BEEE VIVA QUESTIONS WITH ANSWERS.

1. Why we need starter for machines?

Ans: **Starters** are used to protect DC motors from damage that can be caused by very high current and torque during startup. They do this by providing external resistance to the motor, which is connected in series to the motor's armature winding and restricts the current to an acceptable level.

2. What are the applications of DC motors ?

Ans:

Type of Motor	Characteristics	Applications
Shunt	Speed is fairly constant and medium starting torque.	1. Blowers and fans 2. Centrifugal and reciprocating pumps 3. Lathe machines 4. Machine tools 5. Milling machines 6. Drilling machines
Series	High starting torque. No load condition is dangerous. Variable speed.	1. Cranes 2. Hoists, Elevators 3. Trolleys 4. Conveyors 5. Electric locomotives
Cumulative compound	High starting torque. No load condition is allowed.	1. Rolling mills 2. Punches 3. Shears 4. Heavy planers 5. Elevators
Differential compound	Speed increases as load increases.	Not suitable for any practical applications

3. State KCL and KVL.

Ans: The **KVL states** that the algebraic sum of the voltage at node in a closed circuit is equal to zero. The **KCL** law **states** that, in a closed circuit, the entering current at node is equal to the current leaving at the node.

4. What is the need for zener diode ?

Ans: The **most common** application and **use** of a **zener diode** is in voltage regulation. Because a **zener diode** has such steady and constant voltage output across its terminals when its breakdown voltage is exceeded, it can act as a steady output voltage for a load connected in parallel with it.

5. Write some applications maximum power transfer theorem.

Ans:

Applications of Maximum Power Transfer

1. In communication system, maximum power transfer is always sought. For example in public address system, the circuit is adjusted for maximum power transfer by making load resistance (speaker) equal to the source resistance (amplifier). When source and load have the same resistance, they are said to be matched.
2. In car engines, the power delivered to the starter motor of the car will depend upon the effective resistance of the motor and the internal resistance of the battery. If the two resistances are equal, maximum power will be transferred to the motor to turn to the engine.

6. Compare series and parallel circuits.

Ans:

Difference Between Series and Parallel Circuits	
Series	**Parallel**
The same amount of current flows through all the components	The current flowing through each component combines to form the current flow through the source.
In an electrical circuit, components are arranged in a line	In an electrical circuit, components are arranged parallel to each other
When resistors are put in a series circuit, the voltage across each resistor is different even though the current flow is the same through all of them.	When resistors are put in a parallel circuit, the voltage across each of the resistors is the same. Even the polarities are the same
If one component breaks down, the whole circuit will burn out.	Other components will function even if one component breaks down, each has its own independent circuit
If V_t is the total voltage then it is equal to V1+V2+V3	If V_t is the total voltage then it is equal to V1=V2=V3

7. What are intrinsic and extrinsic semiconductors ?

Ans: The **semiconductor** is divided into two types. The pure form of the **semiconductor** is known as the **intrinsic semiconductor** and the **semiconductor** in which intentionally impurities is added for making it conductive is known as the **extrinsic semiconductor**.

8. Give the expression for energy stored in the capacitor.

Ans:

The energy stored in a capacitor can be expressed in three ways:

$$E_{cap} = \frac{QV}{2} = \frac{CV^2}{2} = \frac{Q^2}{2C}$$

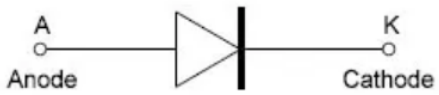
, where Q is the charge, V is the voltage, and C is the capacitance of the capacitor. The energy is in joules when the charge is in coulombs, voltage is in volts, and capacitance is in farads.

9. Give the different types of semiconductors with symbols.

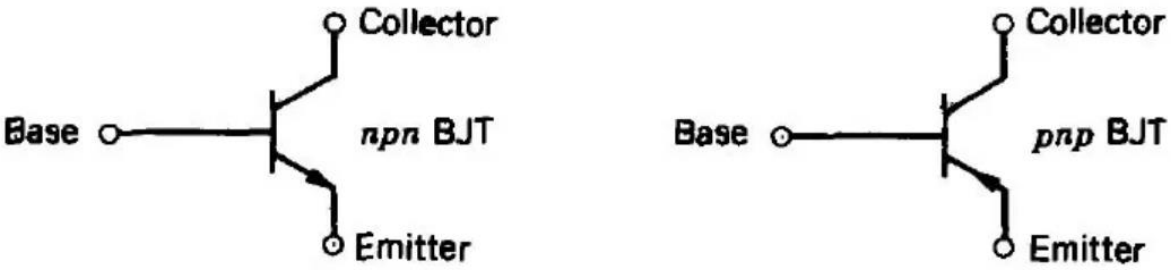
Ans:

Power Diode

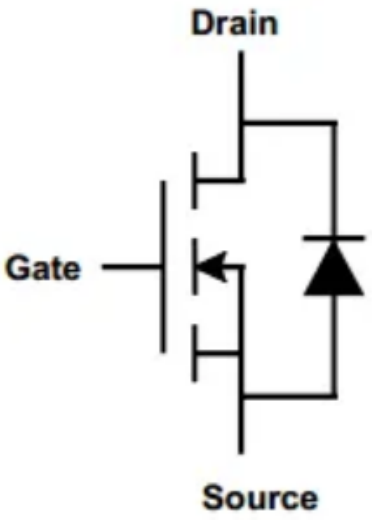
It is a two terminal P-N junction device. The terminals are namely Anode and Cathode.

