

# **Dronacharya Group of Institutions, Greater Noida**

## **Electrical & Electronics Department**

### **Switchgear & Protection Question Bank**

#### **Overvoltage & Lightning Protection**

##### **PART-A**

1. What are the causes over voltages on power system?
2. What is meant by voltage surge?
3. State the attenuation and distortion of traveling waves.
4. What are the causes of power frequency and its harmonic over voltage?
5. What is ground wire?
6. What is use of ground wire?
7. What is a protector tube?
8. Define basic impulse level.
9. Mention the various insulation levels in substations?
10. What is a surge absorber?

##### **PART-B**

1. (a) What are the causes of over voltage on a power system?  
(b) Why is it necessary to protect the lines and other equipment of the power system against over voltages?
2. Describe the phenomenon of lightning.
3. What protective measures are taken against lightning over voltages?
4. Describe the protection of stations and sub-stations against direct lightning stroke.
5. What is Peterson coil? What protective functions are performed by this device?
6. What are the requirements of a ground wire for protecting power conductors against direct lightning stroke? Explain how they are achieved in practice.
7. Explain the operation of various types of surge absorbers.

#### **Circuit Breakers**

##### **PART-A**

1. What is an arc?
2. Define restricting voltage.
3. Define recovery voltage.
4. Define current chopping.
5. Mention the different methods of high resistance arc interruption.
6. What is switchgear?
7. What is breaking capacity?
8. What are the functional requirements of a circuit breaker under fault condition?

9. What are the advantages of low oil circuit breaker?
10. What are the types of air blast circuit breaker?
11. What are the advantages of SF6 circuit breaker?

### **PART-B**

1. Discuss the recovery rate theory and energy balance theory of arc interruption in a Circuit breaker.
2. What is resistance switching?
3. Derive the expression for critical resistance.
4. Explain the phenomenon of current chopping in a circuit breaker.
5. What measures are taken to reduce it?
6. With neat sketch, describe the working principle of an axial air blast type circuit breaker.
7. Discuss the operating principle of SF<sub>6</sub> circuit breaker.
8. Enumerate various types of ratings of a circuit breaker.
9. What are the different methods of testing of circuit breakers?
10. What is the difficulty in the development of HVDC circuit breaker?

### **Fuses & Switches**

#### **PART-A**

1. Define Fuse?
2. Define fuse element or (fuse wire)
3. What are the materials commonly used for fuse elements.
4. Define minimum fusing current? What are the factors at which it depends?
5. How the minimum fusing current does differs for stranded wires?
6. Define fusing factor?
7. What are the types of fuses?
8. What are main advantages of HRC fuses?
9. What are the main disadvantages of HRC fuses
10. Mention the points in selection of fuse?
11. Define isolator and explain its requirements.
12. Define earthing switch?
13. What is the necessity of earthing switch?
14. What are the types of isolators?
15. What is main advantage of pantograph isolator?
16. What is a gas insulated substation.

#### **PART-B**

1. Describe the construction and operation of the HRC cartridge fuse.
2. What are the factors on which the current carrying capacity of the fuse depends?
3. What are the types of isolators?
4. Explain the advantages of gas insulator substation, probable location where it can be located and its demerits.
5. State the sequence of operation of circuit breaker, isolator and earthing switch.
  - I. while opening
  - II. while closing

## **Faults in Components**

### **PART-A**

1. What are the types of stator winding faults in alternator?
2. Mention the most commonly used protection scheme for alternators.
3. What are the types of feeders in power system.
4. What is meant by radial feeder?
5. What is the disadvantage of radial feeder?
6. What are the relays used for time graded protection in radial feeders.

### **PART-B**

1. Enumerate the relaying schemes which are employed for the protection of a modern alternator.
2. What is transverse or split phase protection of an alternator?
3. What type of a protective scheme is employed for the protection of the field winding of the alternator against ground faults?
4. Discuss the protection employed against loss of excitation of an alternator.

## **Relays**

### **PART-A**

1. Define protective relay.
2. Give the types of electromagnetic relays.
3. What are the essential qualities of a relay?
4. How the relays are basically classified.
5. What is meant by directional relay?
6. What is differential relay and list the applications of differential relay.
7. What is R-X diagram?

### **PART-B**

1. What are the different types of electromagnetic relays?
2. What are the various types of over current relays? Discuss their area of application.
3. Explain the working principle of distance relays.
4. Write a detailed note on differential relays.
7. Describe the realization of a directional over current relay using a microprocessor.