



# Electrical Interview

**Questions & Answers**

## ELECTRICAL INTERVIEW QUESTIONS AND ANSWERS.

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### 1. What happens if I connect a capacitor to a generator load?

Answer : Connecting a capacitor across a generator always improves power factor, but it will help depends up on the engine capacity of the alternator, otherwise the alternator will be over loaded due to the extra watts consumed due to the improvement on pf. Secondly, don't connect a capacitor across an alternator while it is picking up or without any other load.

### 2. Why the capacitors works on ac only?

Answer: Generally capacitor gives infinite resistance to dc components (i.e., block the DC components). It allows the ac components to pass through.

### 3. Explain the working principal of the circuit breaker?

Answer: Circuit Breaker is one which makes or breaks the circuit. It has two contacts namely fixed contact & moving contact. Under normal condition the moving contact comes in contact with fixed contact thereby forming the closed contact for the flow of current. During abnormal & faulty conditions (when current exceeds the rated value) an arc is produced between the fixed & moving contacts & thereby it forms the open circuit, Arc is extinguished by the Arc Quenching media like air, oil, vacuum etc.

### 4. How many types of colling system it transformers?

Answer:

1. ONAN (oil natural, air natural)
2. ONAF (oil natural, air forced)
3. OFAF (oil forced, air forced)
4. ODWF (oil direct, water forced)
5. OFAN (oil forced, air forced)

### 5. What is the function of anti-pumping in circuit breaker?

Answer :when breaker is close at one time by close push button, the anti-pumping contactor prevent re close the breaker by close push button after if it already close.

### 6. What is stepper motor? What is its uses?

Answer: Stepper motor is the electrical machine which act upon input pulse applied to it.it is one type of synchronous motor which runs in steps in either direction instead of running in complete cycle.so, in automation parts it is used.

### 7. Tell me in detail about c.t. and p.t.?

Answer: The term C.T means current transformer, and the term P.T means potential transformer. In circuit where measurements of high voltage and high current is involved, they are used there.

Particularly when a measuring device like voltmeter or ammeter is not able to measure such high value of quantity because of large value of torque due to such high value it can damage the measuring device. so, CT and PT are introduced in the circuits. They work on the same principle of transformer, which is based on linkage of electromagnetic flux produced by primary with secondary. They work on the ratio to they are designed. E.g. if CT is of ratio 5000\5A and it has to measure secondary current of 8000A. then  $ANS = 8000 \times \frac{5}{5000} = 8A$  and this result will be given to ammeter .and after measuring 8A we can calculate the primary current. Same is the operation of PT but measuring voltage.

**8. There are a Transformer and an induction machine. Those two have the same supply. For which device the load current will be maximum? And why?**

Answer: The motor has max load current compare to that of transformer because the motor consumes real power and the transformer is only producing the working flux and it's not consuming. Hence the load current in the transformer is because of core loss so it is minimum.

**9. What is power factor? Whether it should be high or low? Why?**

Answer: Power factor should be high in order to get smooth operation of the system. Low power factor means losses will be more. it is the ratio of true power to apparent power. It has to be ideally 1. If it is too low then cable over heating & equipment overloading will occur. If it is greater than 1 then load will act as capacitor and starts feeding the source and will cause tripping. (If pf is poor ex: 0.17 to meet actual power load has to draw more current (V constant), result in more losses if pf is good ex: 0.95 to meet actual power load has to draw less current (V constant), result in less losses)

**10. What is the difference between Isolator and Circuit Breaker?**

Answer: Isolator is an off load device which is used for isolating the downstream circuits from upstream circuits for the reason of any maintenance on downstream circuits. It is manually operated and does not contain any solenoid unlike circuit breaker. It should not be operated while it is having load. First the load on it must be made zero and then it can safely operate. Its specification only rated current is given. But circuit breaker is on load automatic device used for breaking the circuit in case of abnormal conditions like short circuit, overload etc., it is having three specification 1 is rated current and 2 is short circuit breaking capacity and 3 is instantaneous tripping current .

