

Power System Interview Questions

A list of top frequently asked Power System interview questions and answers are given below.

1) What is the Power plant or Power Station?

The generation, distribution, and transmission system together constitute a network called as Power plant. The power plant uses the form of energy such as coal, diesel and converts it into electrical energy. An example of the power system is a grid that supplies power to the other system.

2) What do you mean by the zone of protection?

The protection is provided in the system to protect each and every element of the power system. If any fault occurs in the system, then the relays associated with it trip all the circuit breaker so that the faulty element gets removed from the power system. This Security provided to the system is called the 'Zone of protection'.

3) What is the difference between the Transmission line and distribution line?

The main work of transmission line and distribution line is to transfer power from one place to another but the difference between transmission and distribution line is based on the factors like the type of phase, the distribution line because the wire for transmission line is thick and for distribution line is thin, the transmission line requires three phase supply for carrying electricity and distribution line requires single phase supply for carrying electricity.

4) What are the common sources of energy?

The common sources of energy are:

- Sun.
 - Water.
 - Waterhead.
 - Fuel.
 - Nuclear Energy.
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5) Write down the classification of the transmission line?

Depending upon the voltage and length of the conductor the classification of the transmission line is as follows:

1. A.C Transmission Line.

- Short transmission line.
- Medium transmission line.
 - Pi model of a medium transmission line.
 - T model of a medium transmission line.
- Long transmission line.

2. D.C Transmission Line.

6) What is a Relay?

The Relay is an automatic device that senses the abnormal condition of the electrical circuit and closes its contact.

7) How many types of Protection relays are there based on the Characteristic?

On the basis of a characteristic, protection relays can be categorized as follows:

- Definite time relays.
- IDMT (Inverse time relays with definite minimum time).
- Instantaneous relays.
- IDMT with inst.
- Stepped Characteristic relays.
- Programmed Characteristic relays.
- Voltage Restraint overcurrent relays.

8) What is meant by Reset level of the Relay?

The value of **current** or **voltage** below which the relay opens its contact is called the reset level of the relay.

9) What are the internal and external faults?

Internal faults are the faults that occur inside the zone and external faults are the faults that occur outside the zone of protection.

10) How many types of faults are there in 3 phase power system?

The faults that occur in the three-phase power system are as follows:

- Single line to ground (LG) fault
- Line to line (LL) fault
- Double line to ground (LLG) fault
- Three Phase short circuit (LLL) fault
- Three phase to ground (LLLG) fault

11) What do you mean by reach and reach the point of the relay?

The reach point is the farthest point from the relay which is still inside the zone of protection and reach is the distance between the reach point and relay.

12) Why does the adjacent zone of protection overlap?

Adjacent zone of protection overlaps because if we do not overlap then some portion of the power system will be left out unprotected.

13) What is Electrical Grounding?

Electrical grounding or merely grounding is a safety measure used to prevent people accidentally coming in contact with the hazardous electrical faults.

14) What is Electrical Earthing?

Electrical earthing is a process of transferring the immediate discharge of the electrical energy directly to the earth by the help of low resistance wire.

15) How many types of electrical earthing are there?

Electrical earthing is of two types:

1. Neutral Earthing.

2. Equipment Earthing.

16) What is the difference between Electrical earthing and Electrical grounding?

The difference between electrical earthing and electrical grounding is that in grounding the current carrying part is connected to the ground, whereas in earthing the non-current carrying part is connected to the ground. Grounding does not have zero potential but earthing has zero potential.

17) What is the importance of earthing?

Earthing is important because of the given below reasons:

1. Earthing protects the person from the short circuit current.
2. Earthing provides the easiest path of flow for short-circuit current at the time of insulation failure.
3. Earthing protects the persons and apparatus from the high voltage surges and lightning discharge.

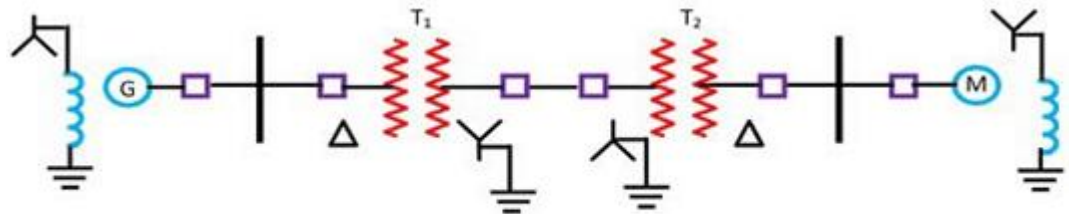
18) What is meant by Sag?

'Sag' is the difference in level between the points of support and the lowest point on the conductor.

19) What is Corona?

'Corona' is the phenomenon of violet glow, hissing noise, and production of ozone gas in an overhead transmission line.

20) Draw the Single Line Diagram of the Power Station?



Single Line Representation of a Typical Power System

© Circuit Globe

21) How do you select the pickup value of the relay?

The pickup value of the relay should be more than the maximum load and it should allow the normal load as well as the certain degree of overload to be supplied. The relay should be sensitive enough to respond to the smallest fault, therefore, the pickup value should be less than the smallest fault current.

22) What is the difference between a fuse and a breaker?

The difference between Fuse and a circuit breaker is that fuse works on the principle of the thermal and electrical properties of the conducting materials, whereas the circuit breaker works on the principle of electromagnetism and switching principle. We can use the fuses only once but circuit breakers can be used many more times, and the breaking capacity of the fuse is low as compared with the circuit breaker.

23) What is the difference between the relay and the circuit breaker?

The difference between the relay and the circuit breaker is that relay is a switching device that gives the signal to the circuit breaker in case of fault occurrence, whereas circuit breaker breaks the circuit automatically when receives the signal.

24) What is the difference between resistance grounding system and resistance earthing system?

In resistance grounding, one or more resistance is connected to the neutral of the system. Resistance winding limits the fault current and protects the system from transient overvoltages. The arcing ground risk is decreased by the resistance grounding and permits the ground fault protection, whereas resistance earthing system is provided in electric equipment to protect the equipment from the occurrence of the fault in the system.

25) What is Primary and Backup protection?

Primary protection also known as main protection is the first line of protection which provides quick acting and clearing of the fault within the boundary of the elements it protects. In the electrical installation, the primary protection is provided to each section. Whereas the backup protection provides the backup to the primary or main protection whenever it fails in operation and cut out for repair. For the proper functioning of the electrical system back up protection is essential.

26) What is meant by Bus Bar Protection?

When the fault occurs on the bus bar, then the whole of the supply gets interrupted, and all the feeders are disconnected in this case Busbar protection is provided to the system to eliminate the occurrence of these faults. For removing the faults, the entire circuits connecting the faulty section needs to be open.

27) How many types of fault occur in a 3-phase power system?

Electrical faults are the deviation of voltage and current from normal values. There are two types of faults that occur in a three-phase system.

1. Symmetrical faults.
 2. Unsymmetrical faults.
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28) What are the effects of Electrical Faults?

The effects of electrical faults are as follows:

1. **Overcurrent flow**- During fault occurrence high current flows in the system and which leads to tripping of relays, damaging insulation and components of the equipment.
 2. **The danger to operating personnel**- Fault can also affect the individual working there, and severity of the fault depends upon the voltage and current at the point of fault.
 3. **Loss of equipment**- Heavy current due to short circuit faults result in the burning of equipment completely which leads to improper working of equipment or device.
 4. **Disturbed interconnected active circuits**- During the occurrence of fault the active, connected components of the system also get disturbed.
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29) Give some example of fault limiting devices?

Some examples of fault limiting devices are as follows:

1. **Circuit Breaker**- It is a device which works in normal condition and breaks when an abnormal condition occurs.
2. **Fuse**- A fuse is a thin wire enclosed in a casing or glass which connects two metal parts. It is used as a primary protection device.

3. **Relay**- It is a condition based operating switch which opens its contact when an abnormal condition occurs.
 4. **Lighting power protection devices**- These are the devices that are used to protect the system from surge voltages or lighting like- lightning arrestors and grounding devices.
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30) When are the directional relays used?

In ring main feeder system, single end fed system of parallel feeders directional relays are used.

31) What are the causes of electrical faults?

The causes of electrical faults are as follows:

1. The existing weather conditions like lightning strikes, heavy rains, heavy winds, salt deposition on overhead lines and conductors etc. interrupts the powers supply and damages the damages the electrical installations.
 2. Malfunctioning, aging, insulation failure of cables and winding leads to failure of equipment like generators, motor, transformer.
 3. Electrical faults are also caused because of human errors such as selecting an improper rating of equipment, switching the circuit while it is under servicing etc.
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32) What is Skin Effect?

The tendency of an alternating electric current (A.C) to get distributed within a conductor such that the current density becomes largest near the surface of the conductor, and decreases with greater depth in the conductor, is called as "**Skin Effect.**"

33) What is the bundle conductor?

A bundle conductor consists of two or more parallel subconductors at a spacing of several diameters.

34) What is the use of bundle conductors?

Bundle conductors are used to reducing the Corona and Skin effect.

35) What are the commonly used schemes for the bus zone protection?

The commonly used schemes for the protection are:

- Backup Protection.
 - Differential overcurrent protection.
 - Circulating current protection.
 - Voltage overvoltage protection.
 - Frame leakage protection.
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36) What are the internal and external faults?

Internal faults are the faults that occur within the zone of protection and external faults are the faults that occur outside the zone of protection.

37) What are the advantages of a Three-Phase system over a Single-Phase System?

The advantages of the three-phase transformer over a single-phase transformer are as follows:

1. In the three-phase system, the power delivered is constant whereas the power delivered in the single-phase system is pulsating in nature.
2. The three-phase induction motors are self-starting and more efficient whereas the single-phase motor is not self-starting and requires an auxiliary means for the start of motor.
3. The output of the three-phase machine is higher than a single-phase machine for a given size of a frame.
4. Three phase motors have higher power factor whereas the single phase motors have low power factor.

38) What is Critical disruptive Voltage?

The minimum phase to a neutral voltage that is required for corona discharge to start is called the Critical disruptive voltage. In this, the corona discharge means the current discharge in the air.

Critical Disruptive Voltage:

1. $V_c = \mu \times \beta \times [r \log (d/r)]$

Where the value of surface irregularity factor μ for a different surface condition is as follows:

Surface Condition	Value of Surface Irregularity Factor μ
Polished Surface	1
Conductor with dust deposit	0.92 to 0.98
Stranded Conductor	0.8 to 0.87

39) What is a Slack bus?

A slack bus also known as reference bus or swing bus balances the active and reactive power of the system. The slack bus serves as angular reference for all the buses in the system.

40) How many methods use the load flow solution?

The method that uses the load flow analysis is as follows:

- Gauss-Seidel method using Y bus
- Newton- Raphson method (NR)
- Power flow through slack bus and line.
- Decouple load flow method
- Fast Decouple load flow method.