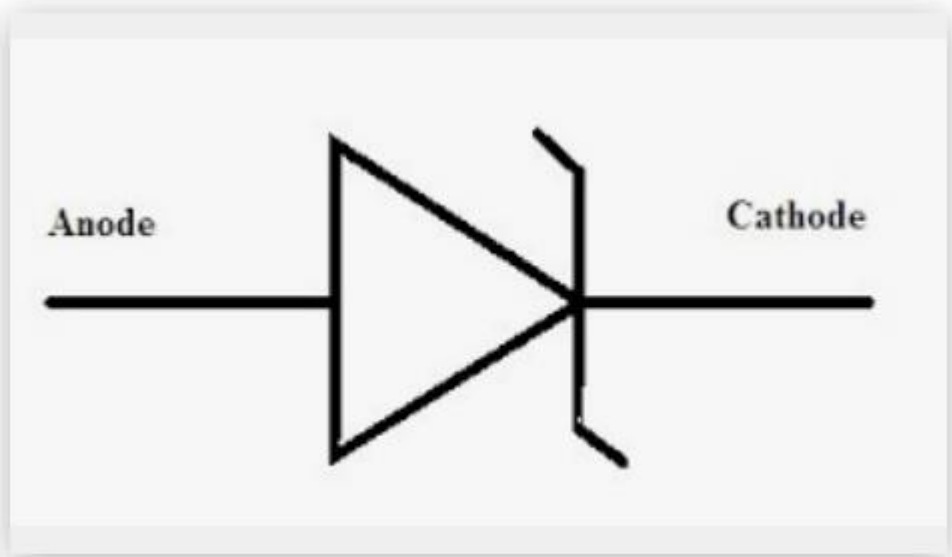


Power BJT

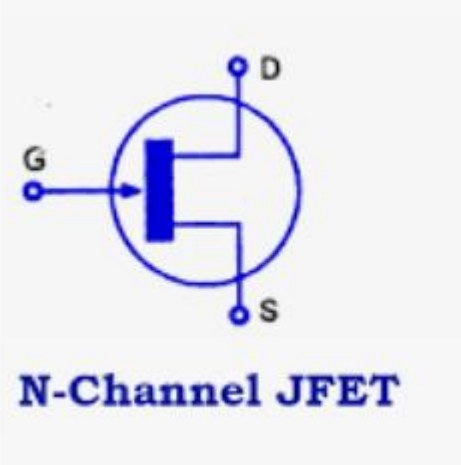


MOSFET: Metal Oxide Semiconductor Field Effect Transistor





Zener Diode : Working Principle ...



10. How does fluorescent lamp work ?

Ans: **Fluorescent** lamps **work** by ionizing mercury vapor in a glass tube. This causes electrons in the gas to emit photons at UV frequencies. The UV light is converted into standard visible light using a phosphor coating on the inside of the tube.

11. Give the classification of AC machines ?

Ans: Based on the working principle, there are mainly three types of AC motors: ***Induction Motor, Synchronous Motor and AC Commutator Motor.***

An induction motor can further be of two types: ***Single Phase Induction Motor and Three Phase Induction Motor***. This classification of induction motor is based on the type of power supply required for its operation. 1 phase AC supply is required for single phase induction motor whereas 3 phase AC supply is needed for three phase induction motor.

On the basis of construction, there are two types of induction motor: ***Squirrel cage Induction Motor and Slip Ring Induction Motor***. Squirrel cage induction motor is most used motor in industries. Slip Ring Induction motor is used where speed control is required.

12. What is the necessity of rectifier ?

Ans: As we are aware that all electrical appliances use a DC power supply to function. Using a rectifier in the power supply helps in converting AC to DC power supply. Bridge rectifiers are widely used for large appliances, where they are capable of converting high AC voltage to low DC voltage.

13. What is the use of brushes in DC motor ?

Ans: They can either be graphite or precious metal **brushes** which have electrical **motor** connections. To supply power to the rotor we put in place a **brush** system and each of the **brushes** have a direct voltage symbol (+/-). The **brushes** are connected to the commutator bars which allows the current to flow into the winding.

14. What is ripple factor ? Why is it required ?

Ans: The definition of the ripple factor is the ratio of the AC component's RMS value and the DC component's RMS value within the output of the rectifier. The symbol is denoted with "γ" and the formula of R.F is mentioned below.

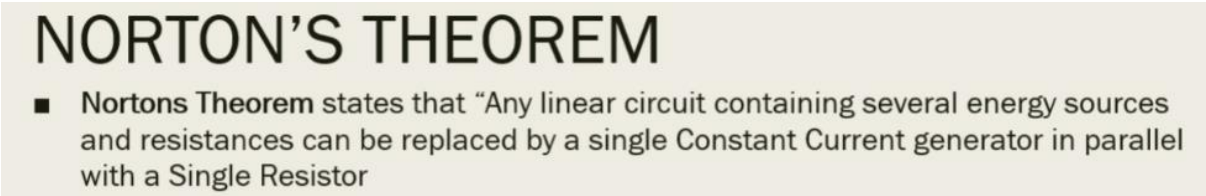
(R.F) = AC component's RMS value / DC component's RMS value

Thus the **R.F = I (AC) / I (DC)**

When the fluctuation occurs within the output of the rectifier then it is known as ripple. So this factor is essential to measure the rate of fluctuation within the resolved output.