**11. What is Boucholz relay and the significance of it in to the transformer?**

Answer: Boucholz relay is a device which is used for the protection of transformer from its internal faults, it is a gas based relay. whenever any internal fault occurs in a transformer, the Boucholz relay at once gives a horn for some time, if the transformer is isolated from the circuit then it stop its sound itself otherwise it trips the circuit by its own tripping mechanism.

**12. What is SF6 Circuit Breaker?**

Answer

SF6 is Sulphur hexa Fluoride gas. If this gas is used as arc quenching medium in a Circuit breaker means SF6 CB

**13. What is ferranti effect?**

Answer: Output voltage is greater than the input voltage or receiving end voltage is greater than the sending end voltage.

**14. What is meant by insulation voltage in cables? Explain it?**

Answer: It is the property of a cable by virtue of it can withstand the applied voltage without rupturing it is known as insulation level of the cable.

**15. Why we do 2 types of earthing on transformer (i.e. :) body earthing & neutral earthing, what is function. i am going to install a 500 kva transformer & 380 kva DG set what should the earthing value?**

Answer: The two types of earthing are Familiar as Equipment earthing and system earthing. In Equipment earthing: body (non-conducting part) of the equipment should be earthed to safeguard the human beings. System Earthing: In this neutral of the supply source (Transformer or Generator) should be grounded. With this, in case of unbalanced loading neutral will not be shifted so that unbalanced voltages will not arise. We can protect the equipment also. With size of the equipment (transformer or alternator) and selection of relying system earthing will be further classified into directly earthed, Impedance earthing, resistive (NGRs) earthing.

**16. What is the difference between MCB & MCCB, Where it can be used?**

Answer: MCB is miniature circuit breaker which is thermal operated and use for short circuit protection in small current rating circuit. MCCB moulded case circuit breaker and is thermal operated for over load current and magnetic operation for instant trip in short-circuit condition. Under voltage and under frequency may be inbuilt. Normally it is used where normal current is more than 100A

**17. What is use of lockout relay in ht voltage?**

Answer: A lock-out relay is generally placed in line before or after the e-stop switch so the power can be shut off at one central location. This relay is powered by the same electrical source as the control power and is operated by a key lock switch. The relay itself may have up to 24 contact points within the unit itself. This allows the control power for multiple machines to be locked out by the turn of a single key switch.

**18. What is the difference between earth resistance and earth electrode resistance?**

Answer: Only one of the terminals is evident in the earth resistance. In order to find the second terminal we should recourse to its definition: Earth Resistance is the resistance existing between the electrically accessible part of a buried electrode and another point of the earth, which is far away. The resistance of the electrode has the following components : (A) The resistance of the metal and that of the connection to it. (B) The contact resistance of the surrounding earth to the electrode.

**19. Which power plant has high load factor?**

All base load power plants have a high load factor. If we use high efficiency power plants to supply the base load, we can reduce the cost of generation. Hydro power plants have a higher efficiency than thermal & nuclear power plants.

**20. Why an ac solenoid valve attract the plunger even though we interchanges the terminal? Will the poles changes?**

Answer: Yes because the poles changes for every half-cycle of ac voltage so the polarity of AC voltage is continuously changing for every half cycle. So, interchanging of terminals in ac system does not show any difference. That's why the ac solenoid attract the plunger even though it's terminals are interchanged.

**21. Define IDMT relay?**

Answer: It is an inverse definite minimum time relay. In IDMT relay its operating is inversely proportional and also a characteristic of minimum time after which this relay operates. It is inverse in the sense, the tripping time will decrease as the magnitude of fault current increase.

**22. What are the transformer losses?**

Answer: TRANSFORMER LOSSES - Transformer losses have two sources-copper loss and magnetic loss. Copper losses are caused by the resistance of the wire ( $I^2R$ ).Magnetic losses are caused by eddy currents and hysteresis in the core. Copper loss is a constant after the coil has been wound and therefore a measurable loss. Hysteresis loss is constant for a particular voltage and current. Eddy-current loss, however, is different for each frequency passed through the transformer.

**23. What is meant by regenerative braking?**

Answer: When the supply is cut off for a running motor, it still continue running due to inertia. In order to stop it quickly we place a load (resistor) across the armature winding and the motor should have maintained continuous field supply. So that back emf voltage is made to apply across the resistor and due to load the motor stops quickly. This type of breaking is called as "Regenerative Breaking".

