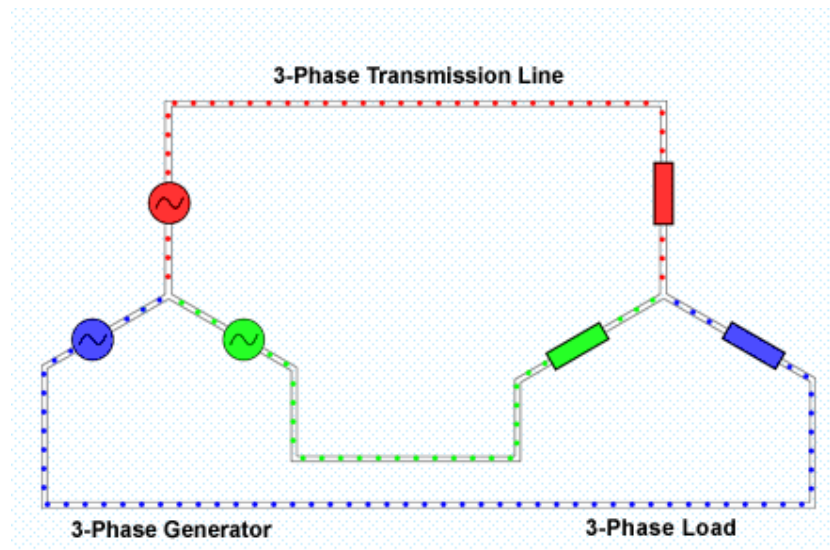


ELECTRICAL AND ELECTRONICS ENGINEERING INTERVIEW Q & A

Explore Yourself...



Mrinal Kanti Roy

Bachelor of Science in Electrical and Electronics Engineering

PREFACE

All praise is to the Supreme Being; creator and ruler of the universe, **God** whose mercy keeps us alive and to pursue my education in Electrical and Electronics Engineering and to provides this book for the Electrical and Electronics Engineering students. This book is based on some of the Electrical and Electronics Engineering interview questions with answers. I think so; it can help you to increase your basic knowledge and confidence in the interview and also written examination. I collect all the data from some books and with the help of internet. Any suggestion in favour of this book will be cordially and thankfully received.

However, I am responsible for any remaining errors or inadequacies.

So explore yourself...

The Provider

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ELECTRICAL AND ELECTRONICS INTERVIEW Q & A

E-book Published: Dhaka, February 2010.

*WE ALL ARE IGNORANT, JUST
ABOUT DIFFERENT THINGS.*

MARK TWAIN

*THERE IS SO MUCH GOOD IN THE WORST OF US,
AND SO MUCH BAD IN THE BEST OF US,
THAT IT LITTLE BEHOOVES ANY OF US,
TO TALK ABOUT THE REST OF US.*

J. M.

*FOR EVERYTHING YOU HAVE MISSED,
YOU HAVE GAINED SOMETHING ELSE;
AND FOR EVERYTHING YOU GAIN,
YOU LOSE SOMETHING ELSE.*

R. W. EMERSON

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EEE Interview Questions Part 1

EEE Interview Question: Why we use 3-phase supply? Why are not 4 or something else?

Answer: Three phase power has several advantages over single phase power, including smaller transformer size and weight, and simplified motor construction. Four phase power, which is actually two phase power with the phases in quadrature (90° apart), doesn't really offer any advantage over three phase power but requires an extra conductor. Some experimental work has been done with 6 and 12 phase power, but these have never been put into common usage. When you consider the cost of long transmission lines from the power source, three phase power is the best alternative.

Why three phases? Why not one or two or four?

In 1-phase and 2-phase power, there are 120 moments per second when a sine wave is crossing zero volts. In 3-phase power, at any given moment one of the three phases is nearing a peak. High-power 3-phase motors (used in industrial applications) and things like 3-phase welding equipment therefore have even power output. Four phases would not significantly improve things but would add a fourth wire, so 3-phase is the natural settling point.

EEE Interview Question: Why do we use 3 phase power supply for heavy loads?

Answer: With a single phase, the voltage drops to 0 every half-cycle. Therefore, the amount of power you can get out of the line is not constant over time; it has a very large 120-hz ripple. With a large motor, this can cause vibration, and also means that larger wires are needed for the same power load.

The same is true for so-called "2-phase" power, 2 voltages 180 degrees apart. They both cross zero at the same time, which is why this is normally also referred to as single-phase. It isn't any better than single phase.

