure resistance

1. Resistance can be measured using multimeter or LCR meter.
2. Make the contact of leads of the resistor with the probes of the meter (attached specific port in case of LCR meter).
3. Choose the proper range by rotating the knob so that the accurate value of resistance is measured.
4. The measured value is displayed on the LCD screen.
5. Compare the measured value with the value calculated using color code.

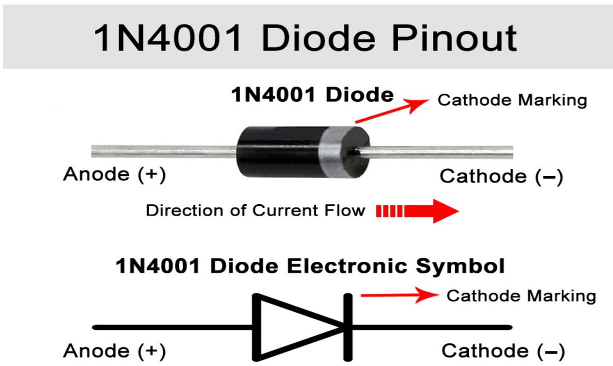
(b) To measure capacitance

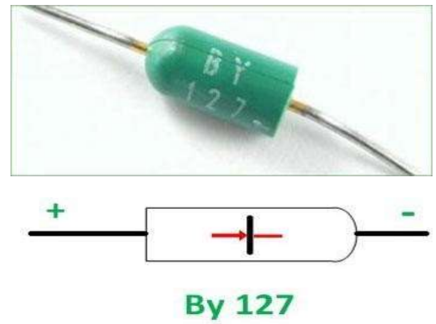
1. Capacitance is measured using LCR meter.
2. Make the contact of leads of the capacitor with the probes of the LCR meter attached to the specific port (LxCx).
3. Choose the proper range by rotating the knob so that the accurate value of capacitance is measured.
4. The measured value is displayed on the LCD screen.
5. Compare the measured value with the value calculated using letter code.
6. In case of electrolytic capacitor, ensure that proper polarity is maintained while measuring (+ to + and – to -).

RESULT:

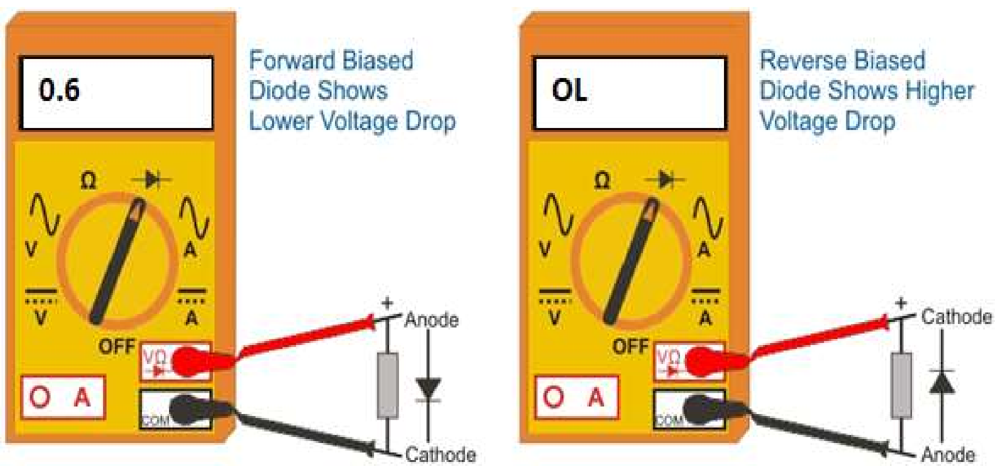
EXP NO. 3: Identification of Diode, Zener diode and BJT & testing them using multimeter

DIODE IDENTIFICATION:





TESTING OF DIODE:

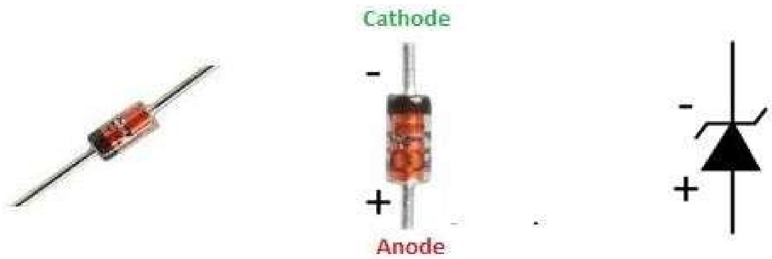


Tabular Column

Sl.No.	Multimeter connection with Diode	Reading	Remarks
1	Red to Anode, Black to cathode		
2	Red to Cathode, Black to Anode		

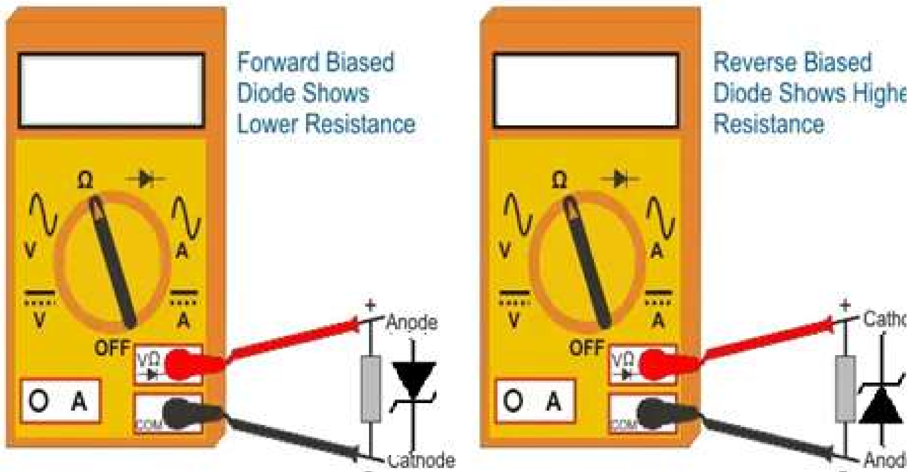
Result: The given Diode BY127/1N4007 is in good condition

ZENER DIODE IDENTIFICATION:



TESTING OF ZENER DIODE:

Method 1



Tabular Column

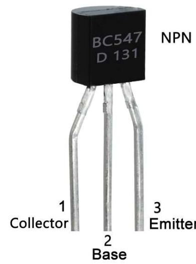
Sl.No.	Multimeter connection with Diode	Reading	Remarks
1	Red to Anode, Black to cathode		
2	Red to Cathode, Black to Anode		

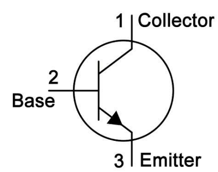
Result: The given Zener Diode 5.1 is in good condition

BJT IDENTIFICATION:

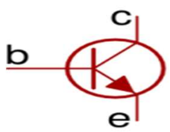
2N3904
(TO-92)

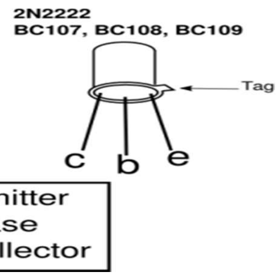
BC107
(TO-18)

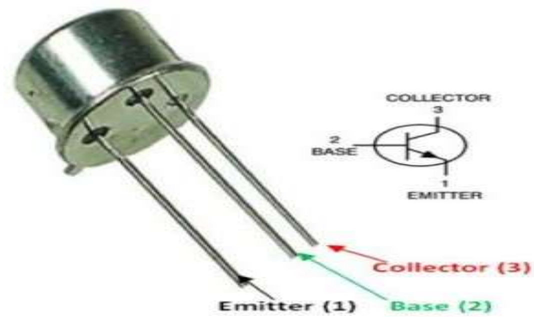




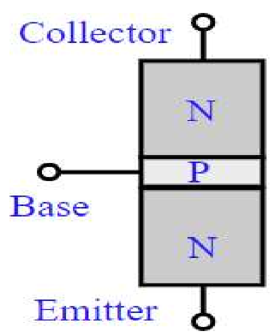
CL100 / SL100

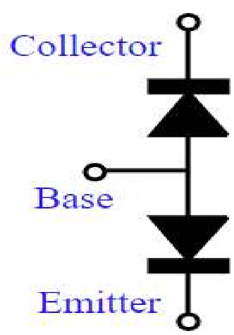


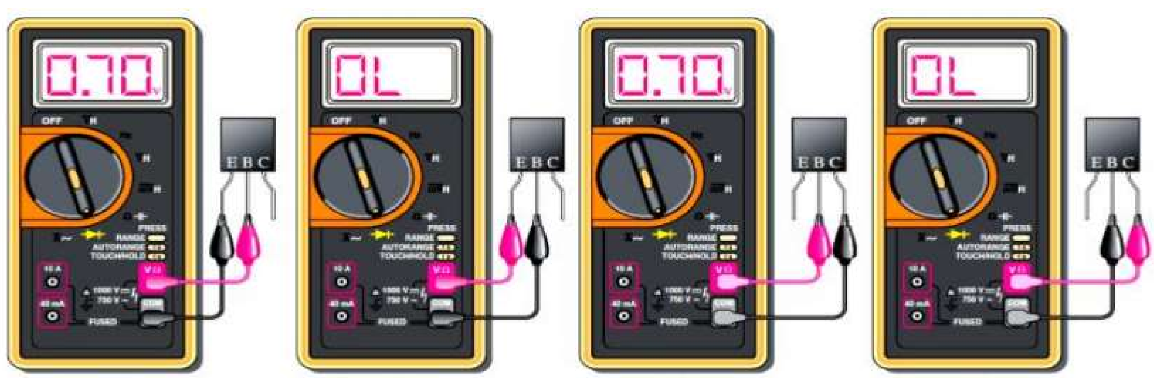




TESTING OF BJT:







(a) Forward-bias test of the BE junction
(b) Reverse-bias test of the BE junction
(c) Forward-bias test of the BC junction
(d) Reverse-bias test of the BC junction

Fig : Typical DMM test of a properly functioning npn transistor. Leads are reversed for a pnp transistor.