**24. Why is the starting current high in a DC motor?**

Answer: In DC motors, Voltage equation is  $V = E_b - I_a R_a$  ( $V$  = Terminal voltage,  $E_b$  = Back emf in Motor,  $I_a$  = Armature current,  $R_a$  = Armature resistance).At starting,  $E_b$  is zero. Therefore,  $V = I_a R_a$ ,  $I_a = V/R_a$ , where  $R_a$  is very less like 0.01ohm.i.e,  $I_a$  will become enormously increased.

**25. What are the advantages of star-delta starter with induction motor?**

Answer :(1). The main advantage of using the star delta starter is reduction of current during the starting of the motor. Starting current is reduced to 3-4 times Of current of Direct online starting.(2). Hence the starting current is reduced , the voltage drops during the starting of motor in systems are reduced.

**26. Why Delta Star Transformers are used for Lighting Loads?**

Answer: For lighting loads, neutral conductor is must and hence the secondary must be star winding and this lighting load is always unbalanced in all three phases. To minimize the current unbalance in the primary we use delta winding in the primary. So delta / star transformer is used for lighting loads.

**27. Why in a three pin plug the earth pin is thicker and longer than the other pins?**

Answer: It depends upon  $R = \rho l/a$  where area(a) is inversely proportional to resistance(R), so if (a) increases, R decreases & if R is less the leakage current will take low resistance path so the earth pin should be thicker. It is longer because the First to make the connection and last to disconnect should be earth Pin. This assures Safety for the person who uses the electrical instrument.

**28. Why series motor cannot be started on no-load?**

Answer: Series motor cannot be started without load because of high starting torque. Series motor are used in Trains, Crane etc.

**29. Why ELCB can't work if N input of ELCB do not connect to ground?**

Answer: ELCB is used to detect earth leakage fault. Once the phase and neutral are connected in an ELCB, the current will flow through phase and that much current will have to return neutral so resultant current is zero. Once there is a ground fault in the load side, current from phase will directly pass through earth and it will not return through neutral through ELCB. That means once side current is going and not returning and hence because of this difference in current ELCB will trip and it will safe guard the other circuits from faulty loads. If the neutral is not grounded, fault current will definitely high and that full fault current will come back through ELCB, and there will be no difference in current.

**30. How electrical power is generated by an A.C Generator?**

Answer: For the generation of elect power we need a prime mover which supplies mechanical power input to the alternator, can be steam turbines, or hydro turbines. When poles of the rotor moves under the armature conductors which are placed on the stator ,field flux cut the armature conductor ,therefore voltage is generated and is of sinusoidal in nature...due to polarity change of rotor poles(i,e) N-S-N-S.

**31. Why an ac solenoid valve attract the plunger even though we interchanges the terminal? Will the poles changes?**

Answer: Yes because the poles changes for every half-cycle of ac voltage so the polarity of AC voltage is continuously changing for every half cycle. So, interchanging of terminals in ac system does not show any difference. That's why the ac solenoid attract the plunger even though its terminals are interchanged.

**32. What is derating? Why it is necessary, it is same for all means for drives, motors, and cables.**

**33. What is Automatic Voltage regulator (AVR)?**

Answer: AVR is an abbreviation for Automatic Voltage Regulator. It is important part in Synchronous Generators, it controls the output voltage of the generator by controlling its excitation current. Thus it can control the output Reactive Power of the Generator.

**34. What is an exciter and how does it work**

Answer: There are two types of exciters, static exciter and rotary exciter. Purpose of exciter is to supply the excitation dc voltage to the fixed poles of generator. Rotary exciter is an additional small generator mounted on the shaft of main generator. If it is dc generator, it will supply dc to the rotary poles through slip ring and brushes (conventional alternator). if it is an ac exciter, output of ac exciter is rectified by rotating diodes and supply dc to main fixed poles. ac exciter is the ac generator whose field winding are stationary and armature rotates. Initial voltage is built up by residual magnetism. It gives the starting torque to the generator.