With 3-phase power, however, there is never a time when all the voltages go to 0. In fact, if you are extracting power from all 3 phases, (like in a motor) the power stays constant throughout the whole cycle. This gives a vibration-free drive (and also allows for simpler motor design because 3-phase power has an inherent "direction" which 2-phase or 1-phase power does not).

Think of it like pedaling a bicycle. With single phase, it's like you only have 1 pedal. So you only do work while pushing the pedal down. If you have 2 pedals, one foot can apply a force while the other is going up doing no work. 3 phase is similar to that but there's 3 "pedals" each being "pushed" at different times so they work together to create more power.

Even for a DC application, where you're rectifying the output voltage (like in a car alternator) 3-phase is better. Although you're only pulling power from one phase at a time, the voltage still never goes to 0; it only ripples down to about 70% of its full-scale value before the next phase picks up.

With single phase there are 2 zero crossings in every cycle. At the zero crossing there is no power available for the load. With 3 phases the zero crossings are staggered so there is always power to the load. This true for motors, but also for DC rectified loads. High power television and radio transmitters use 3 phase for the DC supply for greatly improved efficiency.

So you can use star and delta configurations. Star for start for high torque then delta for running once the motor is up to speed.

You transfer the most power with the least copper and least losses that way.

For example: A three-phase AC motor has only the bearings as moving parts. The only electrical component is the stator which is just three stationary coils of wire. These motors, when applied correctly, typically last for a decade or more in operation.

A single-phase motor, on the other hand, has to be designed to compensate for the lack of starting torque inherent in the circuit. There are many ways in which this can be accomplished, but in every case there are drawbacks that are not present in the 3-phase system

EEE Interview Question: Why we are using only 50 Hz for single and three phase electrical instruments?

Answer: Synchronization condition:

There are five conditions that must be met before the synchronization process takes place. The alternator must have equal line voltage, frequency, phase sequence, phase angle and waveform to that of the infinite bus/Grid. Because of this condition, we got 50Hz frequency.

Assume having a grid with 50Hz and another with 60Hz, you can't synchronize these two and can't use an instrument designed for one in another unless you got some kind of converter.

Because 50 Hz was decided a long time ago and transformers and instruments have been designed for that frequency. If the instruments were designed for another frequency then it wouldn't work properly and overheat (and get damaged). There are better frequencies but it would be too costly to pretty much rebuild the nations entire power grid (not to mention world's power grid). Every transformer in every pole, substation, and home appliance would have to be changed.

50 Hz Instruments works in 60 Hz mostly without any problem, where as 60 Hz Instrument may damage in 50 Hz (overheating of control transformer, fan etc.) Unless it is designed for 50/60Hz

Although there are two, 60 Hz in the US and North America and 50 Hz in most of the rest of the world.

EEE Interview Question: We use single and three phase generators not two phase generator .Why?

Answer: In an electrical distribution system power is delivered via three wires, each operating 120 degrees from the other. This is a 3-phase system. As the voltage gets lowered to residential areas, there is often only a single high voltage wire at the top of the poles. This is a single phase from the original system. It feeds a pole mounted transformer which will supply your house with 120/240V. The transformer is center tapped with 120 volts on either side, or you can use 240 volts between the two lines.

A generator usually creates electricity by spinning a magnetic field through stationary coils of wire. In three phase systems the coils are placed such that the output voltages are 120 degrees out of phase with each other. This is the same as a three phase electrical system.

In order to create the 120/240V system which is commonly used in homes, the generator uses two separate coils. Each coil is 180 degrees out of phase. They are connected in series to create the neutral conductor. This is essentially a two phase system, but is known as single phase, referring to the original electrical system feed which it is designed to replace. By placing the two coils in parallel you can create a higher output 120V system which is single phase.

EEE Interview Question: What is the basis of selection of electrical transmission voltage?

Answer:

1. Material of transmission line.
2. Rating of wire.
3. Environments
4. Load to be driven and many more things

EEE Interview Question: Why we use a capacitor in an electric fan?

Answer: 1. Capacitor is used for both starting the electric fan and improving power factor.

2. The voltage taken by the fan during running has lagging power factor and in order to run the fan we need leading power factor. The capacitor increases the power factor. So we use capacitor in fan to increase its power factor

3. to give a quick start-up for any instrument, capacitor is used in electronics, by using capacitor in the start-up there is a charge accumulation in between the plates of capacitor, which is discharged again and gives a quick start to the instrument otherwise we have to use a very high voltage to the instrument.



EEE Interview Question: Why the Direction of Rotation of a TABLE Fan & CEILING Fan is different?

Answer: In table fan rotor is rotating part, but in ceiling fan stator is rotating part, so the direction of rotation is different.

