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Department of Electrical Engineering

Assignment

Date: 14/04/2020

Course Details

Course Title: High Voltage

Module: 6th

Instructor: Engr. Sajid Nawaz

Total Marks: 30

Student Details

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Student ID: 14200

Q 1 - High voltage is used through the world briefly explain which type of High voltage is used in Pakistan and also write down the categories of High voltage transmission line.

Ans. Following type of voltage are used in Pakistan for power transmission line.

- | | | | |
|----|--------|-----|--------|
| 1) | 500 KV | (2) | 220 KV |
| 3) | 132 KV | (4) | 11 KV |

220 KV Grid Station. NTDC operates and maintains sixteen 500KV and forty five 220 KV Grid Station, 5893 Km of 500 KV transmission line and 10963 Km of 220 KV transmission in Pakistan.

Categories of Transmission line.

- 1) 500 KV Transmission line 3 wire.
- 2) 220 KV Transmission line 3 wire
- 3) 132 KV Transmission line 3 wire
- 4) 11 KV Transmission line 3 wire
- 5) 440 V 4 wire Transmission line.

→ Various system of power Transmission

1) DC system

- 1) DC two-wire
- 2) DC two wire with mid-point earthed
- 3) DC three wire

2) Single-phase A.C system

- 1) Single-phase two wire
- 2) Single phase two-wire with mid-point earthed
- 3) Single-phase ~~two-wire~~ three wire

3) Two-phase A.C system.

- 1) Two phase four wire
- 2) Two phase three wire

4) Three-phase A.C system.

- 1) Three phase three wire.
- 2) Three phase four wire.



Q3 The transmission and Distribution section is divided in different categories. Differentiate the following terms accordingly to your hometown scenario with the help of proper diagram labelling.

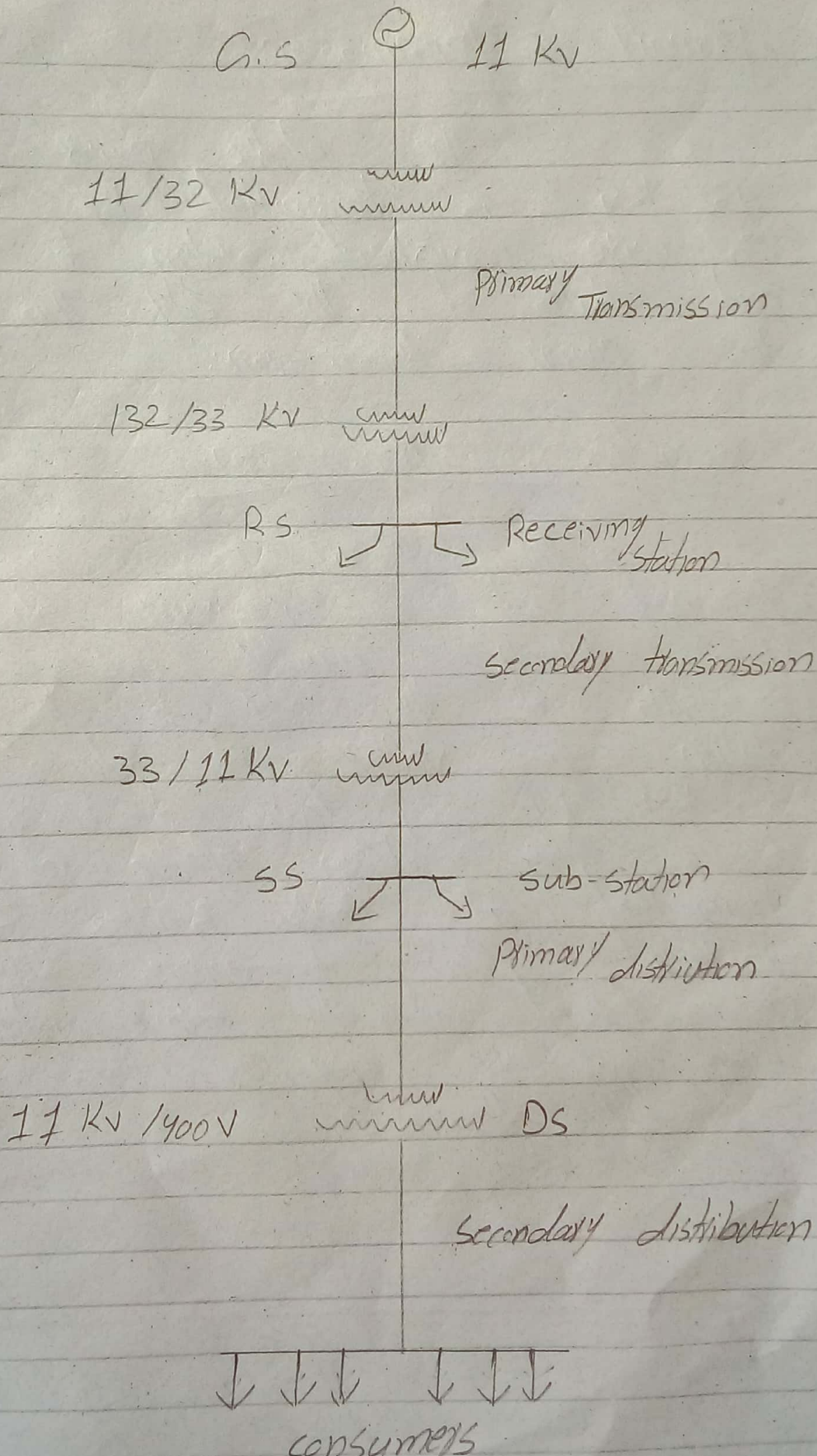
- 1) Primary Transmission and Secondary Transmission
- 2) Primary Distribution and Secondary Distribution
- 3) conductor and insulators.