**35. Difference between a four point starter and three point starter?**

Answer: The shunt connection in four point stater is provided separately from the line where as in three point stater it is connected with line which is the drawback in three point stater

**36. Why use the VCB at High Transmission System? Why can't use ACB?**

Answer: Actually the thing is vacuum has high arc quenching property compare to air because in VCB, the die electric strengths equal to 8 times of air. That y always vacuum used as in HT breaker and air used as in LT.

**37. What is the difference between surge arrestor and lightning arrestor?**

Answer: LA is installed outside and the effect of lightning is grounded, whereas surge arrestor installed inside panels comprising of resistors which consumes the energy and nullify the effect of surge.

**38. Why syn. generators r used for the production of electricity?**

Answer: synchronous machines have capability to work on different power factor (or say different imaginary POW varying the field emf. Hence syn. generators r used for the production of electricity.

**39. Enlist types of dc generator?**

Answer: D.C. Generators are classified into two types

- 1) Separately excited d.c.generator
- 2) Self-excited d.c.generator, which is further classified into; 1) series 2) shunt and
- 3) Compound (which is further classified into cumulative and differential).

**40. What is the difference between synchronous generator & asynchronous generator?**

Answer: In simple, synchronous generator supply's both active and reactive power but asynchronous generator (induction generator) supply's only active power and observe reactive power for magnetizing. This type of generators are used in windmills.

**41. Give two basic speed control scheme of DC shunt motor?**

Answer: 1. By using flux control method: in this method a rheostat is connected across the field winding to control the field current. so by changing the current the flux produced by the field winding can be changed, and since speed is inversely proportional to flux speed can be controlled

2. Armature control method: in this method a rheostat is connected across armature winding by varying the resistance the value of resistive drop ( $I_a R_a$ ) can be varied, and since speed is directly proportional to  $E_b - I_a R_a$  the speed can be controlled.

**42. What is the principle of motor?**

Answer: Whenever a current carrying conductor is placed in a magnetic field it produce turning or twisting movement is called as torque.

**43. What is meant by armature reaction?**

Answer: The effect of armature flu to main flux is called armature reaction. The armature flux may support main flux or opposes main flux.

**44. What is the Polarization index value? (Pi value) and simple definition of polarization index?**

Answer: Its ratio between insulation resistance (IR) i.e. meggar value for 10min to insulation resistance for 1 min. It ranges from 5-7 for new motors & normally for motor to be in good condition it should be Greater than 2.5.

Polarization Index Test (PI) – The PI test measures the ability of the insulation to absorb voltage over a period of time. This gives an indication of the overall insulation quality of the individual pieces of insulation in the transformer. This test is usually performed in conjunction with the Meggar Test. It is measured as ratio of insulation resistance (IR) for 10 minutes to insulation resistance for 1 minute.

**45. What will happen when power factor is leading in distribution of power?**

Answer: If there is high power factor, i.e. if the power factor is close to one:

1. Losses in form of heat will be reduced,
2. Cable becomes less bulky and easy to carry, and very cheap to afford, &
3. It also reduces over heating of transformers.

**46. What is 2 phase motor?**

Answer: A two phase motor is a motor with the starting winding and the running winding have a phase split. e.g.; ac servo motor. Where the auxiliary winding and the control winding have a phase split of 90 degree.



47. Advantages of vvvf drives over non vvvf drives for EOT cranes?

Answer:

1. Smooth start and stop.
2. No jerking of load.
3. Exact positioning
4. Better protection for motor.
5. high/low speed selection.
6. Reliability of break shoe.
7. Programmable break control.
8. Easy circuitry
9. Reduction in controls
10. Increases motor life

**48. What is the significance of vector grouping in Power Transformers?**

Answer: Every power transformer has a vector group listed by its manufacturer. Fundamentally it tells you the information about how the windings are connected (delta or wye) and the phase difference between the current and voltage. EG. DYN11 means Delta primary, Wye Secondary and the current is at 11 o'clock referred to the voltage.

**49. Type of A.C motor is used in the fan (ceiling fan, exhaust fan, pedestal fan, bracket fan etc) which are find in the houses?**

Answer: Its Single Phase induction motor which mostly squirrel cage rotor and are capacitor start capacitor run.