Transformer is not rotating because for rotating magnetic field is required which is produced only when the current is passed through the windings which are displaced physically by 120degrees and phase difference of 120 degrees whereas in transformer there is no physical displacement of 120degrees hence transformer cannot rotate.

EEE Interview Question: An electric bulb is connected on a holder. One end of the wire is connected to the phase and the remaining one connected to earth instead of neutral. The bulb will glow or not? If yes then what is the need of neutral?

Answer: 1. Yes the bulb will be glow & neutral is return path of Circuit it is originated from distribution transformers star point, from this point only neutral is taken.

2. Then what is the need of neutral?

We can connect the secondary of transformer as delta

3. Generally all the distribution transformers have Primary DELTA and Secondary STAR connection. The neutral of the STAR is grounded. So the bulb will glow if connect across PHASE and NEUTRAL or PHASE and GROUND.

4. The need of Neutral: It gives assurance of reliable centralized earthing as your home may or may not have reliable earthing.

EEE Interview Question: Why transformer is not rotating?

Answer: Transformer is a static device that changes voltage level, unlike motors which are electromechanical device n convert electrical energy into mechanical energy. Transformer doesn't have ROTATARY PART.

EEE Interview Question: Why we are use 11KV / 22KV / 33KV / 66KV / 110KV / 230KV / 440KV this type of ratio. Why can't we use other voltage ratio like 54KV / 99KV etc.

Answer: 1. When an alternator generates voltage, its rms value is given by $4.4 \cdot f \cdot \Phi \cdot t$, where Φ is value of total flux per pole. So we can see all the voltages are made inevitably multiple of this value (1.1, which is the form factor of ac wave). Also it provides us the best economic construction of step up and step down transformers.

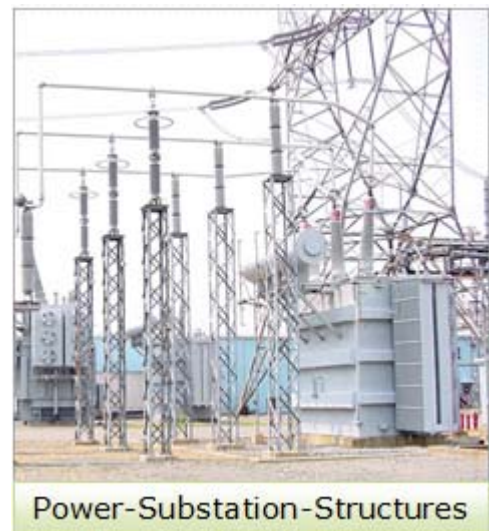
2. We always use a multiple of 1.11 because for a pure sine wave the FORM FACTOR is the ratio of rms value of voltage or current with the avg. value of voltage or current and for pure sine wave rms value of current is $I_{\max}/\sqrt{2}$ and avg. value is $2I_{\max}/\pi$ and which comes out to be 1.11 so we cant have a combination of other then a multiple of 1.11.

EEE Interview Question: What will happen if Transformer is operated at 100 HZ Frequency?

Answer: 1. As per EMF equation of the transformer frequency is directly proportional to winding voltage. If we double the frequency the sinusoidal root mean winf=ding voltage also doubled.

$$E = 4.44 \cdot f \cdot \Phi \cdot n \cdot a \cdot b$$

Voltage in winding increase double, due to this effect flux density increases to double it cause high no load losses and may cause to destroy the core



$\text{emf } e = 4.44BAfn$ volts

If the frequency is increased induced emf also increased so the induced emf damages the insulation of the winding it will leads to short ckt

2. The transformer iron losses will increase 4 times as iron losses is a function of the square of the frequency. As a result of increased Iron losses temperature will shoot up.

3. Following series of action will occur when 100Hz power is applied to 50Hz transformer.

- 1) Core gets saturated
- 2) No-load losses increases and Temp. Too goes up
- 3) Output voltage cannot be predicted as the core is totally saturated.
- 4) Heating continuous and gradually damages the core
- 5) This is followed by heating up of the oil and thus cooling temperature goes down sharply.

EEE Interview Question: Why transmission line 11Kv OR 33KV, 66Kv not in 10kv 20kv?

Answer: Due to the form factor=1.11, so output voltage must be multiply of form factor, so we get 11, 22, 33 the answers mentioning the form factor 1.1 are correct.

Just one clarification...