EXPT NO. 3: Identification of Diode, Zener diode and BJT & testing them using multimeter

AIM: Identify the active components, terminals, packages, and test them for working, using multimeter

COMPONENTS REQUIRED:

Sl. No.	Name	Specification/Model	Quantity
1.	Diode	1N4001 or BY127	1
2.	Zener diode	5.1V	1
3.	BJT	BC107/108 or CL100	1

PROCEDURE TO TEST DIODE:

1. Set the multimeter to its diode check mode.
2. Connect the red probe of the multimeter to the anode and black probe to the cathode. This means the diode is forward-biased.
3. Observe the reading on multimeter display. If the displayed voltage value is in between 0.6 to 0.7 (for a Silicon Diode), then the diode is healthy and perfect.
   For Germanium Diodes, this value is in between 0.25 to 0.3.
4. Connect the red probe to cathode and black to anode. This is reverse biased condition of the diode where no current flows through it. Hence, the meter should read OL or 1 (which is equivalent to open circuit) if the diode is healthy.
5. If the meter shows irrelevant values to the above two conditions, then the diode is defective.

PROCEDURE TO TEST ZENER DIODE:

1. Connect the test circuit as shown in the above figure.
2. Place the multimeter knob in voltage mode.
3. Gradually increase the input supply to the diode, and observe the voltage on the meter display.
4. Increase the supply, meter output should increase until the breakdown voltage of the diode. And beyond this point meter should show a constant value of voltage irrespective of any increase of the input variable supply. If it so, then Zener diode is healthy, otherwise defective.

PROCEDURE TO TEST BJT:

1. The test relies on the fact that a bipolar transistor can be considered to comprise of two back to back diodes, and by performing the diode test between the base and collector and the base and emitter of thetransistor using a multimeter.
2. Keep the Digital Multimeter (DMM) in diode checking mode by rotating the central knob to

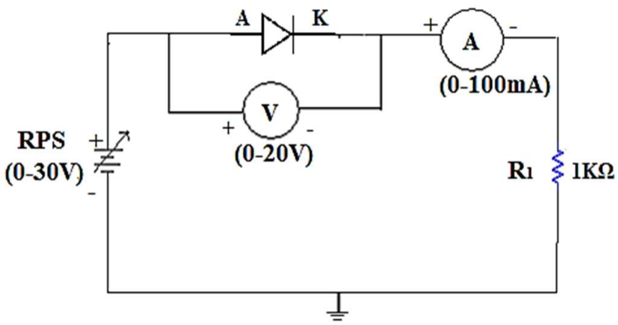
the positionwhere the diode symbol is indicated. In this mode, the multimeter is capable to supply a current of approximately 2mA between the test leads.

3. Connect the red probe to base of the NPN BJT. Now, make contact between black probe and collectorand emitter alternately.
4. The reading would be between 0.5 and 0.7 in each case, for a healthy BJT. If any other value isdisplayed, then the BJT is bad.
5. For a PNP BJT, black probe has to be connected to base of BJT and red probe must be connected toemitter and collector alternately. The reading and condition is same as with NPN.

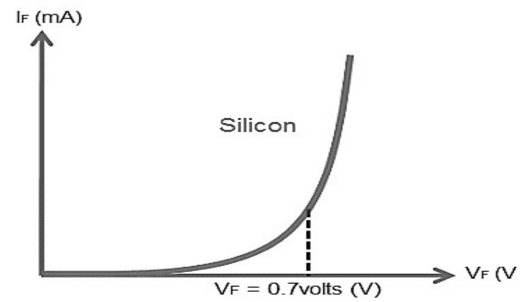
RESULT:

EXP NO. 4: Plot VI characteristics of Diode and ascertain Ri and cut-in voltage using simulator

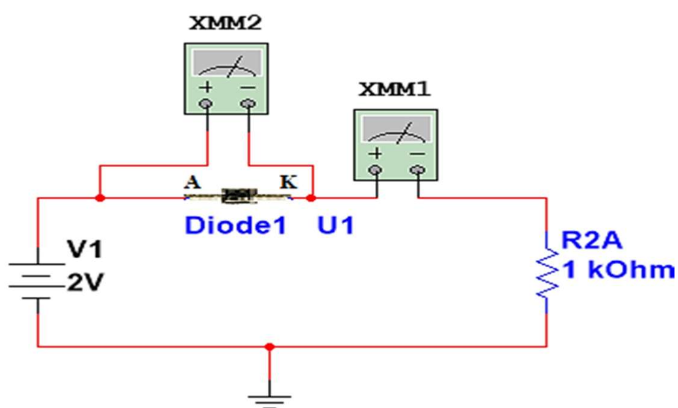
FORWARD BIAS CIRCUIT:

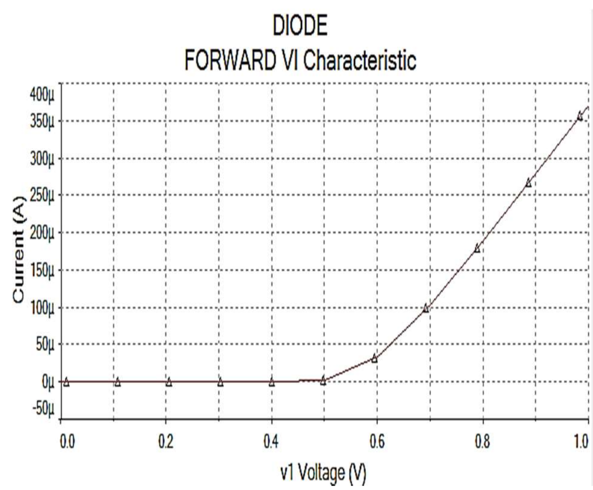


IDEAL WAVEFORM:



CIRCUIT IN MULTISIM SIMULATOR:





Sl.No.	Applied Voltage	Voltage across diode (Vd)	Diode current (mA) (Id)	Forward Resistance of Diode (Ri) = Id/Vd
1	0.1			
2	0.2			
3	0.3			
4	0.4			
5	0.5			
6	0.6			
7	0.7			
8	0.8			
9	0.9			
10	1			
11	1.5			
12	2			
13	2.5			
14	3			

EXP NO. 4: Plot VI characteristics of Diode and ascertain Ri and cut-in voltage using simulator

AIM: - To plot VI characteristics of diode and to find it's cut-in

THEORY:

- ✓ VI characteristics of P-N junction diodes is a curve between the voltage and current through the circuit.
- ✓ When the external voltage is zero, the potential barrier at the junction does not allow the flow of current.
- ✓ When the p-type is connected to + terminal and the n-type to – terminal of the supply, then the diode is forward-biased. The forward voltage sets up an electric field in the opposite direction to that of the potential barrier. As the value of supply increases from 0 to cut-in voltage, the width of the potential barrier decreases. There is no current flowing through the diode till supply voltage becomes barrier potential. Once supply is equal to barrier potential the barrier vanishes allowing current to flow free. After cut-in voltage as supply increases, the current rises exponentially till the diode enters into fully conduction zone.
- ✓ The cut-in voltage (barrier potential) for Germanium is 0.3V and for Silicon is 0.7V.
- ✓ When the p-type is connected to - terminal and the n-type to + terminal of the supply, then the diode is reverse-biased. The deletion region increases and no majority carrier flows through the junction. But the minority carriers crosses the junction allowing a small diffusion current to flow. This current is known as reverse saturation current.

PROCEDURE USING MULTISIM:

1. Make the circuit as shown in circuit diagram.
2. Save the circuit.
3. To set input, click on simulate → analyses & simulation→ DC sweep → analysis parameters→start value= 0 V, stop value = 2V and increment = 0.1 V
4. Click on output→ I → add→ save.
5. To check output click Run.

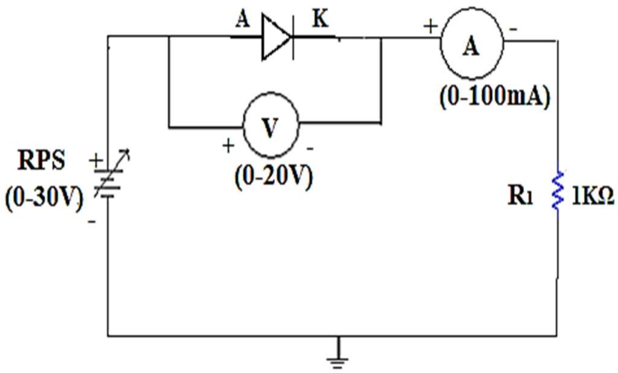
RESULT:

VI characteristic of diode is verified.