**50. Why, when birds sit on transmission lines or current wires doesn't get shock?**

Answer: It's true that if birds touch the single one line (phase or neutral) they don't get electrical shock... if birds touch 2 lines than the circuit is closed and they get electrical shock. so if a human touch single one line (phase) then he doesn't get shock if he is in the air (not touching – standing on the ground if he is standing on the ground then touching the line (phase) he will get a shock because the ground on what we standing is like line (ground bed – like neutral) | and in the most of electric lines the neutral is grounded. So that means that human who touch the line closes the circuit between phase and neutral.

**51. What happens if we give 220 volts dc supply to tube light?**

Answer: Bulbs [devices] for AC are designed to operate such that it offers high impedance to AC supply. Normally they have low resistance. When DC supply is applied, due to low resistance, the current through lamp would be so high that it may damage the bulb element.

**52. Which motor has high Starting Torque and Starting current DC motor, Induction motor or Synchronous motor?**

Answer: DC Series motor has high starting torque. We cannot start the Induction motor and Synchronous motors on load, but cannot start the DC series motor without load.

**53. What is vacuum circuit breaker? Define with cause and where we use it.**

Answer: A breaker is normally used to break a circuit. While breaking the circuit, the contact terminals will be separated. At the time of separation an air gap is formed in between the terminals. Due to existing current flow the air in the gap is ionized and results in the arc. Various mediums are used to quench this arc in respective CB's. But in VCB the medium is vacuum gas. Since the air in the CB is having vacuum pressure the arc formation is interrupted. VCB's can be used up to 11kv.

**54. What is ACSR cable and where we use it?**

Answer: ACSR means Aluminum conductor steel reinforced, this conductor is used in transmission & distribution.

**55. What's is MARX CIRCUIT?**

Answer: It is used with generators for charging a number of capacitor in parallel and discharging them in series. It is used when voltage required for testing is higher than the available.

**56. What is the principle of motor?**

Answer: Whenever a current carrying conductor is placed in a magnetic field it produce turning or twisting movement is called as torque.

**57. What is electric traction?**

Answer: Traction means using the electric power for traction system i.e. for railways, trams, trolleys etc. electric traction means use of the electricity for all these. Now a days, magnetic traction is also used for bullet trains. Basically dc motors are used for electric traction systems.

**58. How can you start-up the 40w tube lite with 230v AC/DC without using any choke/Coil?**

Answer: It's possible by means of Electronic choke. Otherwise it's not possible to ionize the particles in tube. Light, with normal voltage.

What is "pu" in electrical engineering?

Answer: Pu stands for per unit and this will be used in power system single line diagram there it is like a huge electrical circuit with no of components (generators, transformers, loads) with different ratings (in MVA and KV). To bring all the ratings into common platform we use pu concept in which, in general largest MVA and KV ratings of the component is considered as base values, then all other component ratings will get back into this basis. Those values are called as pu values. ( $p.u = \text{actual value} / \text{base value}$ ).

**59. Operation carried out in Thermal power station?**

Answer: The water is obtained in the boiler and the coal is burnt so that steam is obtained this steam is allowed to hit the turbine, the turbine which is coupled with the generator generates the electricity.

**60. Why link is provided in neutral of an ac circuit and fuse in phase of ac circuit?**

Answer: Link is provided at a Neutral common point in the circuit from which various connection are taken for the individual control circuit and so it is given in a link form to withstand high Amps. But in the case of Fuse in the Phase of AC circuit it is designed such that the fuse rating is calculated for the particular circuit (i.e. load) only. So if any malfunction happen the fuse connected in the particular control circuit alone will blow off.

**61. Enlist types of dc generator?**

Answer: D.C. Generators are classified into two types 1)separately excited d.c.generator 2)self-excited d.c.generator, which is further classified into;1)series 2)shunt and 3)compound(which is further classified into cumulative and differential).

**62. What is the difference between an Electronic regulator and ordinary rheostat regulator for fans?**

Answer: The difference between the electronic and ordinary regulator is that in electronic reg. power losses are less i.e. for as we decrease the speed the electronic reg. give the power needed for that particular speed but in case of ordinary rh type reg. the power wastage is same for every speed and no power is saved. In electronic regulator triac is employed for speed cntrl.by varying the firing angle speed is controlled but in rheostat ctrl resistance is decreased by steps to achieve speed control.