1.1 is form factor of a Sine wave...hence ac voltage being a sine wave holds Form Factor of 1.1

2. FORM FACTOR of sine wave is $1.11\text{rms/avg}=(I_m/\sqrt{2})/(2*I_m/\pi) = 1.11$
FF of square wave is 1.00 n triangular is 1.15 so I think form factor is not the only logic behind 11kv/33kv but while the generator o/p formula suggest there are certain terms multiplied with the form factor(1.11) n it is forcibly made to a standardized value by changing certain parameters..

3. First let us define form factor before we go into the question:

The form factor of an alternating current waveform (signal) is the ratio of the RMS (Root Mean Square) value to the average value (mathematical mean of absolute values of all points on the waveform). In case of a sinusoidal wave, the form factor is approximately 1.11.

Nowadays that thought has changed and we are using 400 V instead of 440 V, or 230 V instead of 220 V.

Also alternators are now available with terminal voltages from 10.5 kV to 15.5 kV so generation in multiples of 11 does not arise.

EEE Interview Question: How harmonics generated in electrical power distribution system?

Answer: Harmonic frequencies are integral multiples of the fundamental supply frequency, i.e. for a fundamental of 50 Hz, the third harmonic would be 150 Hz and the fifth harmonic would be 250 Hz. Harmonic distorted waveform is clearly not a sine wave and that means that normal measurement equipment, such as averaging reading rms-calibrated multi-meters, will give inaccurate readings. Note also that there could be also many zero crossing points per cycle instead of two, so any equipment that uses zero crossing as a reference will

malfunction. The waveform contains non-fundamental frequencies and has to be treated accordingly.

When talking about harmonics in power installations it is the current harmonics that are of most concern because the harmonics originate as currents and most of the ill effects are due to these currents. No useful conclusions can be drawn without knowledge of the spectrum of the current harmonics but it is still common to find only the total harmonic distortion (THD) figures quoted. When harmonics propagate around a distribution system, that is, to branch circuits not concerned with carrying the harmonic current, they do so as voltages. It is very important that both voltage and current values are measured and that quoted values are explicitly specified as voltage and current values. Conventionally, current distortion measurements are suffixed with 'I', e.g. 35% THDI, and voltage distortion figures with 'V', e.g. 4% THDV.

Harmonic currents have been present in the electricity supply system for many years. Initially they were produced by the mercury arc rectifiers used to convert AC to DC current for railway electrification and for DC variable speed drives in industry. More recently the range of types and the number of units of equipment causing harmonics have risen sharply, and will continue to rise, so designers and specifiers must now consider harmonics and their side effects very carefully.

A three-phase power system is called balanced or symmetrical if the three-phase voltages and currents have the same amplitude and are phase shifted by 120° with respect to each other. If either or both of these conditions are not met, the system is called unbalanced or asymmetrical. It is implicitly assumed that the waveforms are sinusoidal and thus do not contain harmonics.

In most practical cases, the asymmetry of the loads is the main cause of unbalance. At high and medium voltage level, the loads are usually three-phase and balanced, although large single- or dual-phase loads can be connected, such

as AC rail traction (e.g. high-speed railways) or induction furnaces (large metal melting systems employing highly irregular powerful arcs to generate heat).

Low voltage loads are usually single-phase, e.g. PCs or lighting systems, and the balance between phases is therefore difficult to guarantee. In the layout of an electrical wiring system feeding these loads, the load circuits are distributed amongst the three-phase systems, for instance one phase per floor of an apartment or office building or alternating connections in rows of houses. Still, the balance of the equivalent load at the central transformer fluctuates because of the statistical spread of the duty cycles of the different individual loads. Abnormal system conditions also cause phase unbalance. Phase-to-ground, phase-to-phase and open-conductor faults are typical examples. These faults cause voltage dips in one or more of the phases involved and may even indirectly cause over voltages on the other phases. The system behavior is then unbalanced by definition, but such phenomena are usually classified under voltage disturbances, which are discussed in the corresponding application guides, since the electricity grid's protection system should cut off the fault.

EEE Interview Question: What is the difference between 3 phase 3 wire & 3 phase 4 wire system in electrical system?

Answer: The answer is very simple. A 3-phase 3-wire system does not contain a neutral. This occurs when you have 3-phase loads such as motors that do not require a neutral. A 3-phase 4-wire system has a neutral. A neutral is required to obtain either 120 or 277 volts in a 3-phase system. Both of these scenarios can occur on wye and delta systems. I don't know what you mean by transferring a range of power.

By the way, Kerry K is completely wrong. Every system needs a ground. Just so you know, I am the one who gave you thumbs down.

