

- * Define electronics? Explain the important of electronic in modern society?
- Ans:** Electronics is the branch of science & technology that deals with study of flow or control of the electrons (electricity).
- ↳ The study of their behaviour and effects in vacuum tubes and semi-conductor & conductor with device using such electronics.
- * Ans: Importance of electronic in modern society:
- ↳ Using electronics today is so much part of your daily life we hardly think of the way the world be without electronics everything from cooking to music uses electronic component in some way.
- ↳ A car has many electronics component as does our cooking stove, laptop and cell phones etc.
- ↳ Children and teenagers carry mobile device with them every where and use them to take and send pictures, videos and to play music along with texts etc are done.
- ↳ Wireless internet is becoming more common at all the time, with laptop set-up in cyber cafes where people can drink coffee and check their email all the same time.
- ↳ It made people lives easier, smoother and more vibrant reduced distances between nations, such as the use of mobile phones and personal computers.
- Ans: Function of CRT (Cathode Ray tube):
- To convert an electrical signal into a visual display.
 - In CRO (Cathode Ray Oscilloscope).
 - As display device in Vadday.
 - In television.
 - In computer monitor.
 - In communication technology.
 - In Computer.

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- * Explain dynamic microphone with neat sketch.
- ↳ A microphone in which diaphragm, the sound waves cause a movable wire or coil to vibrate in a magnetic field and thus induced a current is called dynamic microphone.

- Ans:** Construction:
- ↳ The dynamic microphone consists of a magnet and a diaphragm to which a coil is attached.

- ↳ The assembly is held in place by an outer casing and the coil can move freely over the magnet.
- ↳ They are a main part of dynamic microphone. Diaphragm, windscreen, coil, magnetic core, capsule, body, output.
- ↳ Windscreen: The windscreen is the part of the mic that you speak or sing into.
- ↳ Diaphragm: The diaphragm collects sound and transforms them into electrical current.

Ans: Working Principle or Operation:

- ↳ A dynamic microphone operates like a speaker in reverse. The diaphragm is moved by changing sound pressure. This moves the coil, which causes current to flow as lines of flux from the magnet are cut so instead of putting electrical energy into the coil you get energy out of it.

* Application of dynamic microphone:

- live performance (Vocals).
- Sound recording (Vocals).
- close-miking.
- Drum.

- * Explain basic construction and operation of zener diode?
- Ans:** Construction of zener diode:
- ↳ The operation of a zener diode depends on the doping level of the PN Junction.
- ↳ The depletion region is very thin and the electric field is very high even for a small reverse bias voltage.
- ↳ And it allows the electron to move from the valence band of P-type material to the conduction band of the N-type terminal.
- ↳ The breakdown voltage of a diode can be accurately control at the time of the doping level the breakdown voltage of a commonly available zener diode.

Ans: operation (Working):

- ↳ The zener will maintain constant voltage across the load. Inspite of changes in load current or input voltage.
- ↳ As the load current increase the zener current is decrease so that current through resistance R_0 is constant.
- ↳ As Output voltage $V_{out} = I_R \cdot R_0$ & I_R is constant. So output voltage V_{out} remains unchanged.
- ↳ Should the input voltage V_{in} increase more current will flow through the zener, the voltage drop across R_0 will increase but the load voltage would remain constant.

* What is Zener diode?

- ↳ A heavily doped semi-conductor diode which is designed to operate reverse direction is known as zener diode.

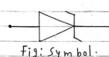


Fig: symbol:

- * Different between Actual (Active) and passive component?

Actual Component	Passive Component
All active component are those that deliver or produce energy or power in the form of voltage & current.	Those that utilize or store energy in the form of voltage & current.
For example: Transistor, diode, integrated circuit and SC etc.	For example: Resistor, capacitor and Inductor.
They are capable for providing the power gain.	They are not capable for providing the power gain.
It can control the flow of current.	It cannot control the flow of current.
They are energy donor.	They are energy acceptors.
It does not require an external source for the operation.	It is require an external source for the operation.

- * Explain the construction and operation of magnetic relay with necessary diagram?

- Ans:** Working Principle of operation:
- ↳ It work on the principle of an electromagnetic attraction when the circuit of the magnetic relay senses the fault current.
- ↳ This magnetic field move the relay armature for opening or closing the connection.
- ↳ The small power relay only, the one contacts and the higher power relay has two contacts for opening the switch.

* Construction of magnetic relays

- ↳ The electromagnetic relay essentially consist of a coil to which a voltage is applied a core upon which the coil is wound, relay contacts and a movable armature which is held against one of the contacts by means of the spring.

