

7/11/2024

PSE - ASSIGNMENT - II

Name :- T.V.N. Suresh
Roll :- 23485A0357

1) Explain the following.

- 1) flat rate tariff 2) Blocked rate tariff
- 3) Two part tariff 4) Power factor tariff.

Sol) 1) flat rate tariff

When different types of consumers are charged at different uniform per unit rate, it is called as flat rate tariff. In this, consumers are grouped into different classes and each class of consumers is charged at different uniform rate. The advantage is that it is more fair to different types of consumers and is simple in calculations.

2) Blocked rate tariff :-

When a given block of energy is charged at a specified rate and succeeding blocks of energy are charged at progressively reduced rates. It is called blocked rate tariff. The energy consumption is divided into blocks and price per unit is fixed in each block.

The price per unit in first block is highest and it is progressively reduced for succeeding blocks of energy.

3) Two Part tariff :-

When rate of electrical Energy is charged on two basis of max. demand of consumer and units consumed, it is called two part tariff. The total charge to be made from consumers is split into two components fixed charges and running charges. The fixed charges depends upon max demand of consumer. While running charges depend upon the no of units consumed by consumer.

$$\text{Total charges} = (b \times \text{kW} + c \times \text{kWh})$$

b = Charge per kW of max demand.

c = Charge per kWh of energy consumed.

4.) Power factor tariff :-

The tariff in which Power factor of consumer's load is taken into consideration called power factor tariff. A low power factor increases rating of station equipment.

i) kVA max. demand tariff :- It is modified form of two part tariff. The fixed charges are made on basis of max. demand in kVA not in kW.

A consumer having low power factor has to contribute more towards fixed charges.

ii) sliding scale tariff :- This is also known as average factor tariff an average power factor, say 0.8 lagging taken as reference. If power factor of consumer falls below this factor, suitable additional charges are made on other hand, if power factor is above reference, a discount is allowed to the consumer.

iii) Kw and KVAR tariff :- In this, both active power and reactive power supplied are charged separately. A consumer having low power factor will draw more reactive power and hence shall have to pay more charge.

2] what is meant by corona. Explain different methods of reducing corona.

corona :-

when an alternating potential difference is applied across two conductors whose spacing is large as compared to their diameters there is no apparent change in condition of atmospheric air surrounding wires if applied voltage is low.

when applied voltage exceeds a certain value critical disruptive voltage, the conductors are surrounded by a faint violet glow called corona.

Methods of reducing corona effect :-

1) By Increasing conductor spacing.

By increasing the spacing b/w conductors voltage at which corona occurs is raised by and hence corona effects can be eliminated. However spacing can't be increased too much otherwise cost of supporting structure may increase to a considerable extent.

2) By Increasing conductor size

By increasing size, voltage at which corona occurs is raised hence corona effects are considerably reduced. This is one of reasons that ACSR conductors which have a larger cross-sectional area are used in transmission lines.

3] Explain different types of insulators used in overhead transmission

1) Pin type insulator :- It is secured to the cross arm on the ~~board~~ pole. There is a groove on the upper end of the insulator for housing the conductor.

The conductor passes through this groove and is bound by the annealed wire of same material as the conductor.

2) Suspension type Insulator :-

The cost of pin type increases rapidly as voltage is increased. They consists of a no. of porcelain disc connected in series by metal links in the form of a string. The conductor is suspended at bottom end of this string, while other end of the string is secured to cross arm of the tower each unit or disc is designed for low voltage say 11 kV.