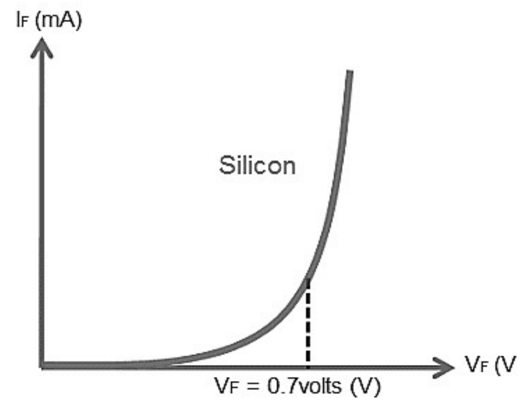
1. Cut-in voltage =_______ V
2. Diode Forward Resistance (Ri) = _________Ω

EXP NO. 5: Plot VI characteristics of Diode and ascertain Ri and cut-in voltage IN REAL ENVIRONMNT

FORWARD BIAS CIRCUIT:



IDEAL WAVEFORM:



TABULAR COLUMN

Sl.No.	Applied Voltage (Vs)	Voltage across diode (Vd)	Diode current (mA) (Id)	Ri = Id/Vd
1	0.1			
2	0.2			
3	0.3			
4	0.4			
5	0.5			
6	0.6			
7	0.7			
8	0.8			
9	0.9			
10	1			
11	1.5			
12	2			
13	2.5			
14	3			

EXPT NO. 5: Plot VI characteristics of Diode and ascertain Ri and cut-in voltage IN REAL ENVIRONMNT

AIM: - To plot VI characteristics of diode and to find its cut-in

COMPONENTS REQUIRED:

Sl.No.	Component	Specification	Quantity
1	P-N Diodes	BY127/ IN4001	1
2	Regulated Power Supply	0-30V	1
3	Voltmeter	0-20V	1
4	Ammeter	0-200 mA, 0-2000µA	1
5	Resistors	1KΩ	1
6	Bread Board and Connecting wires	----------------------	

THEORY:

- ✓ VI characteristics of P-N junction diodes is a curve between the voltage and current through the circuit.
- ✓ When the p-type is connected to + terminal and the n-type to – terminal of the supply, then the diode is forward-biased. The forward voltage sets up an electric field in the opposite direction to that of the potential barrier. As the value of supply increases from 0 to cut-in voltage, the width of the potential barrier decreases. There is no current flowing through the diode till supply voltage becomes barrier potential. Once supply is equal to barrier potential the barrier vanishes allowing current to flow free. After cut-in voltage as supply increases, the current rises exponentially till the diode enters into fully conduction zone.
- ✓ The cut-in voltage (barrier potential) for Germanium is 0.3V and for Silicon is 0.7V.

PROCEDURE in Real Environment:

1. Make the circuit as shown in circuit diagram.
2. Switch on the power supply and increases the supply voltage in steps.
3. Note down the current flowing through the diode and voltage across the diode for step of the input voltage.
4. Plot a graph between voltage and current.
5. Find cut-in voltage and input resistance Ri.

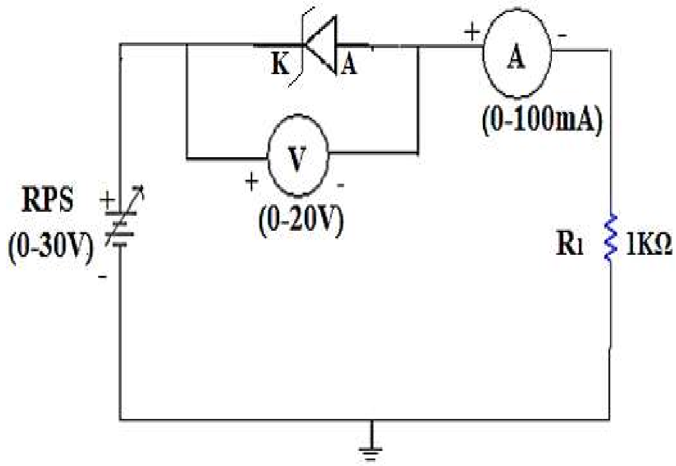
RESULT:

VI characteristic of diode is verified.

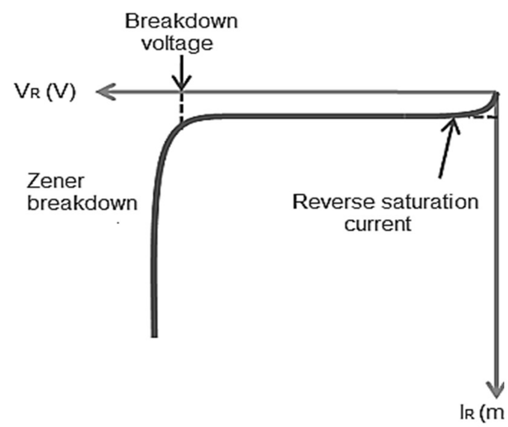
1. Cut-in voltage = ________________ V
2. Static forward resistance = ________________ Ω

EXP NO. 6: Plot REVERSE VI characteristics of ZENER Diode USING SIMULATOR

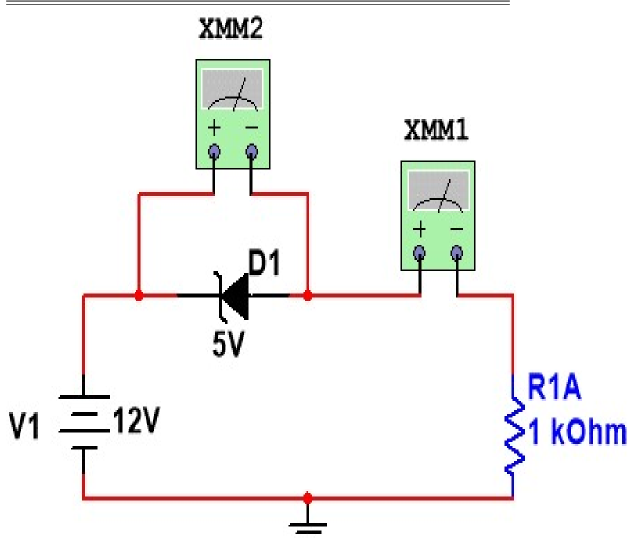
REVERSE BIAS CIRCUIT:

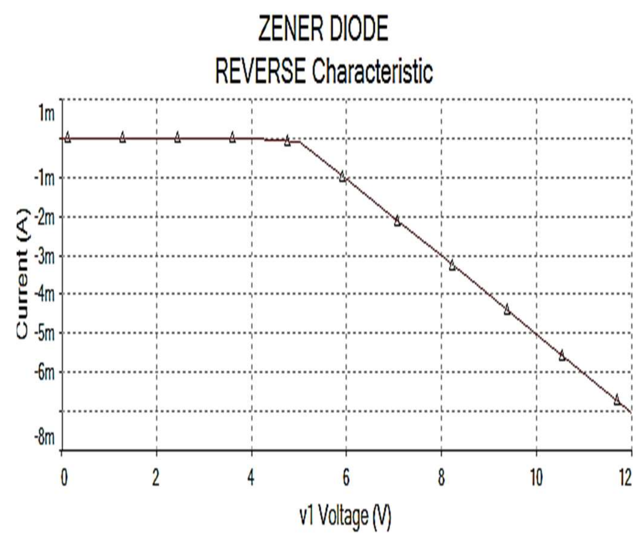


IDEAL WAVEFORM:



CIRCUIT IN MULTISIM SIMULATOR:





EXPT NO. 6 Plot REVERSE VI characteristics of ZENER Diode USING SIMULATOR

AIM: To plot reverse characteristic of zener diode.

THEORY:

- ✓ Zener diode is a heavily doped diode with sharp breakdown voltage. A zener diode acts like normal PN junction diode in forward bias condition. When reverse biased it can either undergo **avalanche break down** or **zener break down.**
- ✓ **Avalanche break down:**

  As reverse voltage increases, the minority carriers gain large amount of energy. These free electrons start moving with high velocity across the junction and collide with the other atoms, thus creating more free electrons. This results in a large reverse current. This process is known as avalanche break down.
- ✓ **Zener break down:**

  In heavily doped diode, depletion region s narrow. When the reverse voltage increased the electric field across the junction increases. Higher electric field at junction causes the covalent bond to break, producing more free electrons. Thus the current increases. This process is known as zener break down.

PROCEDURE USING MULTISIM:

1. Make the circuit as shown in circuit diagram.
2. Save the circuit.
3. To set input, click on simulate → analyses & simulation→ DC sweep → analysis parameters→start value= 0 V, stop value = 20V and increment = 1 V
4. Click on output→ I → add→ save.
5. To check output click Run.

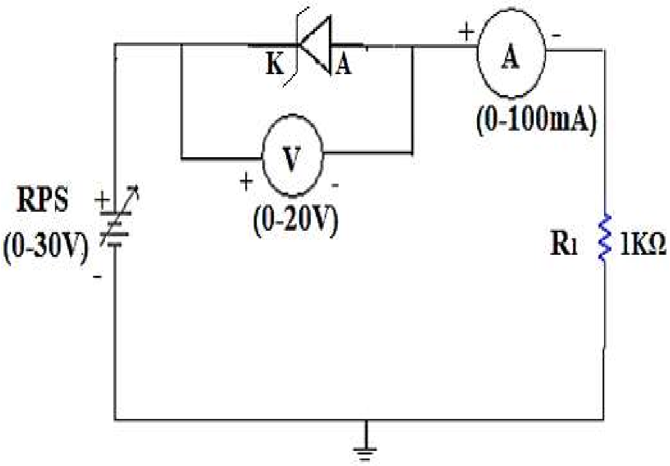
RESULT:

Reverse bias characteristics of the zener diode is verified.