15. State Norton's Theorem.

Ans:



16. List the applications of Thevenin's and Norton's Theorem.

Ans: **Applications of Thevenin's , Norton's Theorem:**

- Thevenin's Theorem is especially useful in analyzing power systems and other circuits where one particular resistor in the circuit (called the "load" resistor) is subject to change, and re-calculation of the circuit is necessary with each trial value of load resistance, to determine voltage across it and current through it.
- Source modeling and resistance measurement using the Wheatstone bridge provide applications for Thevenin's theorem.

The applications of Norton theorem is similar to that of Thevenin's theorem.The main application is nothing but the simplification of electrical circuit by introducing source transoformation.

17. Why the armature of DC motor is laminated ?

Ans: the **armature** of a dc machine is **laminated** to reduce eddy current losses.

18. Why are filters connected at the output of rectifiers ?

Ans: The filter is a device that allows passing the dc component of the load and blocks the ac component of the rectifier output. Thus the output of the filter circuit will be a steady dc voltage. Thats why the filters are connected at the output of rectifier.

19. What are the advantages of fluorescent light bulbs ?

Ans: **Fluorescent Light Tube Advantages**

- **Energy** efficient- so far the best light for interior lighting.
- Low production **cost** (of tubes, not of the ballasts)
- Long life of tubes.
- Good selection of desired color temperature (cool whites to warm whites)
- Diffused light (good for general, even lighting, reducing harsh shadows)

20. What is the purpose of magnetic ballast in fluorescent lamp ?

Ans: a **magnetic ballast** regulates the voltage a fluorescent light receives so that the bulb doesn't overheat and immediately explode. A **magnetic ballast** is a type of electrical power regulator used in fluorescent light systems

21. What is the voltage required to start a fluroscent lamp ?

Ans: Fluorescent tubes and electroluminescent panels typically require 200 to **600 V** for starting and running illumination.

22. Compare electronic ballast and magnetic ballast.

Ans: **Electronic Ballasts**

Electronic ballasts alter the flow of electricity in the light bulb by using a series of induction coils that are separated from one another. In contrast, magnetic ballast uses 1 induction coil and not a series.

Another difference is that electronic ballasts change the frequency of the electrical current without changing the voltage. While magnetic ballasts in fluorescent lamps work at a frequency of 60 hertz, electronic ballasts greatly increase that frequency to 20,000 hertz.

Due to such a high frequency, you will not see the lights flickering and will not hear a buzzing sound with fluorescent lamps using electronic ballasts.

Magnetic Ballasts

Since magnetic ballasts are not as sophisticated as electronic ballasts and can be problematic,

they are being replaced by the electronic versions. Magnetic ballasts are found in the light socket in between the plug for the light bulb and the power cord.

In magnetic ballasts, current flows through coils of copper wire before moving on to the light bulb. Most of the current gets caught in the magnetic field it generates, with only small increments moving on to the light bulb. The current that is passed on depends on the thickness and the length of the copper coil. This inconsistent flow of the current is what causes the lights of the lamp to flicker and also creates the buzzing sound.

electronic ballasts are preferred because it has many other advantages. They are smaller in size and weigh less. They are also great for the environment and your bank account because they are energy efficient and therefore lower your monthly energy bill.

Another advantage is that electronic ballasts can be used in lamps that are in parallel and series mode. If one of the lamps goes out, this will not affect the other lamps even though all the lamps are using the same ballast.

Also, if you want to replace your magnetic ballast with an electronic ballast, this is cheap and relatively easy to do.

23. What is the function of starter in a fluorescent lamp ?

Ans: starters are used to help fluorescent tubes and lamps ignite in the initial starting stage of their operation.

starters are a timed switch. The switch opens and closes until the fluorescent tube 'strikes' and lights-up. If the fluorescent tube does not light, the switch repeats it's open/close cycle and the fluorescent tubes attempts to ignite again.

24. List out the advantages of staircase wiring.

Ans: **Advantages of Using Staircase Wiring:**

- Easy to control appliances from various points.
- Faster control than a single switch.
- Highly Efficient for larger places.
- Living Comfort can be increased.
- Electricity can be saved.

25. Mention the value of ripple factor for HWR , FWR.

Ans: the ripple factor of a half-wave rectifier is = 1.21 and the ripple factor for full-wave rectifier is =0.483

26. State the average and peak value of a half wave rectifier.

Ans:

The average voltage equation for a half wave rectifier is $V_{DC} = V_m/\pi$.

Peak factor of half wave rectifier can be calculated as,
$V_m / V_{RMS} = V_m / (V_m / 2) = 2 V_m / V_m = 2$.

27. State the average and peak value of full wave rectifier.

Ans: Average voltage equation for a full wave rectifier is $V_{DC} = 2V_m/\pi$.

Peak factor of half wave rectifier can be calculated as,
$V_m / V_{RMS} = V_m / (V_m / 2) = 2 V_m / V_m = 2$.

28. Give the merits and demerits of k-map.

Ans: Advantage:

1.Minimizes boolean expressions without the need using various boolean theorems & computations.

2.Minimizes number of Logical gates used.