L1,L2,L3 -3phase 3 wire for balanced Load (3phase x 220v or 380V or 400V , running a 3 phase load like motor, Machine supply 3 wire is enough .3phase 4 wire(L1,L2,L3, NEUTRAL) can be used for balanced load or Un balanced load or both In addition of above load single phase Load (110V or 220V)can be used like lighting, window AC etc, the 4th wire is called Neutral (Star point).In other way Generation (11KV or 15.75kv)- transmission 230KV-400KV) with 3 wire enough in HV side - .In utility point 4 (230 , 380 or 415 V)wire required in LV side.

EEE Interview Question: How to convert electrical energy to infrared energy or to microwave energy?

Answer: To convert to IR, use an IR lamp, aka heat lamp. IR is heat energy.

To convert to microwave, you need a magnetron and a high voltage power supply, as is found in a microwave oven.

For the reverse, it is more difficult.

IR energy to electric energy, you could use a special solar array tuned to the IR frequencies. Or with enough heat, you can boil water and pipe that into a turbine that drives a generator.

Microwave energy, you have to capture it in a dish antenna, and then rectify it to DC electricity.

EEE Interview Questions Part 2

EEE Interview Question: 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 day, magnetic traction is also used for bullet trains. Basically dc motors are used for electric traction systems.



EEE Interview Question: How can you start-up the 40w tube light 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.

EEE Interview Question: 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. ($p.u = \text{actual value} / \text{base value}$).

EEE Interview Question: 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

EEE Interview Question: 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 connections 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 happens the fuse connected in the particular control circuit alone will blow off.

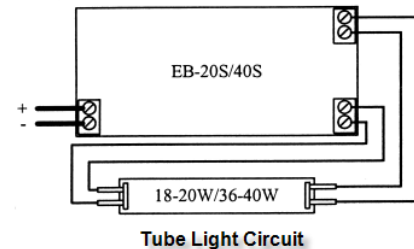
EEE Interview Question: What is the diff. between electronic regulator and ordinary rheostat regulator for fans?

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

EEE Interview Questions Part 3

EEE Interview Question: How tube light circuit is connected and how it works?

Answer: A choke is connected in one end of the tube light and a starter is in series with the circuit. When supply is provided, the starter will interrupt the supply cycle of AC. Due to the sudden change of supply the choke will generate around 1000volts. This volt will capable of to break the electrons inside the tube to make electron flow. Once the current passes through the tube the starter circuit will be out of part. Now there is no change of supply causes choke voltage normalized and act as minimize the current.



EEE Interview Question: What happen if we give 220 volts dc supply to the bulb or 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.

EEE Interview Question: What 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.

EEE Interview Question: What is encoder, how it function?

Answer: An encoder is a device used to change a signal (such as a bit stream) or data into a code. The code may serve any of a number of purposes such as compressing information for transmission or storage, encrypting or adding redundancies to the input code, or translating from one code to another. This is usually done by means of a programmed algorithm, especially if any part is digital, while most analog encoding is done with analog circuitry.

EEE Interview Question: What are the advantages of speed control using THYRISTOR?

Answer: Advantages:

1. Fast Switching Characteristics than MOSFET, BJT, and IGBT
2. Low cost
3. Higher Accurate.

EEE Interview Question: Why Human body feels Electric shock?? And in an Electric train during running, we did not feel any Shock? Why?

Answer: Unfortunately our body is a pretty good conductor of electricity, The golden rule is Current takes the lowest resistant path if you have insulation to our feet as the circuit is not complete (wearing rubber footwear which doing some repairs is advisable as our footwear is a high resistance path not much current flows through our body).The electric train is well insulated from its electrical system.

EEE Interview Questions Part 4

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Question: 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 can not start the Induction motor and Synchronous motors on load, but can not start the DC series motor without load.

EEE Interview Question: 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.

EEE Interview Question: What is ACSR cable and where we use it?

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

EEE Interview Question: What is vacuum circuit breaker? Define with cause and where be use it Device?

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.

EEE Interview Question: What is the link between Voltage and Form Factor?

Answer: Voltage is an electrical field form factor is the actual size and shape of a device or piece of hardware.

EEE Interview Questions Part 5

EEE Interview Question: 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.

EEE Interview Question: What's the one main difference between UPS & inverter?

Answer: Uninterrupted power supply is mainly use for short time. Means according to ups VA it gives backup. ups is also two types : on line and offline . Online ups having high volt and amp for long time backup with high dc voltage. But ups start with 12v dc with 7 amps. But inverter is start with 12v,24,dc to 36v dc and 120amp to 180amp battery with long time backup.

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Question: What is the advantage of vvvf drives over non vvvf drives for EOT cranes?