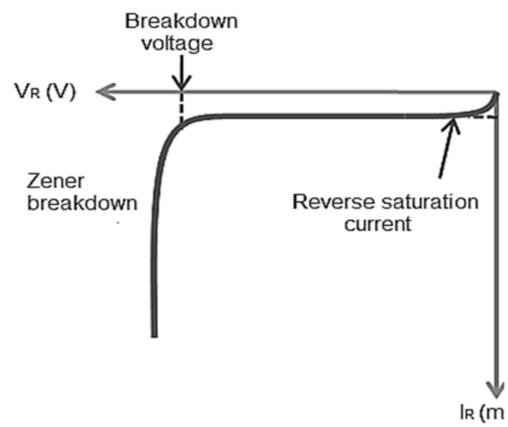
1. Reverse breakdown voltage = _______ V

EXPT NO. 7: Plot REVERSE VI characteristics of ZENER Diode in real environment

REVERSE BIAS CIRCUIT:



IDEAL WAVEFORM:



TABULAR COLUMN:

Sl.No.	Applied Voltage	Zener Voltage (V_R) (V)	Zener current (I_R)
1	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	10		
11	11		
12	12		
13	13		
14	14		
15	15		

EXPT NO. 7: Plot REVERSE VI characteristics of ZENER Diode in real environment

AIM: To plot reverse characteristic of zener diode.

COMPONENTS/APPARATUS REQUIRED:

Sl.No.	Component	Specification	Quantity
1	Zener diode	IZ5.1 or IZ9.1	1
2	Regulated Power Supply	0-30V	1
3	Voltmeter	0-20V	1
4	Ammeter	0-100mA	1
5	Resistors	1KΩ	1 each
6	Bread Board and Connecting wires	-------------------------	

THEORY:

- ✓ Zener diode is a heavily doped diode with sharp breakdown voltage. A zener diode acts like normal PN junction diode in forward bias condition. When reverse biased it can either undergo **avalanche break down** or **zener break down.**
- ✓ **Avalanche break down:**

  As reverse voltage increases, the minority carriers gain large amount of energy. These free electrons start moving with high velocity across the junction and collide with the other atoms, thus creating more free electrons. This results in a large reverse current. This process is known as avalanche break down.
- ✓ **Zener break down:**

  In heavily doped diode, depletion region s narrow. When the reverse voltage increased the electric field across the junction increases. Higher electric field at junction causes the covalent bond to break, producing more free electrons. Thus the current increases. This process is known as zener break down.

PROCEDURE:

1. Make the circuit as shown in circuit diagram.
2. Switch on the power supply and increases the supply voltage in steps.
3. Note down the current flowing through the diode and voltage across the diode for step of the input voltage.
4. Plot a graph between voltage and current.
5. Find breakdown voltage.

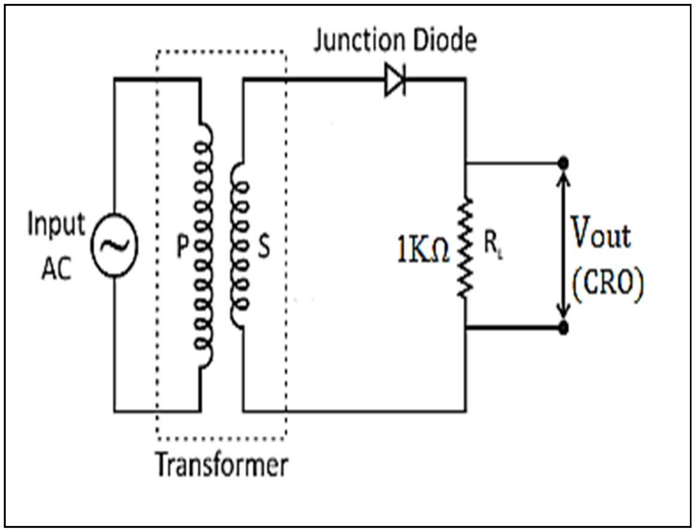
RESULT:

Reverse bias characteristics of the zener diode was Studied.

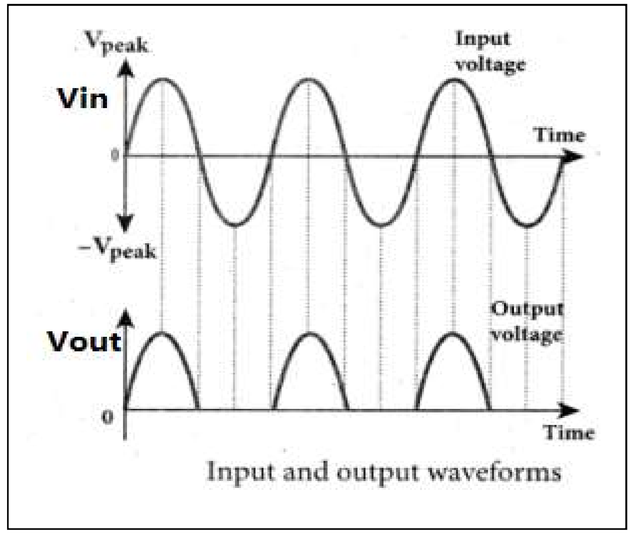
1. Reverse breakdown voltage = ______ V

EXPT NO. 8: Half wave rectifier using simulator

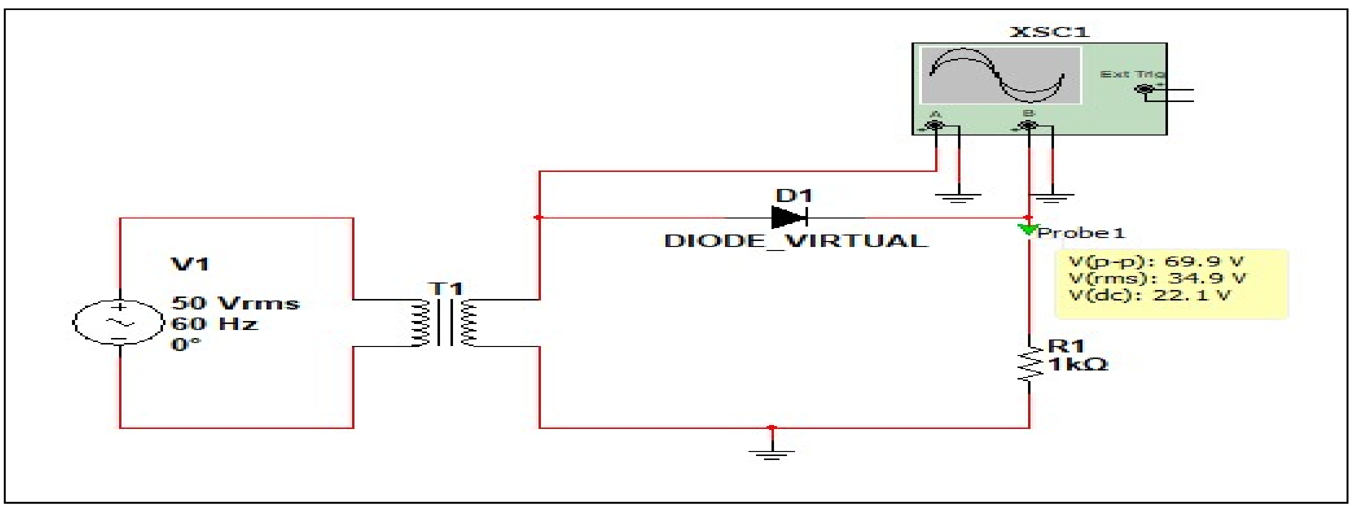
CIRCUIT DIAGRAM:

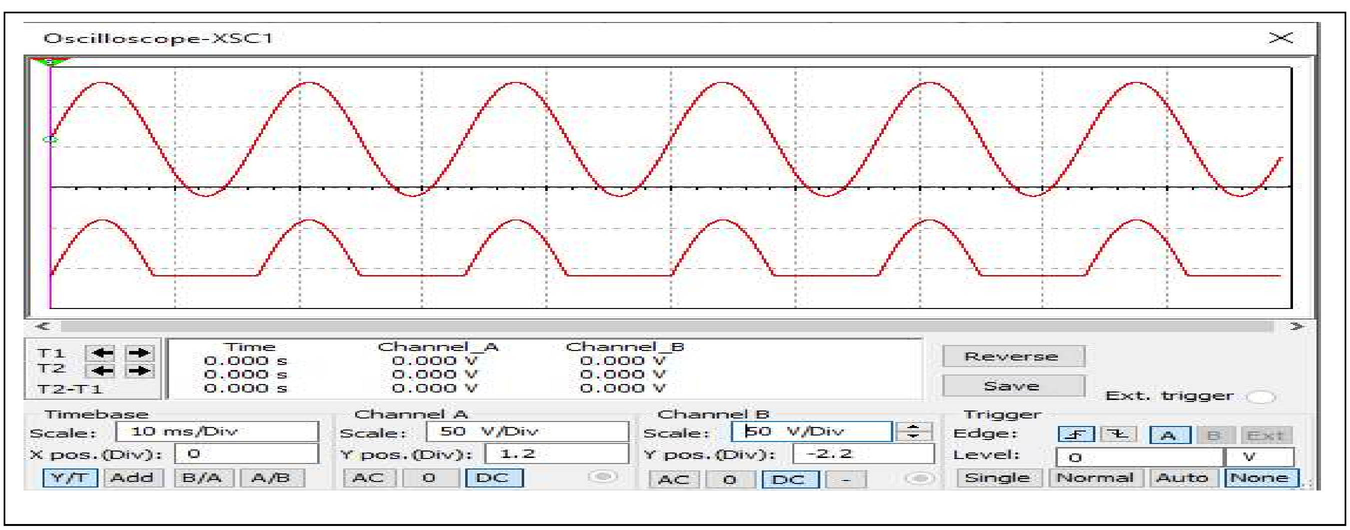


WAVEFORM:



CIRCUIT and OUTPUT IN MULTISIM SIMULATOR:





CALCULATION:

V_m =______ V , V_{rms} = $V_m/2$ = ______ V , V_{dc} = V_m/π = _______ V

Theoretical value:

1) Ripple factor $= \sqrt{(\frac{Vrms}{Vdc})^2 - 1}$

$= \sqrt{(\frac{Vm/2}{Vm/\pi})^2 - 1}$

$= \sqrt{(\frac{\pi}{2})^2 - 1}$

Ripple factor = 1.21

2) Efficiency $= (\frac{Vdc}{Vrms})^2 \text{X}100$

$= (\frac{Vm/\pi}{Vm/2})^2 \text{X}100$

$= (2/\pi)^2 \text{X}100$

η = 40.51

Practical value:

1. Ripple factor = $\sqrt{(\frac{Vrms}{Vdc})^2 - 1}$

   Ripple factor = ___________

2. Efficiency = $(\frac{Vrms}{Vdc})^2 \text{X}100$

   Efficiency = ____________

EXPT NO. 8: Half wave rectifier using simulator

AIM: To study the half wave rectifier without filter and to calculate ripple factor, efficiency and PIV.

THEORY:

Rectifier is an electronic device with covert the alternating current to unidirectional current, in other words rectifier **converts the A.C voltage to D.C voltage**.

Rectifier is classified as

1. Half wave rectifier
2. Full wave rectifier

Rectifiers are used to convert the main voltage into DC voltage.

Working of Half Wave Rectifier:

The input given to the rectifier will have both positive and negative cycles. The half rectifier will allow only the positive or the negative half cycles. During positive half cycle the diode is forward biased allowing all the input signals to output. During negative half cycle the diode is reverse biased not passing input to output.

PROCEDURE USING MULTISIM:

1. Make the circuit as shown in circuit diagram.
2. Save the circuit.
3. To check output click Run.
4. Find efficiency, ripple factor and PIV.

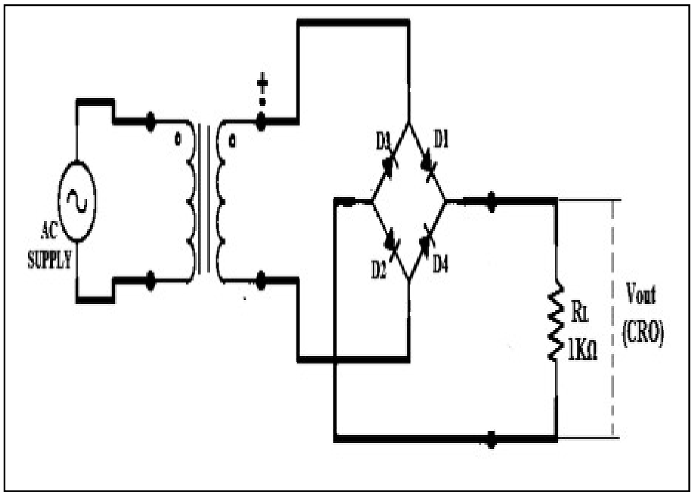
RESULT:

Working of half wave rectifier is studied.

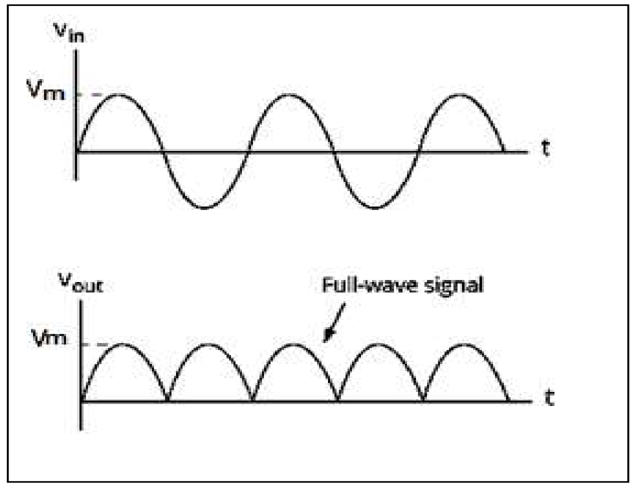
	Ripple Factor	Efficiency (in %)	PIV (in Volts)
Theoretical values			
Practical values			

EXPT NO. 9: full wave rectifier with and without filter in simulator

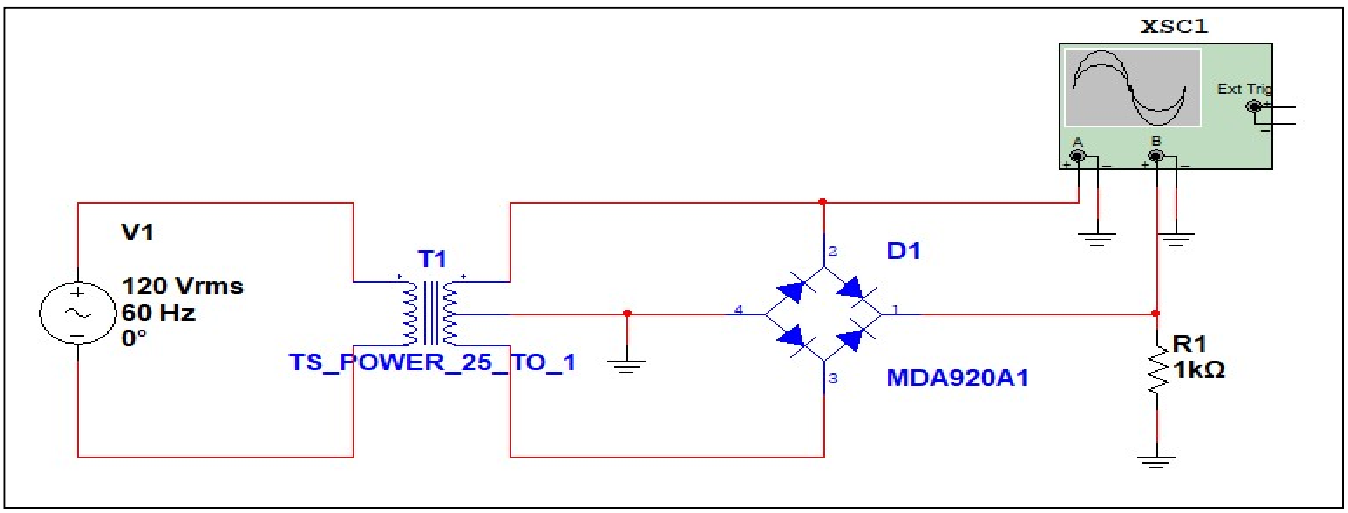
CIRCUIT DIAGRAM WITHOUT FILTER:

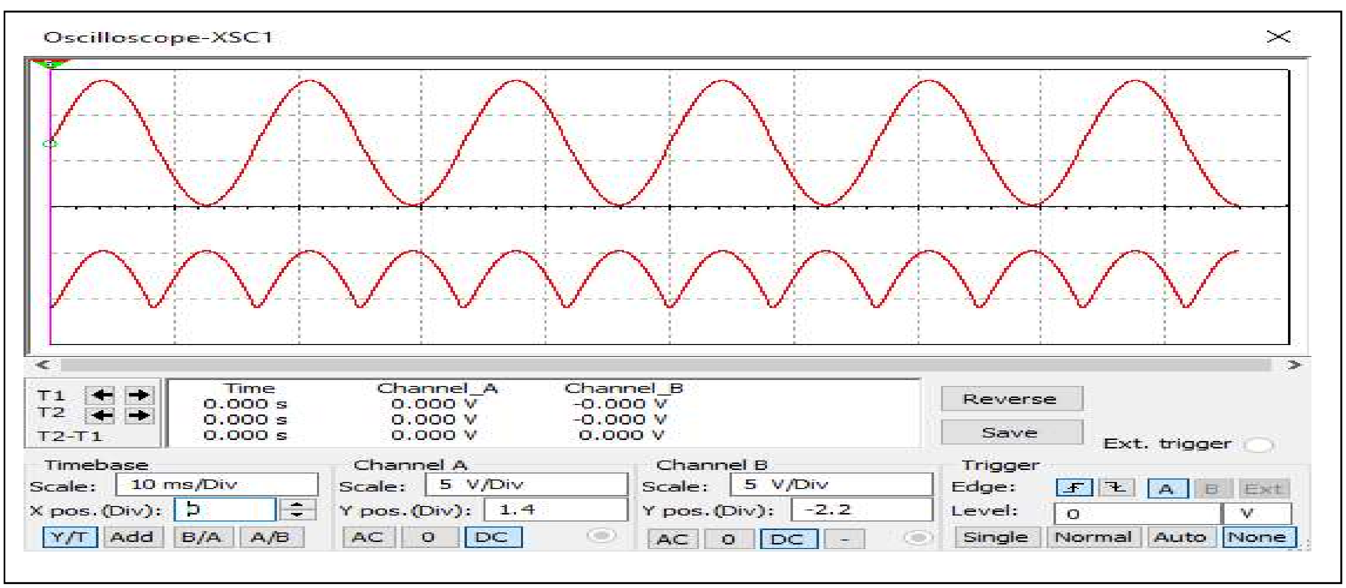


WAVEFORM:

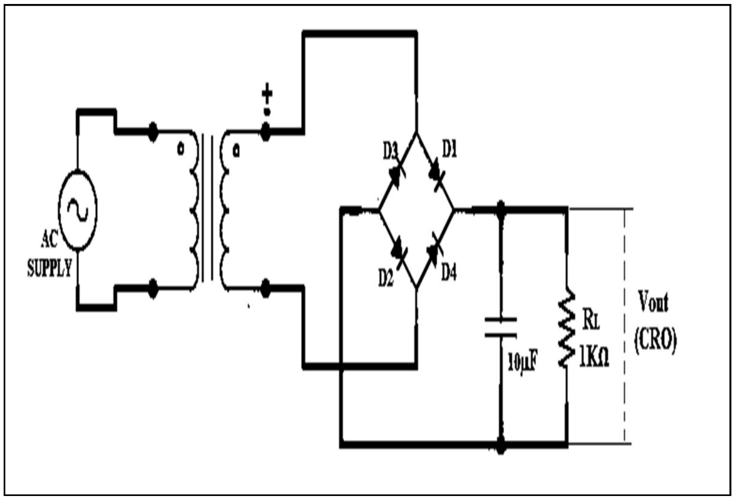


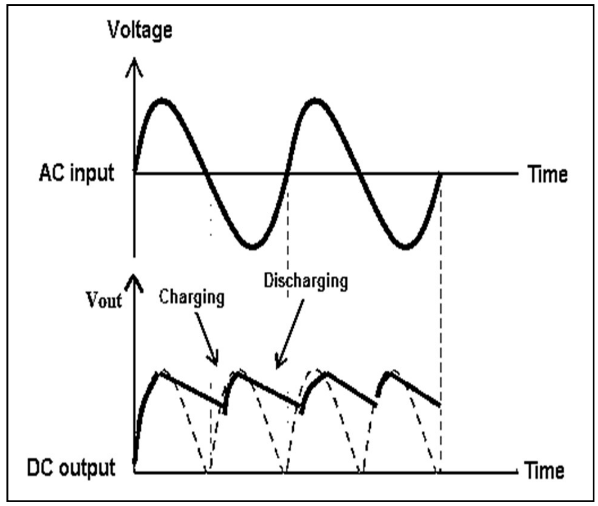
CIRCUIT IN SIMULATOR:



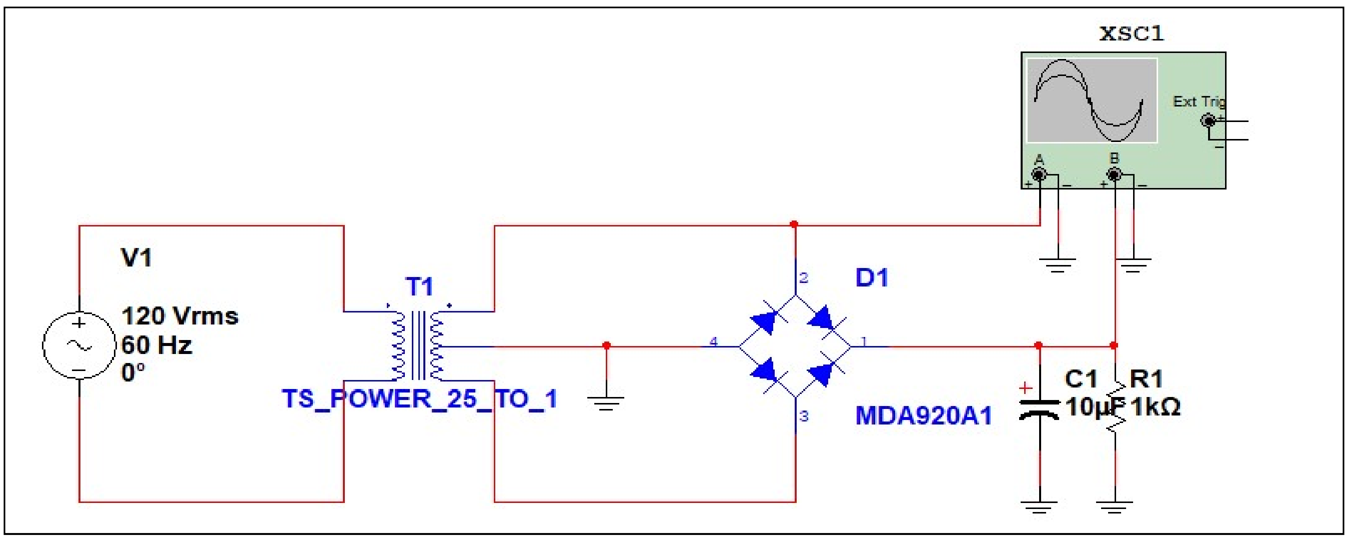


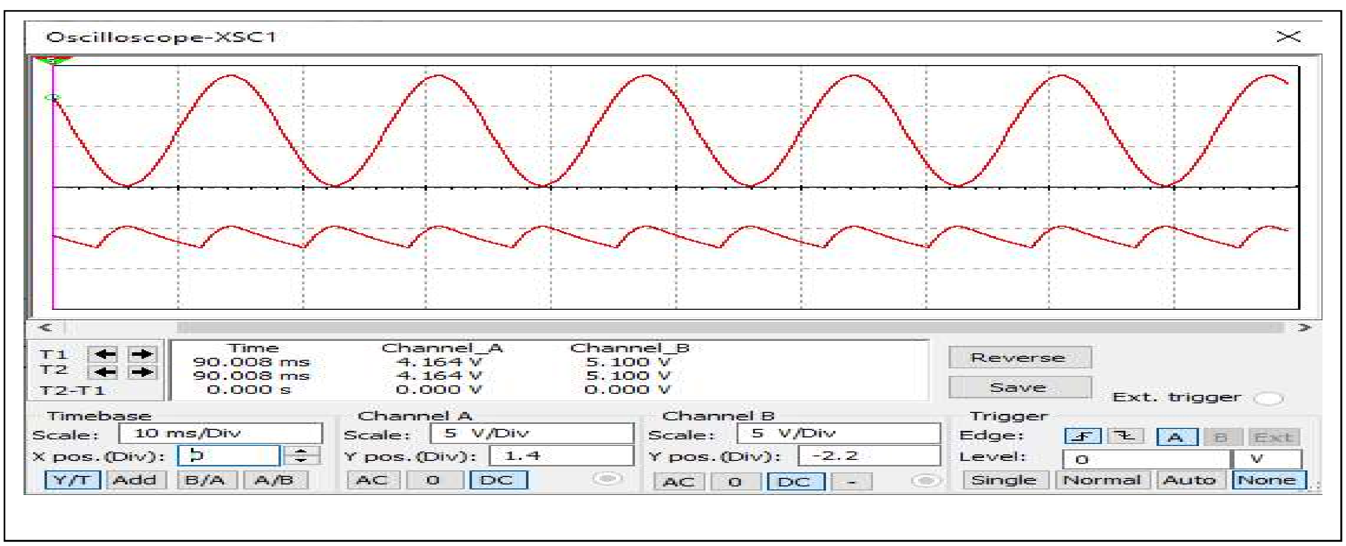
CIRCUIT DIAGRAM WITH FILTER: **WAVEFORM:**





CIRCUIT IN SIMULATOR:





EXPT NO. 9: Full wave rectifier with and without filter in simulator

AIM: To study the bridge rectifier with and without filter and to calculate ripple factor, efficiency and PIV.

THEORY:

The bridge rectifier uses four diodes, connected together in a "bridge" configuration. The secondary winding of the transformer is connected on one side of the diode bridge network and the load on the other side.

The full wave rectifier will allow both positive and negative half cycles. During positive half cycle the diodes D_1 and D_2 are forward biased produces positive load voltage at output. During negative half the diodes D_3 and D_4 are forward biased produces positive load voltage at output. The output of bridge rectifier is pulsating DC. To obtain pure DC voltage filter circuits are used.

PROCEDURE USING MULTISIM:

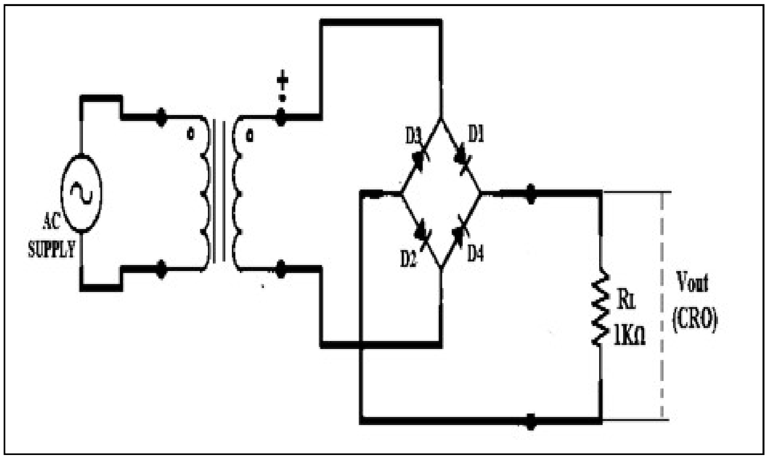
1. Make the circuit as shown in circuit diagram.
2. Save the circuit.
3. To check output click Run.
4. Find efficiency, ripple factor and PIV.