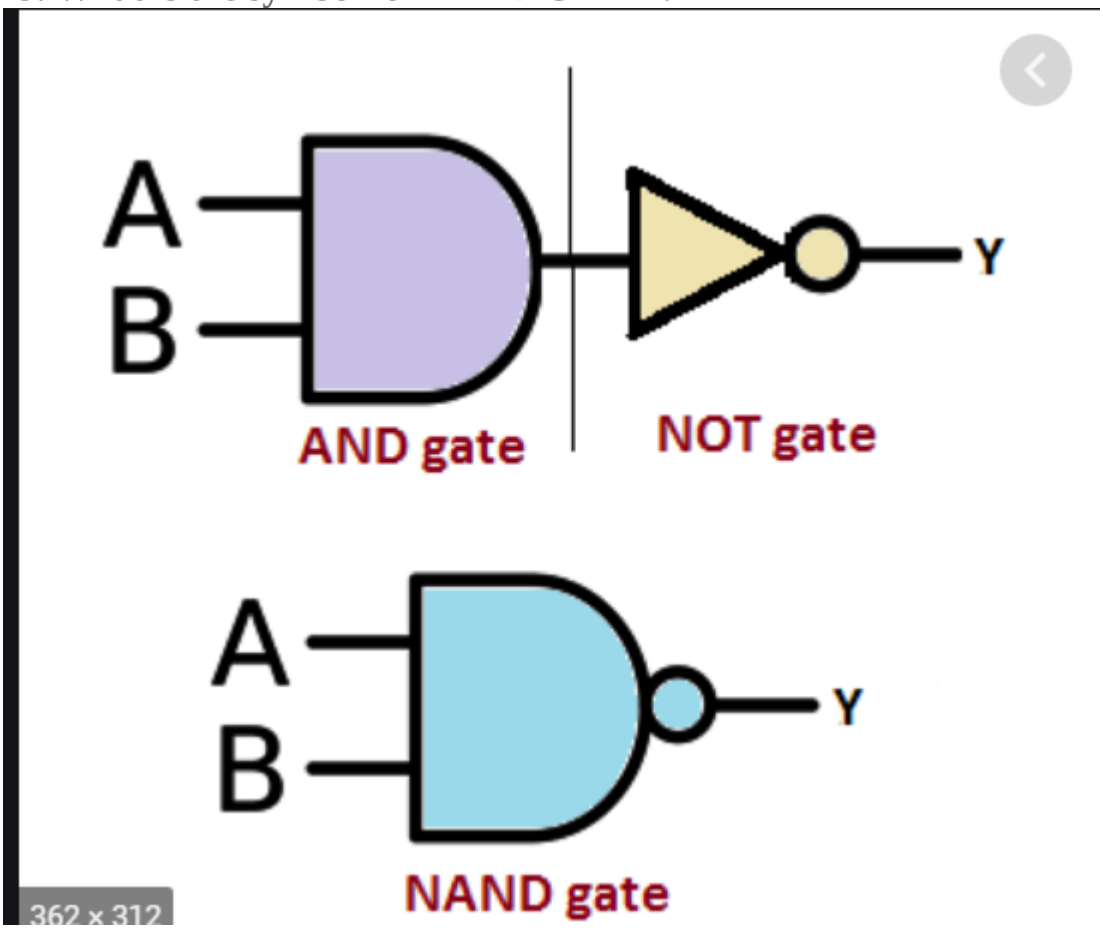
Disadvantage:

1.It is not suitable for computer reduction.

2.It is not suitable when the number of variables involved exceed four.

3.Care must be taken to field in every cell with the relevant entry, such as a 0, 1 (or) don't care terms.

29. What is the symbol for NAND GATE ?



30. State the difference between SOP and POS.
Ans:

31. Name the universal gates.

Ans: The NAND and NOR **gates** are **universal gates**.

32. Write down the De morgan law.

Ans:

De Morgon's **Law** states that the complement of the union of two sets is the intersection of their complements and the complement of the intersection of two sets is the union of their complements. These are mentioned after the great mathematician **De Morgan**. This **law** can be expressed as (A ∪ B) ' = A ' ∩ B '.

33. State maximum power transfer theorem.

Ans: It states that, to obtain maximum external power from a source with a finite internal resistance, the resistance of the load must equal the resistance of the source as viewed from its output terminals.

34. Classification of electrical network.

Ans: Classification of Electrical Network:

The behaviour of the entire network depends on the behaviour and characteristics of its elements. Based on such characteristics electrical network can be classified as below :

1.Linear Network :

A circuit or network whose parameters i.e. elements like resistances, inductances and capacitances are always constant irrespective of the change in time, voltage, temperature etc. is known as linear network. The Ohm's law can be applied to such network. The mathematical equations of such network can be obtained by using the law of superposition.

2.Non linear Network :

A circuit whose parameters change their values with change in time, temperature, voltage etc. is known as non linear network . The Ohm's law may not be applied to such network. Such network does not follow the law of

3.Bilateral Network :

A circuit whose characteristics, behavior is same irrespective of the direction of current through various elements of it, is called bilateral network. Network consisting only resistances is good example of bilateral network.

4.Unilateral Network :

A circuit whose operation, behaviour is dependent on the direction of the current through various elements is called unilateral network. Circuit consisting diodes, which allows flow of current only in one direction is good example of unilateral circuit.