**63. What was the difference between Electrical Engineering and Electronics Engineering?**

Answer: Electrical engineering is a field of engineering that generally deals with the study and application of electricity, electronics, and electromagnetism. Electronics engineering, or electronic engineering, is an engineering discipline where non-linear and active electrical components such as electron tubes, and semiconductor devices, especially transistors, diodes and integrated circuits, are utilized to design electronic circuits, devices and systems, typically also including passive electrical components and based on printed circuit boards.

**64. What is an exciter and how does it work?**

Answer: There are two types of exciters, static exciter and rotary exciter. Purpose of exciter is to supply the excitation dc voltage to the fixed poles of generator. Rotary exciter is an additional small generator mounted on the shaft of main generator. If it is dc generator, it will supply dc to the rotary poles through slip ring and brushes (conventional alternator). if it is an ac exciter, output of ac exciter is rectified by rotating diodes and supply dc to main fixed poles.ac exciter is the ac generator whose field winding are stationary and armature rotates. Initial voltage is built up by residual magnetism. It gives the starting torque to the generator.

**65. Explain the term BOM?**

BOM stands for Bill of Materials; it is a list of item or parts that makeup a product assembly. For example, a lawn mower requires a handle assembly, metal deck assembly, a control assembly, motor and blade assembly.

**66. Explain what is QMS?**

QMS stands for Quality Management System; it documents all necessary information about company's design and operational controls, including issue reporting, monitoring, continuous improvement and training, to make sure that company delivers continuous product.

**67. What is the challenge in manufacturing products?**

Main challenge in manufacturing is to develop better production processes, ensure the right material and component supplies at the least cost, decrease production time, eliminate wastage and maintain quality in the final product.

**68. Define the term "factory overhead"?**

During the manufacturing process, whatever the cost is incurred during the process is referred as "factory overhead", excluding the cost of materials and direct labors.

**69. Explain how to supervise in a manufacturing unit?**

Supervising a manufacturing process includes attending to the individual phases of the production. Also, manufacturing supervisor should have a close eye on the inventory that going to be used.

Step 1: Keep the records of different phases of manufacturing also analyse whether the amount of product produced by the crew is enough to meet the demand

Step 2: Look for the bottlenecks in the unit and see how you can eliminate it

Step 3: Keep the track of inventory and try to reduce the liquid capital used after unused material

Step 4: Examine the final goods to determine whether they meet the company's quality standards.

**70. Explain the process of commutation in a dc machine. Explain what are inter-poles and why they are required in a dc machine.**

Commutation: It is phenomenon when an armature coil moves under the influence of one pole-pair; it carries constant current in one direction. As the coil moves into the influence of the next pole-pair, the current in it must reverse. This reversal of current in a coil is called commutation. Several coils undergo commutation simultaneously. The reversal of current is opposed by the static coil emf and therefore must be aided in some fashion for smooth current reversal, which otherwise would result in sparking at the brushes. The aiding emf is dynamically induced into the coils undergoing commutation by means of compoles or interpoles, which are series excited by the armature current. These are located in the interpolar region of the main poles and therefore influence the armature coils only when these undergo commutation.

**71. Comment on the working principle of operation of a single-phase transformer.**

Working principle of operation of a single-phase transformer can be explained as

An AC supply passes through the primary winding, a current will start flowing in the primary winding. As a result, the flux is set. This flux is linked with primary and secondary windings. Hence, voltage is induced in both the windings. Now, when the load is connected to the secondary side, the current will start flowing in the load in the secondary winding, resulting in the flow of additional current in the secondary winding. Hence, according to Faraday's laws of electromagnetic induction, emf will be induced in both the windings. The voltage induced in the primary winding is due to its self-inductance and known as self-induced emf and according to Lenses' law it will oppose the cause i.e. supply voltage hence called as back emf. The voltage induced in secondary coil is known as mutually induced voltage. Hence, transformer works on the principle of electromagnetic induction.

### **72. What is rated speed?**

At the time of motor taking normal current (rated current) the speed of the motor is called rated speed. It is a speed at which any system take small current and give maximum efficiency.