- ↳ Contacts: The contact are the most important part of the relay that effected the reliability.

- ↳ Bearing: The bearing may be a single ball, multi-ball, pivot-ball, and sleeve bearing.

- ↳ Termination and Housing.

- ↳ The assembly of an armature with the magnet and the base is made with the help of spring.

- ↳ Electromagnetic design: It is a design includes the design of the magnetic circuit and the mechanical attachment of core, yoke and armature.

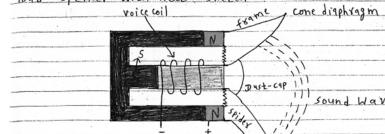
* Application:

- ① Motor control ② Telecommunication

- ③ Industrial appliances ④ Automotive appliances.

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- * Explain the construction and operation of dynamic loud speaker with neat sketch?



Ans: Dynamic loud speaker (Construction):

- ↳ The common type of loudspeaker that uses a magnet field to move a cone-shaped diaphragm. When the alternating current (the audio signal) is applied to the coil, the diaphragm vibrates and causes air to move thus creating sound.
- ↳ It is also known as moving coil loudspeaker.

Ans: Working Principle:

- ↳ An audio signal source such as a microphone or recording produces an electrical "image" of the sound. That is, it produces an electrical signal that has the same frequency and harmonic component and a size that reflects the relative intensity of the sound as it changes.

* Characteristics of loudspeaker:

- Frequency response.
- Noise of music.
- Distortion.
- Directivity.
- Efficiency.
- Impedance.

- * Explain construction working principle and V-I characteristics of SCR with neat sketch?

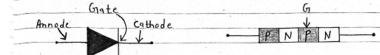


Fig: symbol of SCR.

SCR (Silicon Controlled Rectifier):

- ↳ When a PN junction is added to a junction transistor the resulting three PN junction device is called SCR.

Ans: Construction of SCR:

- ↳ An SCR is constructed with the four layers that consist of the P-type and the N-type semiconductor material.
- ↳ These are layered in such a way that it tends to form three junction that are J_1 , J_2 and J_3 . The three terminals that are attached to it are known as anode, cathode and gate.
- ↳ The anode is the basic terminal through which the current flows where the cathode is the terminal through which the entered current leaves the device.

Ans: Working principle/operation of SCR:

- ↳ The basic working principle in the SCR is that as the triggering or the biasing is applied at the terminal gate then the conduction begins. As it is a unidirectional device that current will be in a single direction.

- ↳ It resembles the operation of the diode but the only difference is that this can withstand the high amount of voltage and power.

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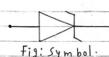


Fig: symbol:

- * Reverse characteristics.

- ↳ When a reverse voltage is applied to a zener voltage a small reverse saturation current flows across the diode.
- ↳ This current is due to the mainly generated minority carriers. As the reverse voltage increases at a certain value of reverse voltage, the reverse current increases drastically and sharply.
- ↳ This is an indication that the breakdown has occurred we call this voltage breakdown voltage or zener voltage.

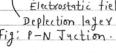
* How PN junction is formed?

- ↳ The system is then heated to a temperature of about 500°C the indium and sum of the (Germanium) melt to form a small puddle of molten Germanium-indium mixture.

- ↳ The temperature is then lowered and puddle begins to solidify under proper condition.

- ↳ The atom of indium impurity will be suitably adjusted in the germanium slab to form a single crystal.

- ↳ Movement of electrons to the P-type side on positive ion cores in the N-type side expose negative ion cores in the P-type side resulting in electron field at the junction and forming the depletion layer.



Electrostatic field.

Depletion layer.

Fig: PN junction.

- * Explain transistor? Explain Working Principle of transistors?

Ans: Transistor:

- ↳ A transistor is a three pin device that regulates current of voltage flow and act as a switch or get for electronic signal. Transistor consists of three layers of a semi-conductor material each capable of carrying a current. It has 3 terminal Emitter, base and collector.

Principle of operation of PNP transistor:

- ↳ When the small current flows through the base of the PNP transistor, it turns on.

- The current in a PNP transistor flows from the emitter to the collector.

- ↳ The voltage required by the transistor's emitter, collector and base is indicated by the letter of the PNP transistor.

- ↳ The connection of an PNP transistor. The forward bias causes the holes in the P-type emitter to flow toward the base.

- ↳ This constitutes emitter current I_E only a few holes (less than 5%) combine with the electron. The remainder (more than 95%) loss into the collector region to constitute collector current I_C .

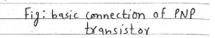


Fig: basic connection of PNP transistor

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