5.Active Network :

A circuit which contains a source of energy is called An energy source may be a voltage or current source.

6.Passive Network :

A circuit which contains no energy source is called passive. There are two forms of circuits in which two types of voltages are used. One alternating i.e. ac. while second is direct i.e. d.c. The alternating current (a.c.) circuits contains voltages which are periodically varying and hence the currents also vary periodically. The direct current circuits (d.c) contains fixed voltage sources having polarities +ve and — ve.

7.Lumped Network :

A network in which all the network elements are physically separable is known as lumped network. Most of the electric networks are lumped in nature.

8.Distributed Network :

A network in which the circuit elements like resistance, inductance etc. cannot be physically separable for analysis purposes, is called distributed network. The best example of such a network is a transmission line where resistance, inductance and capacitance of a transmission line are distributed all along its length and cannot be shown as a separate elements, any where in the circuit.

35. Steps in mesh analysis.

Ans:

Procedure (steps) for applying mesh analysis:

1. Identify the total number of meshes.
2. Assign the mesh currents.
3. Develop the KVL equation for each mesh.
4. Solve the equations to find the mesh currents.

Note:

- The total number of equations (e) required to solve the network with the help of mesh analysis is

$$e = b - (N - 1).$$

where, b is the total number of branches and N is the total number of nodes.

The steps in the Mesh Current Method are,

1. Identify the **meshes**.
2. Assign a current variable to each **mesh**, using a consistent direction (clockwise or counterclockwise).
3. Write Kirchhoff's Voltage Law around each **mesh**. ...
4. Solve the resulting system of equations for all loop currents.

Nodal Analysis

1. Identify all nodes.
2. Choose a reference node. Identify it with reference (ground) symbol. ...
3. Assign voltage variables to the other nodes (these are node voltages.)
4. Write a KCL equation for each node (sum the currents leaving the node and set equal to zero). ...
5. Solve the system of equations from **step** 4.

36. Need of earthing.

Ans:

Why is an Earthing Necessary?

Earthing is an important component of electrical systems because of the following reasons:

- It keeps people safe by preventing electric shocks
- It prevents damage to electrical appliances and devices by preventing excessive current from running through the circuit
- It prevents the risk of fire that could otherwise be caused by current leakage

37. Norton's Current.

Ans:

Norton's equivalent circuit resembles a practical current source. Hence, it is having a current source in parallel with a resistor.

- The current source present in the Norton's equivalent circuit is called as Norton's equivalent current or simply **Norton's current I_N**.

38. Steps in k-map.

Ans:

Steps to solve expression using K-map-

1. Select K-map according to the number of variables.
2. Identify minterms or maxterms as given in problem.
3. For SOP put 1's in blocks of K-map respective to the minterms (0's elsewhere).
4. For POS put 0's in blocks of K-map respective to the maxterms(1's elsewhere).
5. Make rectangular groups containing total terms in power of two like 2,4,8 .. (except 1) and try to cover as many elements as you can in one group.
6. From the groups made in step 5 find the product terms and sum them up for SOP form.

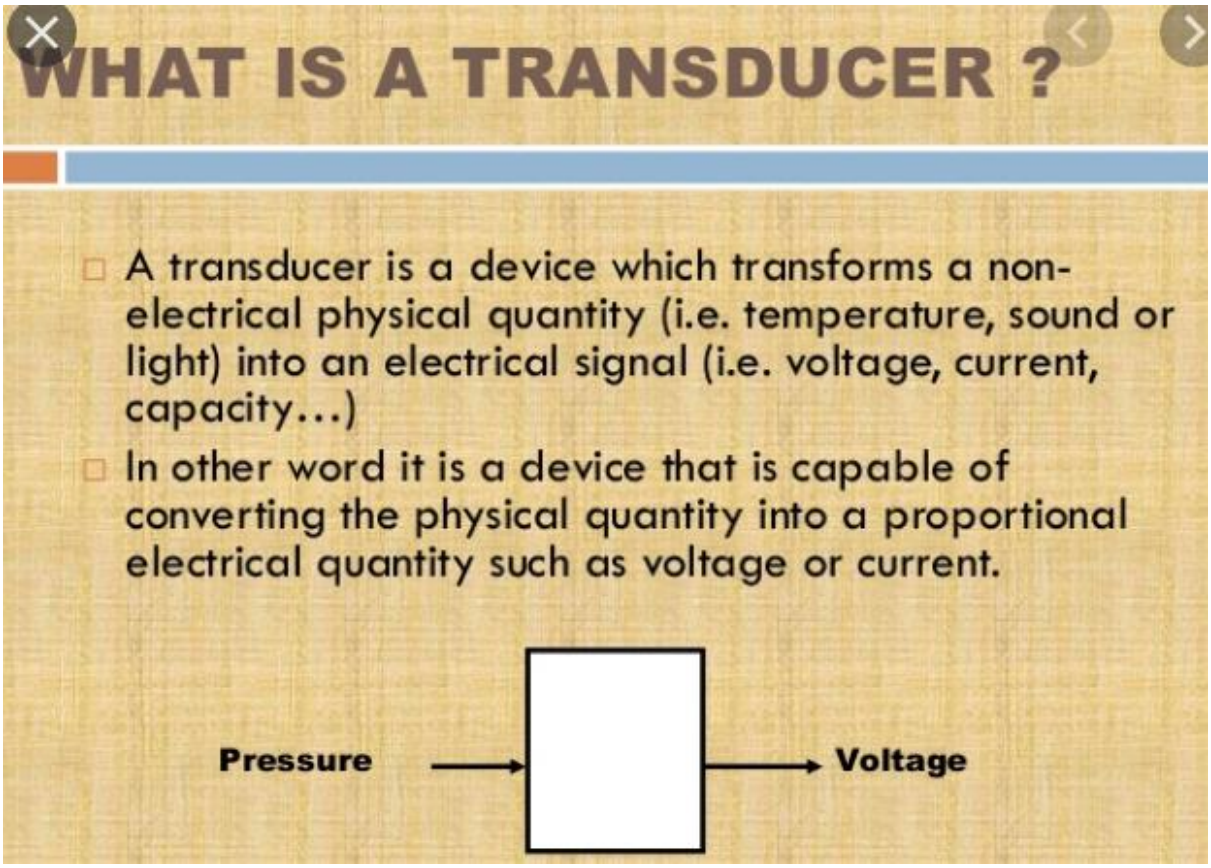
39. What is Transformer ? and its types step up , step down.