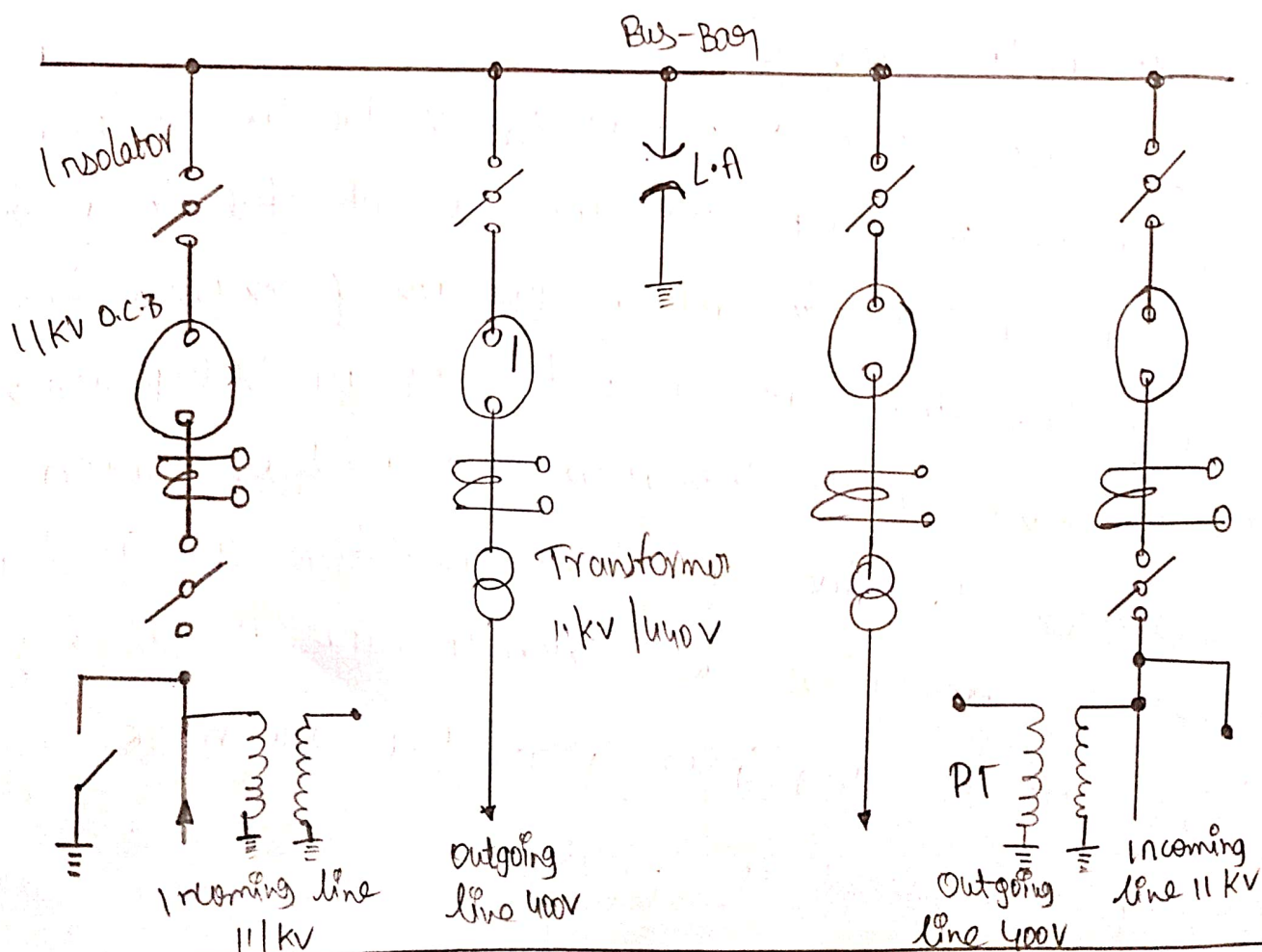
3) Strain Insulator :-

When there is a dead end of the line or there is corner or sharp curve line is subjected to greater tension. In order to relieve the line of excessive tension strain insulators are used to for low voltage lines (less 11 kV) shackle insulators are used as strain insulators. The discs of strain insulators are used in vertical plain when the tension in lines is exceeding high, as at long river spans. Two or more strings are used in parallel.

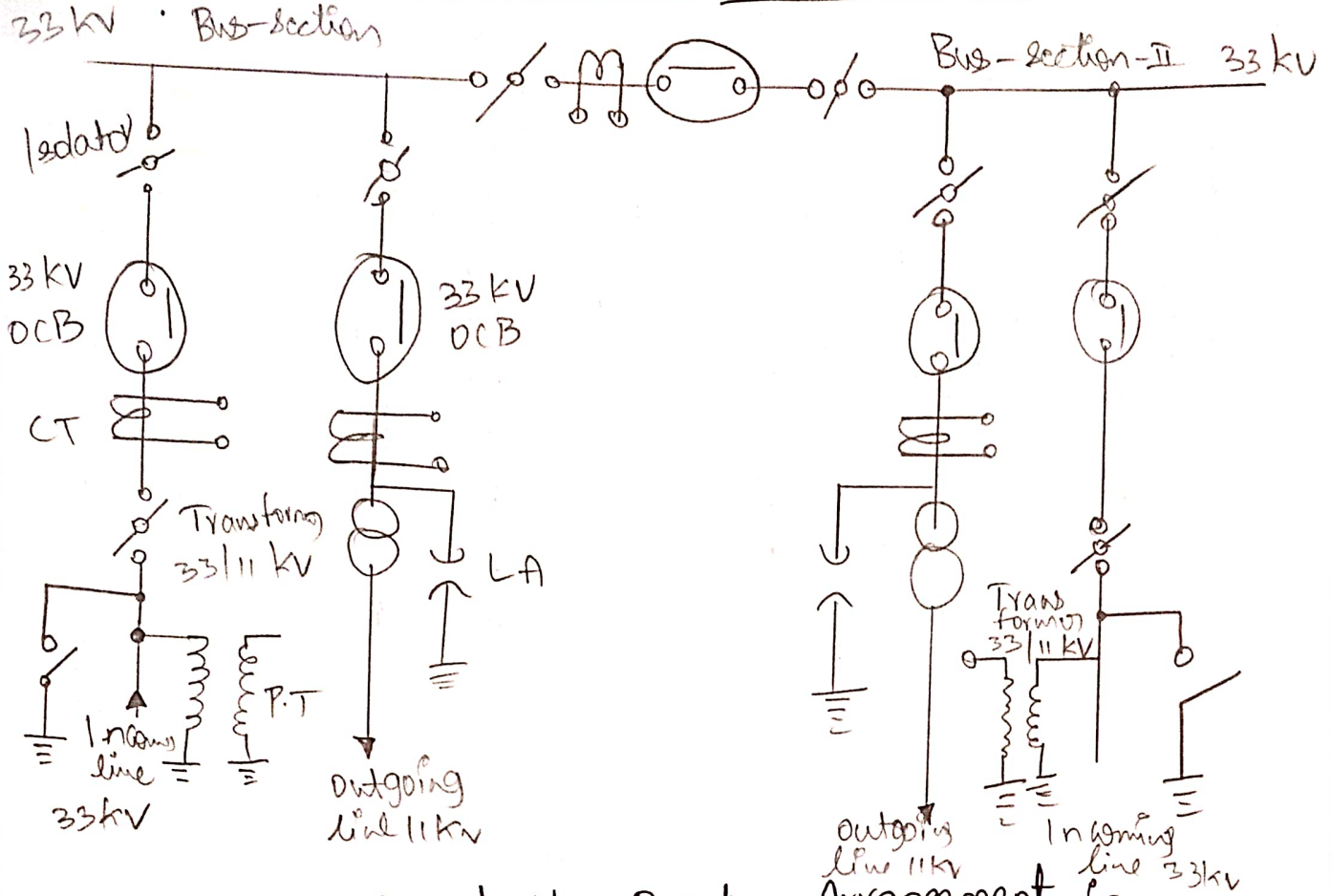
Shackle Insulators In early days these are used as strain Insulators. But now they are frequently used for low voltage distribution lines. They can be directly fixed to the pole with a bolt. Or to the cross arm. The conductor in the groove is fixed with a soft Binding wire.

