

Department of Electrical Engineering

Assignment

Date: 14/04/2020

Course Details

Course Title: High Voltage

Module: 6th

Instructor: Engg. Sajjid Nawaz

Total Marks: 30

Student Details

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Q1	High voltage system is used throughout the world briefly explain which type of high voltages is used in pakistan and also write down the categories of high voltage transmission lines.	(10 marks)
Q2	Compare the pros and cons of overhead lines and underground cables. Which type of lines you will prefer as an electrical engineer and give proper reasons.	(08 marks)
Q3	The Transmission and Distribution section is divided in different categories. Differentiate between the following terms accordingly to your hometown scenario with the help of proper diagram labeling. ✓ Primary Transmission & Secondary Transmission ✓ Primary Distribution & Secondary Distribution ✓ Conductor & Insulator	(12 marks)

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PAPER : HIGH VOLTAGE

QUESTION : 1

ANSWER :

HIGH VOLTAGE SYSTEM USED
IN THE WORLD ARE :

⇒ The highest voltage used throughout the world is 1,200kV and it is proposed in power transmission in Kazakhstan.

⇒ However, voltage of 1500kV and above are still under consideration.

⇒ China also used highest voltage i.e 800kV which is also developing 1100kV system.

HIGH VOLTAGE USED IN
PAKISTAN ARE :

• Highest transmission voltage used in Pakistan is 500 KV

• Pakistan first 765 KV high voltage transmission line are completed by the end of december in this year in Lahore (Makori) by working in Chinese company under the auspices of the china Pakistan Economic corridor (CPEC) and the last point. It will be attached to the NTDC's current 500KV system and grid station will also established for 765KV / 500KV double current line.

⇒ The 500KV Double current Post Qasim transmission line, which is creating and power supply cuts to the consumers.

• 220 KV

• 132 KV

• 66 KV

• 33 KV

CATEGORIES

Of

High

VOLTAGE

TRANSMISSION

LINE :

Following are the categories of high voltage transmission line

* ULTRA HIGH VOLTAGE :

Voltages over 1000 kV are referred to as ultra high voltage.

* EXTRA HIGH VOLTAGE :

Voltages between 230 kV to 800 kV are referred to as extra high voltage.

* HIGH VOLTAGE :

Voltages below 100 kV are referred to as high voltages.

* MEDIUM VOLTAGE :

Voltages between 1000 kV to 69 kV are referred to as medium voltages.

• Low Voltage:

1000 V are referred to as low voltages. Voltages below 1000 V are referred to as low voltages.

QUESTION: 2

ANSWER:

PROS AND CONS OF
 OVERHEAD LINES AND
 UNDERGROUND CABLES:

OVERHEAD SYSTEM	UNDERGROUND SYSTEM
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FAULT LOCATION

As the overhead lines is visible, it is easy to find the location of the fault.

As the underground cable is invisible, it is very difficult to find the location of the fault.

SAFETY

This system is less safe as the conductors placed on the towers.

This system is more safe as the conductors placed on the towers.

MAINTENANCE COST

In this system, no need to dig at the time of maintenance. Hence for the same number of faults, the maintenance cost is less.

In the system to find the fault, digging is compulsory. It increase labour cost, Hence for the same number of faults, the maintenance cost is more.

INITIAL COST

There is no requirement of digging, manholes, and trench so the overhead lines system is cheaper than the underground system.

The initial cost of the underground transmission system is more compared to the overhead line because it needs digging, trenching etc.

USEFUL LIFE

In this system useful life is approximately 20 to 25 years.

Useful life is approximately 40 to 50 years.

FLEXIBILITY

This system is more flexible. Because the expansion of the system is easily possible.

This system is not flexible. The expansion cost is nearly equal to the new erection of the system.

I PREFER UNDERGROUND CABLES;

As an Engineer Muhammad Hilal Khan I prefer underground cables and the reasons are that

- ⇒ It is more safe.
- ⇒ Its useful life is approximately 40 to 50 years.
- ⇒ It has less chance of fault because it is not expose to the environment.

QUESTION: 3

ANSWER: 1

Voltage a power system may be categorized in

sub-systems as
 primary transmission
 secondary transmission
 Primary distribution
 Secondary distribution

TRANSMISSION SYSTEM:

→ transmission line is used for the transmission of electrical power from generating substation to the various distribution units.

→ Transmission system has primary transmission and secondary transmission.

P
PRIMARY
TRANSMISSION

Primary transmission system connects generation station with the transmission grid station.

S
SECONDARY
TRANSMISSION

Secondary transmission system connects a transmission grid station to a distribution grid station.

DISTRIBUTION SYSTEM:

→

distribution network of system is a lines, of overhead transmisses and underground cables, transformers that carry small amounts of power to loads in medium and low voltage levels.

Distribution system has primary distribution and secondary distribution.

PRIMARY DISTRIBUTION

Primary distribution system connects a distribution grid station with the consumer transformer

SECONDARY DISTRIBUTION

The secondary distribution system connects the consumer transformer to the supply service mains.

TABLE

SUB SYSTEM	VOLTAGES USED
Primary Transmission	500KV and 220KV
Secondary Transmission	132KV and 66KV
Primary Distribution	11KV
Secondary Distribution	220-230V (single phase) 380-400V (three phase)

C O N D U C T O R

Conductor are those material which have allows electric current to pass through it easily.

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I N S U L A T O R

Any material that does not allow electric current to pass through it like protective coating on wires.

E X A M P L E

Copper
Aluminium
Gold

Plastic
Rubber
Glass

T H E E N D