Sifatullah = ID 14200-

Page - 4

Ans) conductor and insulator.

conductor passes electricity while in insulator electricity is not passed. In my home town all Aluminium conductor are used for distribution and pin type insulators are used.



1) Primary Transmission.

The electric power at 132 Kv is transmitted by 3-phase 3 wire overhead system to the outskirts of the city. This form the primary transmission.

2) Secondary Transmission.

The primary Transmission line terminate at the receiving station (RS) which usually line at the outskirts of the city. At the receiving station the voltage is reduced to 33 Kv by step-down transformer. Froms this station electric power is transmitted at 33 Kv 3-phase 3 wire overhead system to various sub-station (SS) located at the ~~strage~~ strategic point in the city. This form the secondary transmission.

3) Primary Distribution

The secondary transmission line terminates at the substation where voltage is reduced from 33 KV to 3 phase 3 wire. The 11 KV run important road side of the city. The form the primary distribution it may be noted that sumers having demand more than 50 KW are generally supplied pure at 11 KV with their own sub-stations.

4) Secondary Distribution

The electric power from primary distribution sub-station - (D.S) These sub station are located near the step down the voltage to 400 V, 3 phase 4 wire for secondary distribution lighting load is connected between any one phase and neutral where is 3 phase connected across 3 phase line directly.

Sifatullah = IID-14200- Page-8

Q2) compare the pros and cons of overhead line and underground cables. which type of line you will prefer as an electrical engineer and give proper reason?

Ans) over head.

The overhead line are nothing but a conductor used to transmit electricity from generating station to a consumer above the ground level. In overhead lines conductors are drawn above the ground level to transmit energy.

Under ground.

Underground cable means cables are drawn below the ground or under the ground to transmit electricity.

- 1) Public Safety
- 2) Initial cost (3) Faults
- 4) Location of Faults (5) Repair
- 6) Working voltage (7) Lightning thunder
- 8) Supply interruption (9) Insulation cost
- 10) Appearance.

1) Public Safety.

In the case of overhead line as a conductor is drawn above the ground level it is not safe for human beings because due to the wind, there is a chance of falling conductors. So the overhead line system is not safe. In the case of underground line, conductors are drawn below the ground level so it is safer for human beings.

2) Initial cost.

In the case of the overhead line the initial cost is less expensive whereas in the case of the underground line the initial cost is more expensive.

3) Faults.

In overhead line faults occur frequently due to climate conditions if there is more wind then there is a more chance of occurring a fault whereas in the case of underground cables there is a less or very rare chance of occurring a fault.

4) Location of Faults.

In overhead line faults occur anywhere then the fault can be located very easily whereas in case of underground line faults may take place then locating a very difficult.

5) Repair.

Repairing of faults can be easily done in case of overhead line whereas in case of underground line repairing a fault is very difficult.

6) Working voltage.

The overhead line can handle voltage up to 400 KV 745 KV or sometime more whereas underground cable can work up to 66 KV due to insulation.

7) Lightning Thunders

Overhead line have more chances of being subject to lightning whereas underground line have fewer chances of being subject to lightning. Therefore underground cables are safe compared to overhead lines.

8) Supply interruption.

In the case of overhead line, there is a chance of supply interruption due to climate condition such as wind rain etc. whereas in the case of underground cable there is less chance of supply interruption because cable cables are drawn below to ground level.

9) Insulation cost.

Insulation cost is less in case of overhead line whereas in case of underground cables insulation cost is more.

10) Appearance.

The overhead line appearance affects the view of nature whereas underground cables appearance is good as wires are not visible. So there are some differences between overhead line and underground cables.