Answer: Advantages-

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

EEE Interview Question: Which 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.

EEE Interview Questions Part 6

EEE Interview Question: 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.

EEE Interview Question: What is the Polarization index value? (Pi value) and simple definition of polarization index?

Answer: Its ratio between insulation resistance (IR) i.e. meggar values 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.

EEE Interview Question: 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 observes reactive power for magnetizing. This type of generators is used in windmills.

EEE Interview Questions Part 7

EEE Interview Question: Why syn. generators are used for the production of electricity?

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

EEE Interview Question: 1 ton is equal to how many watts?

Answer: 1 ton = 12000 BTU/hr and to convert BTU/hr to horsepower,
 $12,000 * 0.0003929 = 4.715 \text{ hp}$ therefore 1 ton = $4.715 * .746 = 3.5 \text{ KW}$.

EEE Interview Question: 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).

EEE Interview Questions Part 8

Question: 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.

EEE Interview Question: 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.

EEE Interview Question: What is the difference between a four point starter and three point starter?

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

EEE Interview Question: 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 dielectric strengths equal to 8 times of air. That's why always vacuum is used as in HT breaker and air is used as in LT.

EEE Interview Question: What is the difference between surge arrester and lightning arrester?

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

EEE Interview Question: What is synchronous Condenser? Where and why it is used?

Answer: An overexcited synchronous motor running at no-load and used for power-factor correction is called synchronous condenser. It is also called synchronous capacitor.

It is used in a large system where the use of static capacitor is inefficient and expensive. It is used for power-factor correction.

EEE Interview Questions Part 9

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Question: How many types of cooling 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)

EEE Interview Question: Why the capacitor 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.

EEE Interview Question: 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.

EEE Interview Question: What is stepper motor? What are its uses?

Answer: Stepper motor is the electrical machine which acts 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.

EEE Interview Question: 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.

EEE Interview Question: What is Ferranti effect?

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

EEE Interview Questions Part 10

EEE Interview Question: 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).

EEE Interview Question: Tell me in detail about c.t. and p.t.? (Company: reliance)

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 $ANS = 8000 \times 5 / 5000 = 8A$ 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.

EEE Interview Question: There are a Transformer and an induction machine. Those two have the same supply. For which device the load current will be maximum? 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 its not consuming. Hence the load current in the transformer is because of core loss so it is minimum.

EEE Interview Question: 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.

EEE Interview Question: How to calculate capacitor bank value to maintain unity power factor with some suitable example?

Answer: $KVAR = KW (TAN (COS (-1) \#e) - TAN (COS (-1) \#d))$

#e= EXISTING P.F.

#d= DESIRED P.F.

EEE Interview Questions Part 11

EEE Interview Question: 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 other wise it trips the circuit by its own tripping mechanism.

EEE Interview Question: 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.

EEE Interview Question: 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 operated. Its specification only rated current is given. But circuit breaker is onload 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.

EEE Interview Questions Part 12

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Question: Where should the lightning arrestor is placed in distribution lines?

Answer: Near distribution transformers and out going feeders of 11kv and incoming feeder of 33kv and near power transformers in sub-stations.

EEE Interview Question: 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.

EEE Interview Question: What is the general difference between DC and AC machine?

Answer: 1. In DC machine armature rotates and the field is stationary,

In AC machine armature is stationary and the field is rotating.

2. DC machine contains commutator and brush,

AC machine contains slip ring and brush.

EEE Interview Questions Part 13

EEE Interview Question: 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.

EEE Interview Question: 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, $V = I_a R_a$
 $I_a = \frac{V}{R_a}$ where R_a is very less like 0.01ohm.i.e I_a will become enormously increased.

EEE Interview Question: 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 e.m.f 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".

EEE Interview Question: Why series motor cannot be started on no-load?

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

EEE Interview Question: 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.

EEE Interview Question: 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.

EEE Interview Questions Part 14

EEE Interview Question: 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.

EEE Interview Question: Why ac solenoid valves attract the plunger even though we interchange the terminal? Will the poles changes?

Answer: Yes because the poles change 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 attracts the plunger even though its terminals are interchanged.

EEE Interview Question: What is derating? Why it is necessary, it is same for all means for drives, motors, and cables.

Answer: The current currying of cables will change depending upon the site temperature (location of site), type of run (it will run through duct, trench, buried etc.), number of tray, depth of trench, and distance between cables. Considering this condition actual current currying capacity of cable reduce than current currying capacity (which given to cable Catalogue) this is called derating.

EEE Interview Question: Why temperature rise is conducted in bus bars and isolators?