Ans:

A **transformer** is defined as a passive electrical device that transfers electrical energy from one circuit to another through the process of electromagnetic induction. It is most commonly used to increase ('step up') or decrease ('step down') voltage levels between circuits. 21-Jul-2020

40. What is Transducer ?

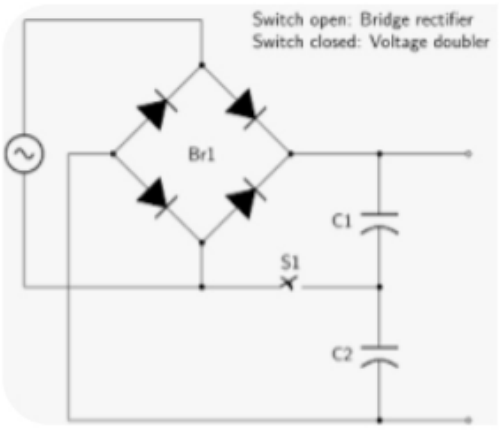
Ans:

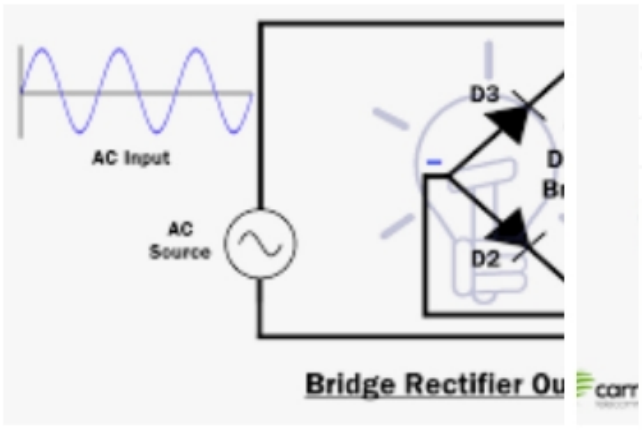


41. What is rectifier ?

Ans:

Rectifier





A rectifier is an electrical device that converts alternating current, which periodically reverses direction, to direct current, which flows in only one direction. The reverse operation is performed by the inverter. The process is known as rectification, since it "straightens" the direction of current.

42. Differentiate between fluorescent and LED bulb.

Ans:

What's the Difference Between Fluorescent and LED Lights?

The two different technologies are entirely different methods of producing light. Fluorescent bulbs contain inert gas within the glass casing while LEDs are a solid state technology. Fluorescent lights produce UV radiation and then convert it into visible light through the use of a phosphor coating inside the bulb. LEDs emit electromagnetic radiation across a small portion of the visible light spectrum and don't waste energy by producing waste heat or non-visible electromagnetic radiation (such as UV). There is such a thing as an IRED (infrared emitting diode) which is specifically designed to emit infrared energy.

43. Choke and starter on fluorescent lamp.

Ans:

The purpose of the choke is to provide a very high voltage initially between the filaments (across the two ends of the tube light). Again once the gas in the tube is ionized the choke provides a low voltage. A choke is a coil of wire.

Fluorescent tubes/lamps are filled with mercury vapor. They use electric charge to excite mercury atoms in order to produce ultra violet light. A glow starter or commonly known as starter is used in the tube light circuit to provide an initial current to filaments of the tube light.

44. Half and full wave rectifier.

Ans:

Parameter	Half Wave Rectifier	Full Wave Rectifier
Definition	The half-wave rectifier is a rectifier which is used for converting the one-half cycle of AC input to DC output	A full-wave rectifier is a rectifier which is used for converting both the half cycles of AC input into DC output

45. Types of modulators.

Ans:

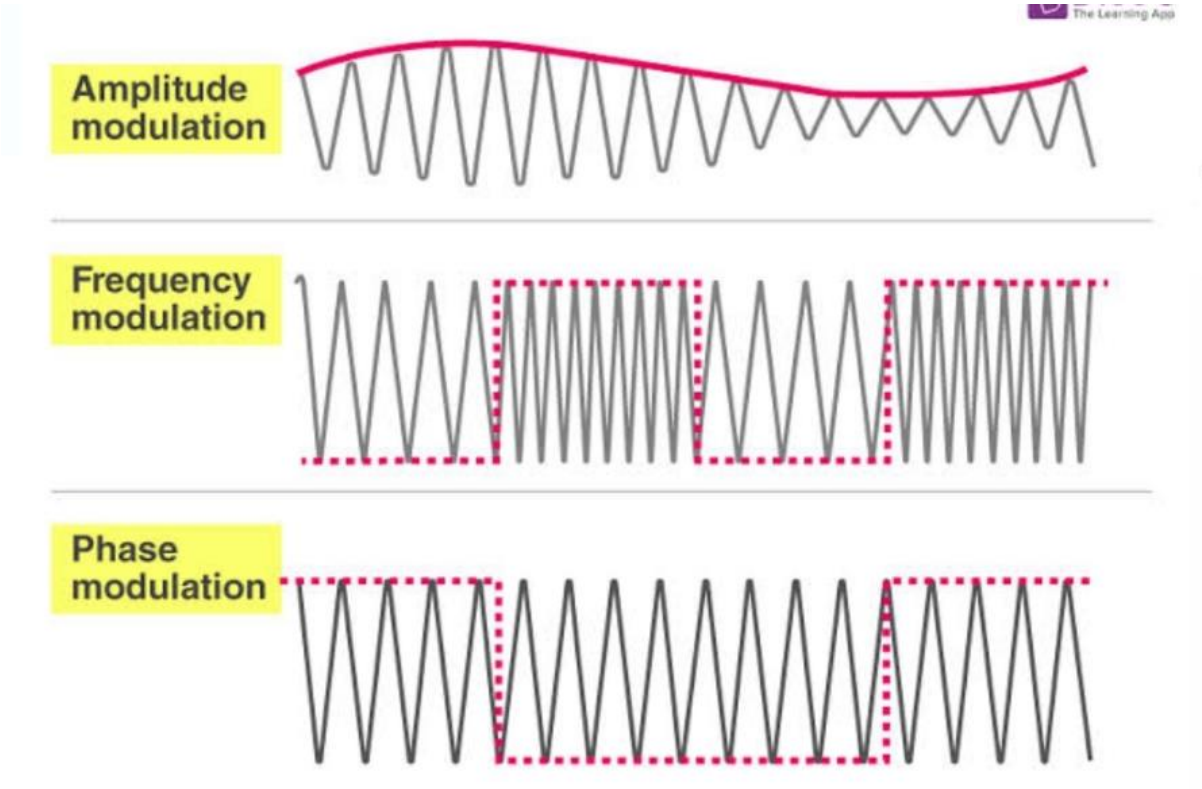
Types of Modulation

There are 3 basic types of modulation: Amplitude modulation, Frequency modulation, and Phase modulation.

amplitude modulation
a type of modulation where the amplitude of the carrier signal is modulated (changed) in proportion to the message signal while the frequency and phase are kept constant.

frequency modulation
a type of modulation where the frequency of the carrier signal is modulated (changed) in proportion to the message signal while the amplitude and phase are kept constant.

phase modulation
a type of modulation where the phase of the carrier signal is varied accordance to the low frequency of the message signal is known as phase modulation.



46. Different types of wiring.

Ans:

Fluorescent lamp wiring

Theory:

1. The electrode of the starter which is enclosed in a gas bulb filled with argon gas, cause discharge in the argon gas with consequent heating.
2. Due to heating, the bimetallic strip bends and causes in the starter to close. After this, the choke, the filaments (tube ends) to tube and starter becomes connected in series.
3. When the current flows through the tube end filaments the heat is produced. During the process the discharge in the starter tube disappears and the contacts in the starter move apart.
4. When sudden break in the circuit occur due to moving apart of starter terminals, this causes a high value of e.m.f to be induced in the choke.
5. According to Lenz's law, the direction of induced e.m.f in the choke will try to oppose the fall of current in the circuit.
6. The voltage thus acting across the tube ends will be high enough to cause a discharge to occur in the gas inside the tube. Thus the tube starts giving light.
7. The fluorescent lamp is a low pressure mercury lamp and is a long evacuated tube. It contains a small amount of mercury and argon gas at 2.5 mm pressure. At the time of switching in the tube, mercury is in the form of small drops. Therefore, to start the tube, filling up of argon gas is necessary. So, in the beginning, argon gas starts burning at the ends of the tube; the mercury is heated and controls the current and the tube starts giving light. At each end of the tube, there is a tungsten electrode which is coated with fast electron emitting material. Inside of the tube is coated with phosphor according to the type of light.
8. A starter helps to start the start the tube and break the circuit.
9. The choke coil is also called blast. It has a laminated core over which enameled wire is wound. The function of the choke is to increase the voltage to almost 1000V at the time of switching on the tube and when the tube starts working, it reduces the voltage across the tube and keeps the current constant.

Staircase Wiring

Theory:

1. A two way switch is installed near the first step of the stairs. The other two way switch is installed at the upper part where the stair ends.
2. The light point is provided between first and last stair at an adequate location and height if the light is switched on by the lower switch. It can be switched off by the switch at the top or vice versa.
3. The circuit can be used at the places like bed room where the person may not have to travel for switching off the light to the place from where the light is switched on.
4. Two numbers of Two-way switches are used for the purpose. The supply is given to the switch at the short circuited terminals.
5. The connection to the light point is taken from the similar short circuited terminal of the second switch. Other two independent terminals of each circuit are connected through cables.