RESULT: **Working of bridge wave rectifier with and without filter are studied.**

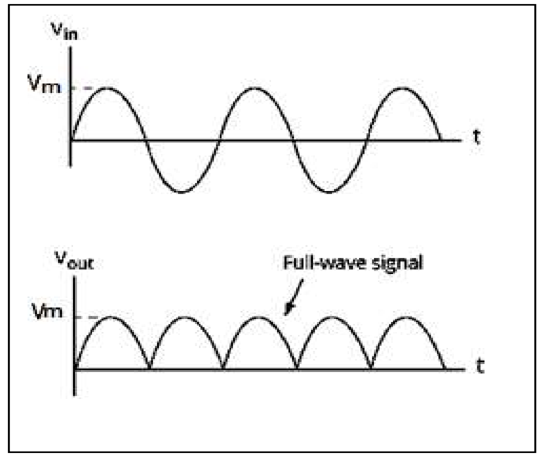
	Ripple Factor		**Efficiency (in %)**		**PIV (in Volts)**	
	Theoretical	Practical	Theoretical	Practical	Theoretical	Practical
With Filter						
Without Filter						

EXPT NO. 10: full wave rectifier with and without filter in real environment

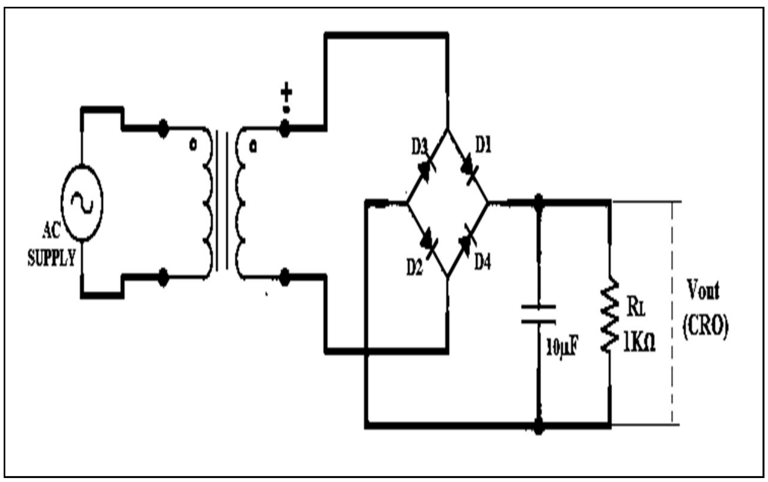
CIRCUIT DIAGRAM WITHOUT FILTER:



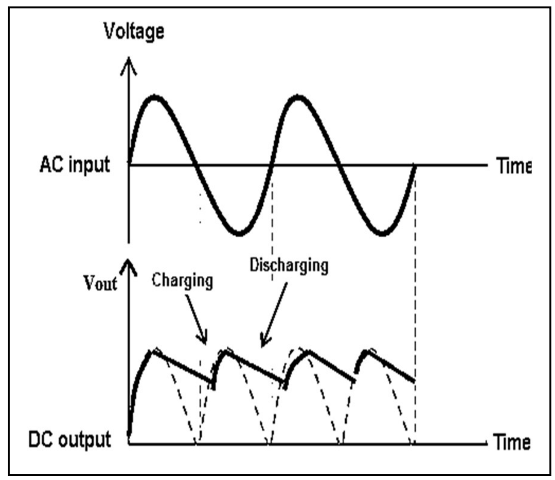
WAVEFORM:



CIRCUIT DIAGRAM WITH FILTER:



WAVEFORM:



CALCULATION:

V_m = ______ V , $V_{rms} = V_m/\sqrt{2}$ = ______ V , $V_{dc} = 2V_m/\pi$ = _______ V

Theoretical value:-

1) Ripple factor $=\sqrt{(\frac{Vrms}{Vdc})^2 - 1}$

$=\sqrt{(\frac{Vm/\sqrt{2}}{2Vm/\pi})^2 - 1}$

$=\sqrt{(\frac{\pi}{2\sqrt{2}})^2 - 1}$

Ripple factor = 0.48

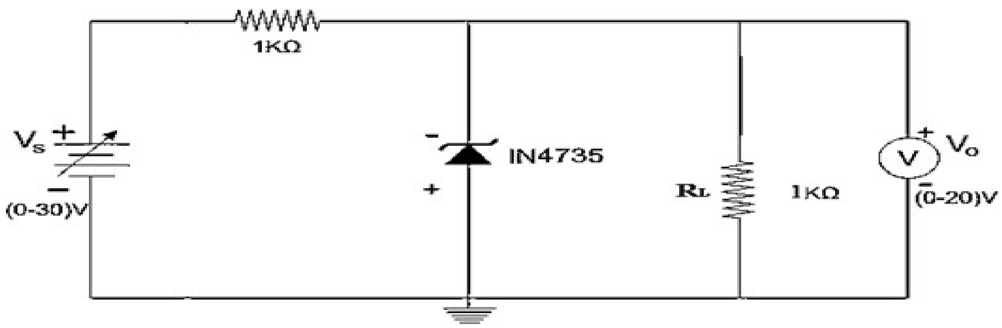
2) Efficiency $= (\frac{Vdc}{Vrms})^2 X100$

$= (\frac{2Vm/\pi}{Vm/\sqrt{2}})^2 X100$

$= (2\sqrt{2}/\pi)^2 X100$

EXPT NO. 11: Zener diode as voltage regulator in simulated and real environment

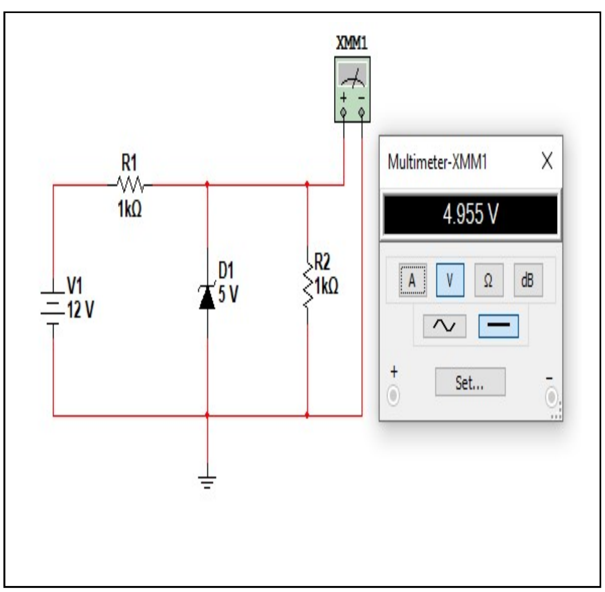
CIRCUIT DIAGRAM:

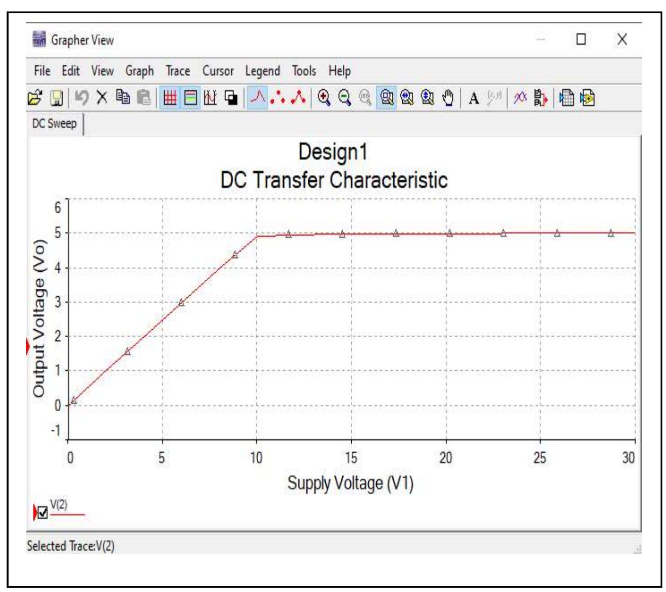


TABULAR COLUMN:

Sl. No.	Supply Voltage (V_S)	Load voltage (V_o)
1	10V	
2	15V	
3	20V	
4	25V	
5	30V	

CIRCUIT IN SIMULATOR:





EXPT NO. 11: zener diode as voltage regulator in simulated and real environment

AIM: To study Zener diode as voltage regulator.

APPARATUS REQUIRED:

Sl.No.	Component	Specification	Quantity
1	Zener diode	IZ5.1 or IZ9.1	1
2	Regulated Power Supply	0-30V	1
3	Voltmeter	0-20V	1
4	Resistors	1KΩ	1 each
5	Bread Board and Connecting wires	-------------------------	

THEORY:

Zener Diodes are widely used as **Shunt Voltage Regulators to regulate the voltage across small loads**. Zener Diodes have a sharp reverse breakdown voltage and is constant for a wide range of currents.