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

EEE Interview Question: When voltage increases then current also increases then what is the need of over voltage relay and over current relay? Can we measure over voltage and over current by measuring current only?

Answer: No. We can't sense the over voltage by just measuring the current only because the current increases not only for over voltages but also for under voltage (As most of the loads are non-linear in nature). So, the over voltage protection & over current protection are completely different. Over voltage relay meant for sensing over voltages & protect the system from insulation break down and firing. Over current relay meant for sensing any internal short circuit, over load condition, earth fault thereby reducing the system failure & risk of fire. So, for a better protection of the system. It should have both over voltage & over current relay.

EEE Interview Question: If one lamp connects between two phases it will glow or not?

Answer: If the voltage between the two phase 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.

EEE Interview Questions Part 15

EEE Interview Question: How do you select a cable size (Cu & Al) for a particular load?

Answer: At first calculate the current of the load, after that derate the current considering derating factor (depending on site condition and laying of cable) after choose the cable size from cable catalog considering derating current. After that measure the length of cable required from supply point of load to load point. Calculate the voltage drop which will max 3% (resistance and reactance of cable found from cable catalog of selecting cable) if voltage drop > 3% then choose next higher size of cable.

EEE Interview Question: What are HRC fuses and where it is used?

Answer: HRC stand for "high rupturing capacity" fuse and it is used in distribution system for transformers.

EEE Interview Question: 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.

EEE Interview Question: What is the power factor of an alternator at no load?

Answer: At no load Synchronous Impedance of the alternator is responsible for creating angle difference. So it should be zero lagging like inductor.

EEE Interview Question: Which power plant has high load factor?

Answer: 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. Hydroelectric power plants have a higher efficiency than thermal & nuclear power plants.

EEE Interview Question: Mention the methods for starting an induction motor?

Answer: The different methods of starting an induction motor

DOL: direct online

starter

Star delta starter

Auto transformer

starter

Resistance starter

Series reactor starter

EEE Interview Question: 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.

EEE Interview Question: Why the induction motor never runs at synchronous speed?

Answer: If rotor & stator have same speed, no relative motion $\{N_r = N_s (1-s)\}$.

Slip is zero, no voltage induce in rotor

Current is zero, then torque is zero ($T \propto E_2 I_2 \cos \phi_2$).

Thus induction motor never runs at synchronous speed.

EEE Interview Question: Why induction motor treated as a rotating transformer?

Answer: Transformer has two sides: primary & secondary.

Transformer transforms energy from primary to secondary by induction. Similarly, Induction motor has primary (stator) & secondary (rotor). Voltage is induced in secondary by rotating flux of constant magnitude i.e. the process of induction

Thus induction motor treated as a rotating transformer.

EEE Interview Question: What is the Necessity of Starter of an Induction Motor?

Answer: Induction motors, when direct-switched, take five to seven times their full-load current and develop only 1.5 to 2.5 times their full-load torque. This initial excessive current is objectionable because it will produce large line-voltage drop that, in turn, will affect the operation of other electrical equipment connected to the same lines. Hence, a starter is necessary to overcome this objection.

EEE Interview Question: Why Power Factor Correction is needed?

Answer: We know,

$$P = VI \cos \theta \Rightarrow I = \frac{P}{V \cos \theta}$$

From the above relation it is clear that a decreased power factor results in an increased current. This increased current results in greater losses in connecting lines. Since most power loads have a lagging power factor which results in poor voltage regulation. Thus from the view point of both efficiency and voltage regulation, it is advantageous to bring a load power factor as close to unity as possible.

EEE Interview Question: How do we select a cable for a machine as per standards? Is there is any standard to select a cable as per voltage, or as per KVA and as per amps ratings?

Answer: Cable size depends upon current carrying capacity and voltage to withstand, to select cable size we must have knowledge of load of machine and operating voltage

EEE Interview Question: How do you measure the leakage current in a house wiring?

Answer: There are two ways for it. First one is to keep all lights and other domestic electric appliances OFF for an hour and record the energy consumption in the energy meter. Calculate current from it. Second way is by measuring the current in the house earth conductor as leakage current goes to earth.

EEE Interview Question: Describe how energy is stored in an inductor on electronic level?

Answer: Energy is stored in an inductor in the form of a magnetic field.

$$\text{Energy stored in an inductor} = \frac{1}{2} L * I^2$$

EEE Interview Question: When there is a sudden loss in the demand what happens to the transformer and generation?