47. Types of DC , AC motor and its use.

Ans:

Overview of AC Motors

1.Synchronous Motors & its Uses: Because its speed remains constant under varying loads, it is used for driving continuously-operating equipment at constant speed. These motors have the rotor (which is connected to the load) rotating at the same speed as the speed of rotation of the stator current. In other words, we can say these motors don't have slip with respect to the stator current. They are sometimes used no to drive the load but instead act as "synchronous condenser", to improve the power factor of the local grid to which it is connected to. These kind of motors are used even in high precision positioning devices like modern robots, ammonia and air compressors, motor-generator sets, continuous rolling mills, paper and cement industries. They can also act as stepper motors.

2. Asynchronous Motors & it's Uses: The most common form of motor which is used in everyday life from pumping water up the overhead tank to power plant boiler feed pumps, these kind of motors rule. These motors are very flexible to use and matches the load demand almost for everything. The most widely used Induction Motors are very important for many industries due to their load bearing capacity and flexibility. These motors, unlike synchronous motors, slip when compared to the stator current field. They are generally used for various types of pumps, compressors and acts as prime movers for many types of machinery.

3. Single & Three Phase Motors and their Uses: The A.C. Motors can find their usage in 2 forms based on their power supply. The single phase motors are generally found their use in low power requirements/domestic appliances like ceiling fans, mixer grinders, portable power tools etc. The three phase motors are generally found for high power requirements like power drives for compressors, hydraulic pumps, air conditioning compressors, irrigation pumps and many more.

4. Constant, Variable & Adjustable Speed Motors: As already said, A.C. Motors are highly flexible in many ways including their speed control. There are motors which should be run at a constant speed for air compressors. Certain cooling water pumps driven by a.c. motors can be run at two or three speeds by just switching the number of poles used. If the number of poles is changed then the speed also changes. These serve best for sea water cooling pumps in marine engine room applications & many power plants. The speed of the motors can also be varied continuously by some electronic arrangements thus this can be suited for certain applications like a ship's cargo pump, whose discharge rate has to lowered as per the terminals requirement.

5. Varied Structure Motors: These types of motors have different outer cage arrangements, depending upon the usage or any special industrial requirement. For motors used in gas and oil terminals, the casing must be of intrinsically safe, thus it may either have a enclosed casing or a pipe ventilated arrangement such that the sparks produced inside the motor

does not cause a fire outside it. Also many motors are totally enclosed as it may be open to weather like those used in hydro-electric power plants.

Overview of DC Motors

1. Permanent-magnet motors

A permanent-magnet motor does not have a field winding on the stator frame, instead relying on permanent magnets to provide the magnetic field against which the rotor field interacts to produce torque. Compensating windings in series with the armature may be used on large motors to improve commutation under load. Because this field is fixed, it cannot be adjusted for speed control. Permanent-magnet fields (stators) are convenient in miniature motors to eliminate the power consumption of the field winding. Larger DC motors are of the “dynamo” type, which have stator windings. Historically, permanent magnets could not be made to retain high flux if they were disassembled; field windings were more practical to obtain the needed amount of flux. However, large permanent magnets are costly, as well as dangerous and difficult to assemble; this favors wound fields for large machines.

To minimize overall weight and size, miniature permanent-magnet motors may use high energy magnets made with neodymium or other strategic elements; most such are neodymium-iron-boron alloy. With their higher flux density, electric machines with high energy permanent magnets are at least competitive with all optimally designed singly-fed synchronous and induction electric machines. Miniature motors resemble the structure in the illustration, except that they have at least three rotor poles (to ensure starting, regardless of rotor position) and their outer housing is a steel tube that magnetically links the exteriors of the curved field magnets.

2. D.C. Series Motor. Since it has high starting torque and variable speed, it is used for heavy duty applications such as electric locomotives, steel rolling mills, hoists, lifts and cranes.

3. D.C. Shunt Motor. It has medium starting torque and a nearly constant speed. Hence, it is used for driving constant-speed line shafts, lathes, vacuum cleaners, wood-working machines, laundry washing machines, elevators, conveyors, grinders and small printing presses etc.

4. Cumulative Compound Motor. It is a varying-speed motor with high starting torque and is used for driving compressors, variable-head centrifugal pumps, rotary presses, circular saws, shearing machines, elevators and continuous conveyors etc.

5. Brushless DC motors

Some of the problems of the brushed DC motor are eliminated in the brushless design. In this motor, the mechanical “rotating switch” or commutator/ brushgear assembly is replaced by an external electronic switch synchronized to the rotor’s position. Brushless motors are typically

85–90% efficient or more (higher efficiencies for a brushless electric motor, of up to 96.5%, were reported by researchers at the Tokai University in Japan in 2009), whereas DC motors with brushgear are typically 75–80% efficient.

Modern DC brushless motors range in power from a fraction of a watt to many kilowatts. Larger brushless motors up to about 100 kW rating are used in electric vehicles. They also find significant use in high-performance electric model aircraft.

Brushless DC motors are commonly used where precise speed control is necessary, as in computer disk drives or in video cassette recorders, the spindles within CD, CD-ROM (etc.) drives, and mechanisms within office products such as fans, laser printers and photocopiers.