### **73. If one lamp connects between two phases it will glow or not?**

If the voltage between the two phases is equal to the lamp voltage then the lamp will glow. When the voltage difference is big it will damage the lamp and when the difference is smaller the lamp will glow depending on the type of lamp.

### **74. What is the full form of KVAR?**

We know there are three types of power in Electricals as Active, apparent & reactive. So KVAR is stand for ``Kilo Volt Amps with Reactive component.

### **75. Two bulbs of 100w and 40w respectively connected in series across a 230v supply which bulb will glow bright and why?**

Since two bulbs are in series they will get equal amount of electrical current but as the supply voltage is constant across the bulb ( $P=V^2/R$ ). So the resistance of 40W bulb is greater and voltage across 40W is more ( $V=IR$ ) so 40W bulb will glow brighter.

### **76. Why temperature rise is conducted in bus bars and isolators?**

Bus bars and isolators are rated for continuous power flow that means they carry heavy currents which rises their temperature. So it is necessary to test this devices for temperature rise.

### **77. What is a System?**

When a number of elements or components are connected in a sequence to perform a specific function, the group of elements that all constitute a System

### **78. What is Control System?**

In a System the output and inputs are interrelated in such a manner that the output quantity or variable is controlled by input quantity, then such a system is called Control System.

The output quantity is called controlled variable or response and the input quantity is called command signal or excitation.

### **79. What are different types of Control Systems?**

Two major types of Control Systems are 1) Open loop Control System 2) Closed Loop Control Systems

**Open loop Control Systems:** The Open loop Control System is one in which the Output Quantity has no effect on the Input Quantity. No feedback is present from the output quantity to the input quantity for correction.

**Closed Loop Control System:** The Closed loop Control System is one in which the feedback is provided from the Output quantity to the input quantity for the correction so as to maintain the desired output of the system.

### **80. What is a feedback in Control System?**

The Feedback in Control System is one in which the output is sampled and proportional signal is fed back to the input for automatic correction of the error (any change in desired output) for further processing to get back the desired output.

### **81. Why Negative Feedback is preferred in the Control System?**

The role of Feedback in control system is to take the sampled output back to the input and compare output signal with input signal for error (deviation from the desired result).

Negative Feedback results in the better stability of the system and rejects any disturbance signals and is less sensitive to the parameter variations. Hence in control systems negative feedback is considered.

### **82. What is the effect of positive feedback on stability of the system?**

Positive feedback is not used generally in the control system because it increases the error signal and drives the system to instability. But positive feedbacks are used in minor loop control systems to amplify certain internal signals and parameters.

### **83. What is protective relay?**

**Answer:** It is an electrical device designed to initiate the isolation of a part of the electrical installation, or to operate an alarm signal, in the event of abnormal condition or a fault. In simple words relay is an electrical device that gives signal to isolation device (eg: Circuit Breaker) after sensing the fault and helps to isolate the fault system from the healthy electrical system

### **84. What are the different relays that employed for protection of apparatus and transmission lines?**

**Answer:** The relays that are usually employed for protection of transmission lines include:

Over current relay, Directional relay, Distance relay, Under Voltage relay, Under-frequency relay

Thermal relay, Differential relay, Phase sequence relays, pilot relays

**85. How the electrical power system protection is divided?**

Answer: The overall system protection is divided into

Generator protection, Transformer protection, Bus bar protection, Transmission line protection and

Feeder protection

**86. How relays are connected in the power system?**

Answer: The relays are connected to the power system through the current transformer (CT) or potential transformer (PT).

**87. What are different types of principles of operation of electro-mechanical relays?**

Answer: Electro-mechanical relays operate by two principles. Electro-magnetic attraction and electro-magnetic induction. In electromagnetic attraction relay plunger is drawn to the solenoid or an armature is attracted to the poles of the electromagnet. In case of electro-magnetic induction, principle of operation is similar to induction motor. Torque is developed by electromagnetic induction principle

**88. Action carried out by the relay and circuit breaker during fault condition?**

Answer: After the relay sensing the fault condition, relay operates and close the trip coils. The effect of this will be circuit breaker operate to open the contacts.