Name = Hassan khan.

ID = 6620

Module = 22.

Subject = Power transmission
&
Distribution.

Submit to = Engr. Sajid Nawaz khan.

Question No 1:→

Overhead power transmission lines are classified in the electrical power industry by the range of voltages. - Extra high voltage (EHV transmission) - from 345kv, up to about 800kv, used for long distance very high power transmission - Ultra high voltage (UHV) - higher than 800kv

over head transmission line is classified as below:→

→ Short transmission lines.
→ Medium transmission lines.
→ long transmission lines.

→ Medium transmission line:→

In this the length is about 50 to 150km and the line voltage is between 20kv to 100kv This line is considered as Medium transmission line.

→ Short transmission line:→

In this the capacitance effects are small - because the length of the over head line is small up to 50km and line voltage is also comparatively low (less than 20kv)

→ long transmission line:→

When the length of an overhead line is more than 150km and the line voltage is more

↳

from 100kV, then this is considered as long transmission line.

Question 1 (b)

The three-phase transmission line consists of over head lines and underground cables. Because of cost consideration the transmission system is generally overhead.

The three phase line is made by using three single-phase conductors - therefore the calculation remains the same as for single-phase line, the difference being that per phase basis is adopted when working with balance three phase line, it is assumed that all the given voltages are line-to-line and all currents are line currents

→ Single and three phase line:-

The single phase is short in length and having low voltage, it has two conductors Each conductor has resistance (R) and inductive reactance (X).

Question No :- 2 (A).

Constant of Transmission line :-

The four line parameter resistance (R) inductance (L), capacitance (C) and conductance (G) are known as primary constenst of the transmission line,

The transmission network is to transfer electrical energy from generating units at various locations to the distribution system which will finally supply the consumers

Transmissions line also interconnects neighboring utilities which permit not only economic dispatch of power with in regions during normal condition.

Transmission lines in power system show the electrical properties of resistance inductance, capacticance and conductance the indudence - the inductance and capacticance are the effects of magnetic and electric field around the conductor - transmission lines are used between transmitter and reciver with the help of "antena" as linking element.

Functions of transmission line:

→ to transmit electrical energy from one place to another place

→ to transmitter and reciver.

→ to work as circuit element like inductor

→ Act as measuring device to obtain impedance.

Question (2b) -

Skin effect :->

The steady direct current will distribute itself uniformly over the whole cross section of a conductor but alternating current does not Distribute uniformly but trends to concentrate near the surface of a conductor - In fact in AC system no. current flow through core and the entire current is concentrated at the surface regions.

This phenomenon is called the skin effect and it causes the resistance to increase slightly particularly when the diameter of the conductor is large - At low frequency or with effect is small - in fact its only of importance with high frequencies or with Solid conductors of larger X-sections. - the skin effect is much smaller with Stranded conductor than Solid.

It increases with the increase in X-section - and supply frequency.

Question No # 3(A)

Types of line supports.

→ Wooden pales.
→ Rcc pales
→ Steel tubular pales.
→ Steel towers.

→ Wooden pales.
→ Made of chemically treated wood.
→ used for distribution lines.
→ very economical. but capable to decay.
→ To protect from decay, pales have zinc or aluminum cap at top.

→ Rcc pales
→ Made of reinforced concrete cement
→ Stronger than wood. pales
→ very costly
→ very long life and need little maintenance
→ can be manufactured at site

→ Steel tubular pales:→
→ More costly than Rcc and wooden.
→ Have light weight, high strength weight ratio
→ long life
→ widely used for lines upto 33kv

Steel towers :->

-> Used for lines of 66kV and above
-> very long life and high degree of reliability.
-> Can with stand very severe weather conditions.
-> Over head (HV), EHV, UHV lines mostly used self supporting steel towers.

Question 3b.

Types of insulators ->

There are several types of insulator but mast common are.

-> P type (Pin type)
-> S- type (Suspension type).
-> post - type.
-> Strain Insulator

-> Pin type ->

small, simple in construction and cheap.
Used on lines upto 33kV.
for higher voltages they end to be more heavy and costly.

Suspension type

→ Used for lines above 33kv

→ Also known as disc or string insulators.

→ Consists of porcelain dics

→ conductor is suspended below the point of support

→ Mechanical stresses are reduced

(Strain insulators) :->

→ special mechanically strong
→ similar to suspension type insulator
→ used to take and tension of conductors at the line.

post insulators

→ used for supporting bus bars and disconnecting switches.
→ An extra high voltage Sub-station
→ similar to pin insulator but has a metal base and metal cap so that more than one unit can be mounted in series.