Basically there are two type of regulations:

1) Line Regulation: In this type of regulation, series resistance and load resistance are fixed, only input voltage is changing. Output voltage remains the same.

2) Load Regulation: In this type of regulation, input voltage is fixed and the load resistance is varying. Output volt remains same for different load resistance value.

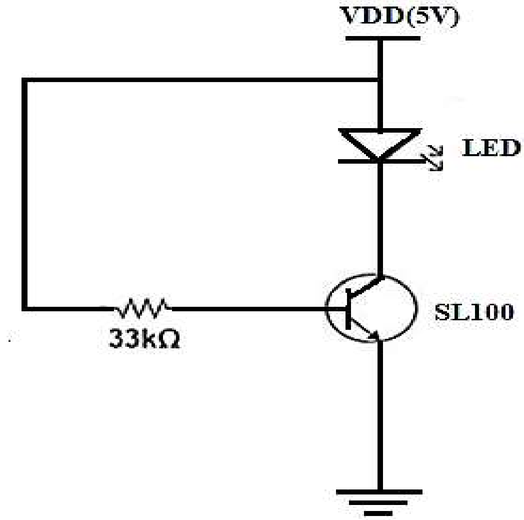
PROCEDURE:

1. Make the circuit as shown in circuit diagram.
2. For load regulation
   - ✓ Keep supply voltage Vs constant (Vs =10V).
   - ✓ Vary the load resistor R_L.
   - ✓ Tabulate the output voltage for each load value.
3. For line regulation
   - ✓ Keep load resistance R_L constant (R_L =1kΩ).
   - ✓ Vary the supply voltage Vs.
   - ✓ Tabulate the output voltage for each supply value.
4. In both regulation the output voltage remains constant. Hence the zener diode can be used as zener regulator

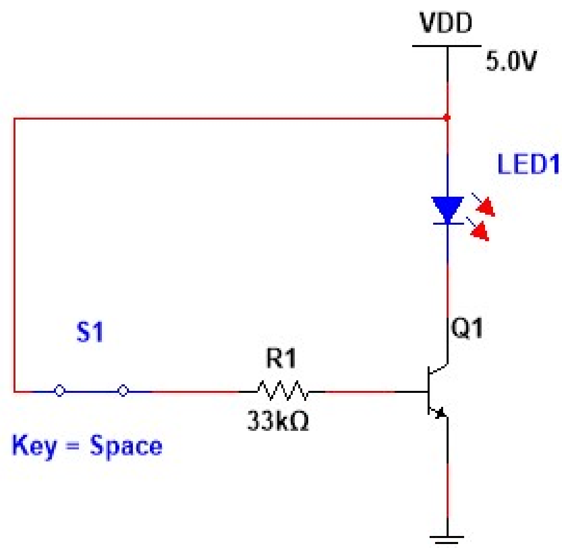
RESULT: Zener diode as voltage regulator is studied.

EXPT NO. 12: BJT as switch using simulator

CIRCUIT DIAGRAM:



CIRCUIT IN MULTISIM:



EXPT NO. 12: BJT as switch using simulator

AIM: To study BJT as switch.

APPARATUS:

Sl. No.	Component	Specification	Quantity
1	Transistor	BC107 or SL100	1
2	Regulated power supply	0-30V	1
3	LED	----------------------	1
4	Resistors	33 KΩ	1 each
5	Bread board, connecting wires		

THEORY:

When the transistor is made to operate between cut-off and saturation region, it acts as a switch.

1. When the input voltage V_{BE}=0V, the emitter base junction is reverse biased and the transistor is OFF i.e., in cut-off region. During this condition the output voltage V_0=V_{CC}.
2. When the input voltage V_{BE}=5V, the emitter base junction is forward biased and the transistor is ON i.e., in saturation region .During this condition, the output voltage V_0=V_{CE} (0.2 to 0.3V).

Therefore,

1) When SW is open, V_{BE}=0V, transistor is OFF, V_0=V_{CC} (open switch) and LED=OFF.

2) When SW is closed, V_{BE}=5V, transistor is ON, V_0=0 (closed switch) and LED=ON.

PROCEDURE:

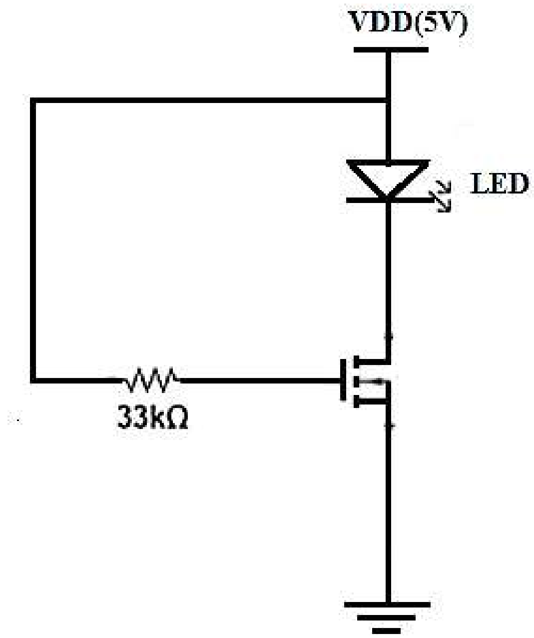
1. Connect the circuit as per the circuit diagram.
2. When SW is open transistor is OFF and the LED is OFF.
3. When SW is closed transistor is ON and the LED is ON.

RESULT:

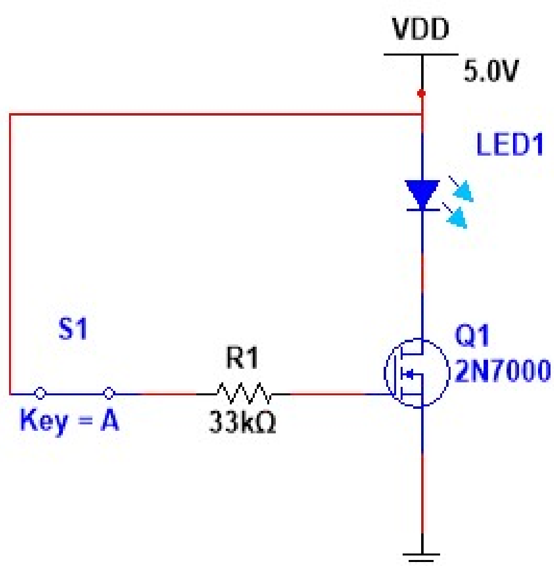
The working of transistor as a switch is verified.

EXPT NO. 13: MOSFET as a switch using simulator

CIRCUIT DIAGRAM:



CIRCUIT IN MULTISIM:



EXPT NO. 13: MOSFET as a switch using simulator

AIM: To study MOSFET as switch.

APPARATUS:

Sl.No.	Component	Specification	Quantity
1	MOSFET		1
2	Regulated power supply	0-30V	1
3	LED	----------------------	1
4	Resistors	33 KΩ	1 each
5	Bread board, connecting wires		

THEORY:

When the MOSFET is made to operate between cut-off and saturation region, it acts as a switch.

1. When the input voltage V_{GS}=0V, the MOSFET is OFF i.e., in cut-off region. During this condition the output voltage V_0=V_{CC}.
2. When the input voltage V_{GS}=5V, the MOSFET is ON i.e., in saturation region.

Therefore,

1) For V_{GS}=0V, MOSFET is OFF, V_0=V_{CC} (open switch) and LED=OFF.

2) For V_{GS}=5V, MOSFET is ON, V_0=0 (closed switch) and LED=ON.

PROCEDURE:

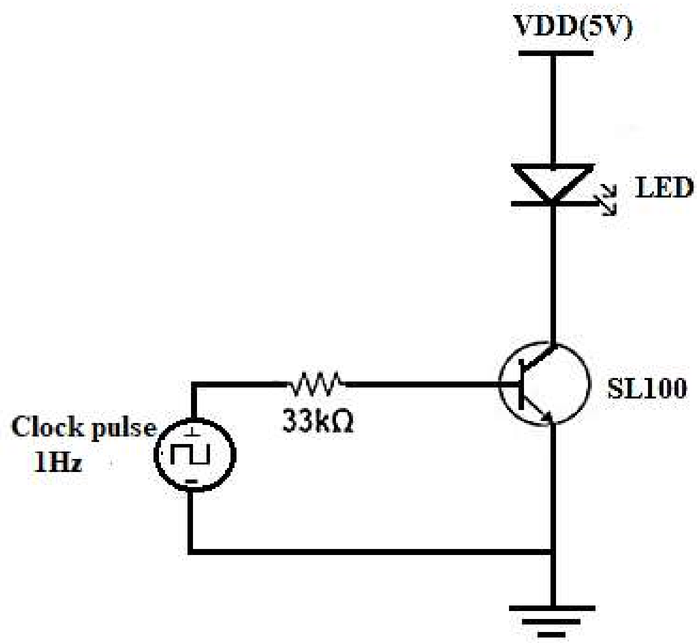
1. Connect the circuit as per the circuit diagram.
2. When SW is open transistor is OFF and the LED is OFF.
3. When SW is closed transistor is ON and the LED is ON.

RESULT:

The working of MOSFT as a switch is verified.

EXPT NO. 14: Blink an led using BJT in simulated and real environment

Circuit diagram:



Circuit in simulator: