Unit-V Substations

Session 1- Introduction: Classification, functions and major components of substations

Quiz

1. What are the types of substations?
2. What are the functions of a substation?
3. What is a substation?
4. Difference between SS and PS

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

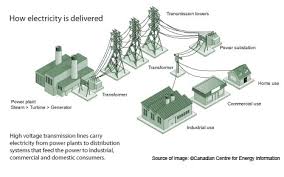
Giving detailed explanation on types of substations

A **substation** is a part of an electrical [generation](http://en.wikipedia.org/wiki/Electricity_generation), [transmission](http://en.wikipedia.org/wiki/Electric_power_transmission), and [distribution](http://en.wikipedia.org/wiki/Electric_power_distribution) system. Substations transform [voltage](http://en.wikipedia.org/wiki/Voltage) from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels.

Types of substation:

Based on service

Based on constructional feature



Board activity

Drawing the different types of substations and explaning

Ref; <http://www.cvel.clemson.edu/Emc/calculators/TL_Calculator/index>.

Session 2- Bus-bar arrangements

Quiz

1. What is a bus bar?
2. What are the advantages of bus bar?
3. What are the materials used for bus bar?

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Discussing the merits and demerits of different types of bus bar arrangements

Bus bar:

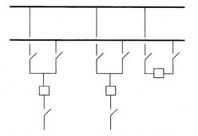
The different types of bus bar arrangements are:

1. Single bus bar
2. Single bus bar system with sectionalization
3. Double bus bar with single breaker
4. Double bus bar with two circuit breakers
5. Breakers and a half with two main buses
6. Main and transfer bus bar
7. Double bus bar with bypass isolator
8. Ring bus

Board activity

Drawing the different bus bar arrangements and explaning

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>



Session 3- Substation bus schemes - Single bus

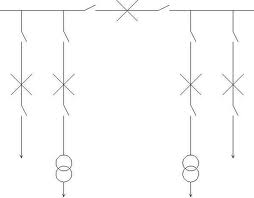
Quiz

1. What are the advantages of single bus bar arrangement?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Merits and demerits of single bus bar arrangement



Board activity

Drawing the single bus arrangement on the board and explaining it

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Session 4- Substation bus schemes – Double busbar

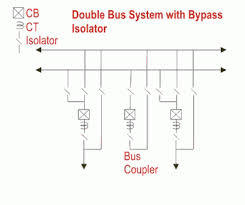
Quiz

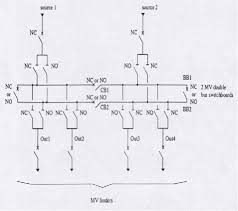
1. What are the advantages of double bus bar arrangement?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Merits and demerits of double bus bar arrangement





Board activity

Drawing the bouble bus arrangement on the board and explaining it

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Session 5- Substation bus schemes – Double bus with single breaker

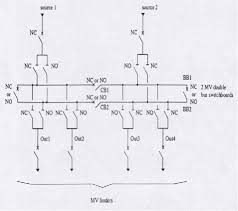
Quiz

1. What are the advantages of double bus bar arrangement?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

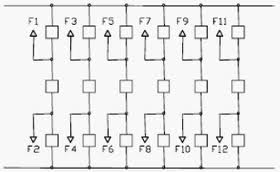
Merits and demerits of double bus bar arrangement



Board activity

Drawing the bouble bus arrangement on the board and explaining it

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>



Session 6- Substation bus schemes – Ring bus

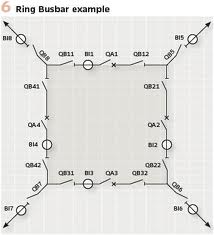
Quiz

1. What are the advantages of ring bus bar arrangement?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Merits and demerits of ring bus bar arrangement



Board activity

Drawing the ring bus arrangement on the board and explaining it

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Session 7- Substation earthing

Quiz

1. What are the difference between earthing and grounding?
2. List the components of flux linkages in a conductor

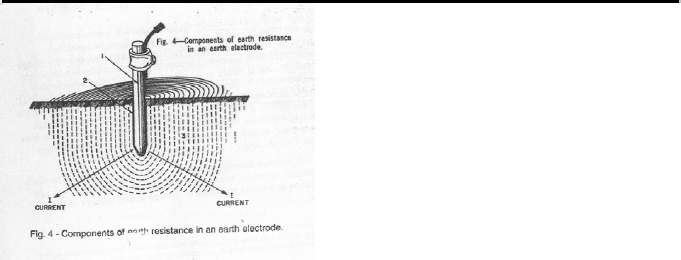
Ref: <http://kiran111.hubpages.com/hub/Substation-Grounding-Earthing>

Presentation

**REQUIREMENT OF GOOD EARTHING**

a) Good earth should have lowresistance

b) It should stabilize circuit potentialwith respect to ground and limitoverall potential rise



Board activity

Drawing the earthing scheme on the board and explaining it

Ref: <http://kiran111.hubpages.com/hub/Substation-Grounding-Earthing>

Session 8- Substation neutral grounding

Quiz

1. What are the advantages of double bus bar arrangement?
2. List the components of flux linkages in a conductor

Ref: <http://kiran111.hubpages.com/hub/Substation-Grounding-Earthing>

Presentation

Different methods of grounding

-solid grounding

-resistance grounding

-reactance grounding

-resonant grounding

Neutral grounding:

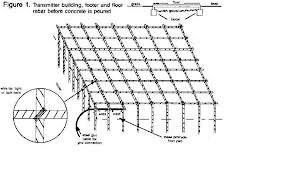
Connecting the neutral or star point of any electrical equipment(generator ,transformer

etc) to earth

Board activity

Drawing the grounding bus arrangement on the board and explaining it

Ref: <http://kiran111.hubpages.com/hub/Substation-Grounding-Earthing>



Session 9- Substation earthing practices

Quiz

1. What are the need for earthing?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

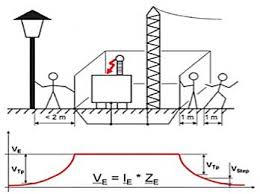
Presentation

Merits and demerits of earthing practices

Board activity

Drawing the earthing for substation

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>



Session 10- Feeders distributor and service mains

Quiz

1. What are feeders and distributors?
2. List the components of flux linkages in a conductor

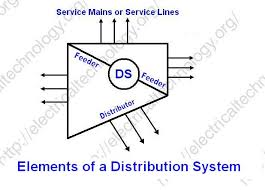
Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>Presentation

Functions of feeders and distributors

Board activity

Differentiating feeder from distributor

Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>



Session 11- DC distributor - 2-wire and 3-wire, radial and ring main distribution

Quiz

1. What are feeders and distributors?
2. List the components of flux linkages in a conductor

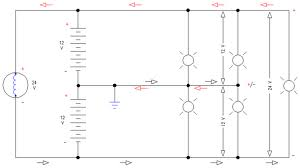
Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>Presentation

Functions of feeders and distributors

Board activity

Differentiating feeder from distributor

Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>



Session 11- AC distribution – single phase and three phase 4-wire distribution.

Quiz

1. What are feeders and distributors?
2. List the components of flux linkages in a conductor

Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>Presentation

Functions of feeders and distributors

Board activity

Differentiating feeder from distributor

Ref: <http://eeemcq.blogspot.in/2012/09/what-is-distribution-system-define.html>