Answer: When there is a sudden loss of load The Generator terminal voltage increases due to the fact that the IX drop in the generator winding decreases. The EMF generated being the same the reduced reactance loss leads to a sudden rise in generator voltage. But the AVR (Automatic Voltage Regulator) will act instantly to bring this voltage to the set value by reducing the excitation. There is practically no effect of this on the transformer barring the reduction in I²R (copper Losses) and reduced IX drop.

EEE Interview Question: what is a UPS?

Answer: UPS stands for Uninterrupted Power Supply. This system can be of two major types and work to ensure uninterruptible power within a specified period before backup comes in. There is a static type and the mechanical type. The static type is common and consists of the rectifier/battery/inverter making up the system where as the mechanical type consists of transfer switch backup generator and an electric motor directly coupled to motor-generator through a flywheel.

Static type has the advantage of less maintenance when compared with the mechanical type with rotating parts.

EEE Interview Questions Part 16

EEE Interview Question: Why do we rate transformer in KVA not in KW?

Answer: since the losses in transformers are mostly due to copper losses and core losses which in turn depends on current and voltage (i.e., copper losses is nothing but i^2R losses depends on current and core losses $v \cdot i$ depends on the voltage) hence the transformer ratings are taken in KVA but not in KW.

Broadly, we know the relation of power in three phase, $P = \sqrt{3}VI\cos\theta$. Hence we can say that the load is not constant it very accordingly. So power factor is also get vary with load it is hard to define the power of transformer so it is rated in KVA.

KVA is the unit for apparent power. Apparent power consists of active and reactive power. Active power is the share of the apparent power which transmits energy from the source (generator) to the user. Reactive power is the share of the apparent power which represents a useless oscillation of energy from the source to the user and back again.

It occurs when on account of some inertia in the system there is a phase shift between voltage and current. This means that the current does not change polarity synchronous with the voltage. But the heat generated in a winding as well as the eddy current losses generated in a transformer core depend on the current only regardless of whether it aligns with the voltage or not.

Therefore the heat is always proportional to the square of the current amplitude irrespective of the phase angle (the shift between voltage and current). So a transformer has to be rated (and selected) by apparent power.

EEE Interview Question: What will happen if we apply dc volt across transformer?

Answer: When a.c is applied: When ac voltage is applied to a transformer winding, as that circuit is closed & based on the impedance present in that winding current starts flowing but the nature of this current is also a.c. This a.c current produces a magnetic flux which is of a.c in nature i.e time varying nature. Because

$$\text{flux} = \text{mmf}/\text{reluctance} = \text{current} \times \text{no.of turns}/\text{reluctance}$$

If current is ac flux will also be ac.

Now according to Faraday's Law- if any conductor links time varying nature of flux then emf will be produced in that conductor & the direction of this emf will be exactly opposite to the applied voltage. In this case *the total current flowing through that winding will be*

$$= \frac{\text{applied voltage} - \text{induced emf}}{\text{impidance}}$$

When d.c is applied: When dc voltage is applied to a transformer winding, as that circuit is closed & based on the impedance present in that winding current starts flowing but the nature of this current is also dc. This d.c current produces a magnetic flux which is of d.c in nature i.e constant magnitude. Because

$$\text{flux} = \text{mmf}/\text{reluctance} = \text{current} \times \text{no.of turns}/\text{reluctance}$$

If current is dc flux will also be dc) flux is constant, i.e.

$$\frac{d\phi}{dt} = 0$$

So emf produced will be 0 & the total current flowing through that winding will be

$$\frac{\text{applied voltage}-0}{\text{impidance}}$$

$$\text{e.g. } \frac{200-0}{1} = 200A$$

So if the magnitude of dc is higher enough, then in that case the current flowing through the winding may exceed the current carrying capacity of that winding thus the winding will be damaged

EEE Interview Question: How is a 100 MVA transformer cooled?

Answer: 100 MVA Transformer is cooled by forced oil forced water cooling method..

EEE Interview Question: Is possible to increase the voltage without using transformer? Why?

Answer: It is possible to increase voltage without a transformer.
Example: With a DC source - active Charge pump circuit.
With an AC source - Cockroft-Waton Diode Voltage Multipliers (just a passive charge pump)

Reference

A Textbook of Electrical Technology Vol.2_B L Theraja

<http://www.geekinterview.com/Engineering/Electrical-Engineering>

<http://electricalinterviewquestions4u.blogspot.com/>

<http://www.allinterview.com>

<http://qna.rediff.com/>

<http://in.answers.yahoo.com/question/index?qid=20081012040353AAQPZkg>

<http://in.answers.yahoo.com/question/index?qid=20090908041121AAgP3zS>