4) What are different types of bus bar arrangements used in sub-stations? Illustrate your answer with suitable diagram.

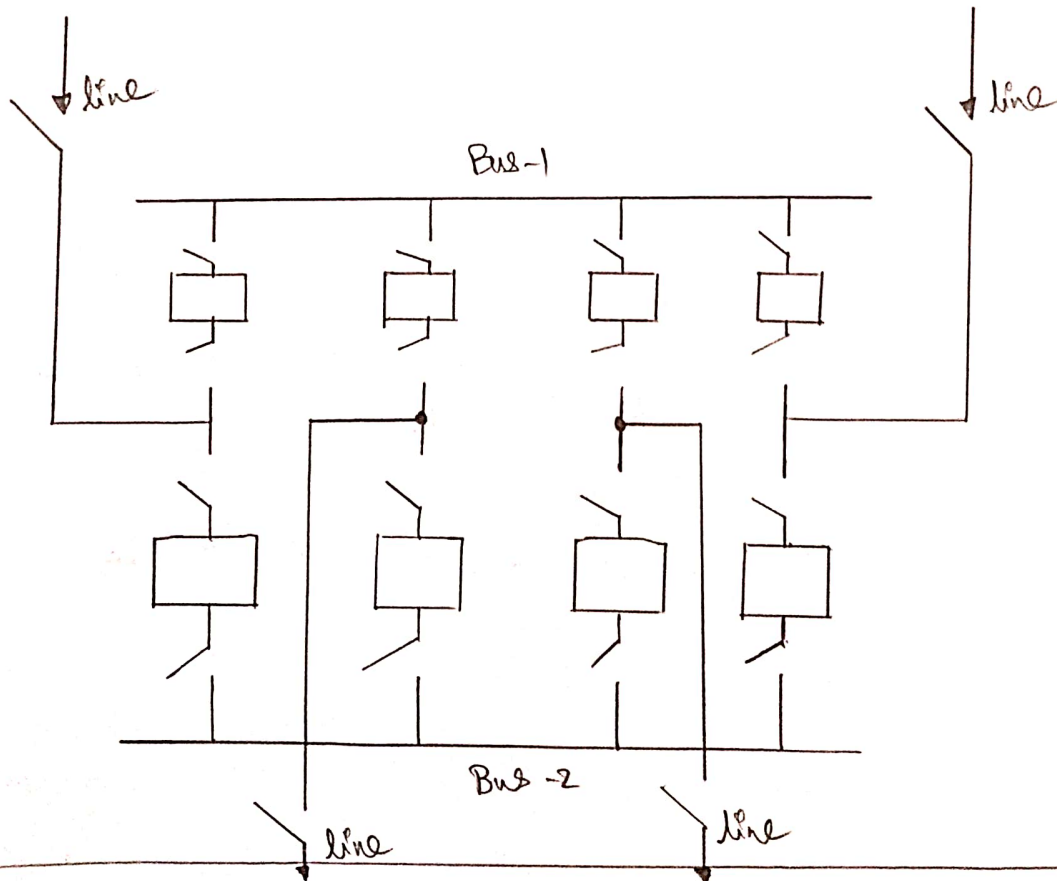
1) Single bus bar system :-



2) Single bus bar system with sectionalisation



3) Double Bus with double Breaker Arrangement



4) Double Bus single breaker :-

