

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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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)

Q Question No 1

High Voltage

High Voltage is

defined as . The voltage above from 1000 V for AC and 1500

volt for DC and dis-

tinguish it from low voltage

50-1000 volt AC or 120-1500 volt

for DC. However, this is in

the context of building wiring

and the safety of electrical a-

pparatus. Voltage over approxi-

mately 50 volt can usually

cause dangerous amount of

current to flow through

a human being who ~~can~~ touch

= Two point of a circuit so
Safety is standard. In general are
more restrictive around such circuit

Classification of high voltage

There are three type of high
Voltage.

1) H.V = High Voltage

2) E.H.V = Extra high Voltage

3) U.H.V = Ultra high Voltage

⇒ In some Transmission system

generally the voltage up to 345-kV
are referred to as HV - High -

Voltage. between 345 kV and

765 kV as referred to E.H.V.

=> Voltage above 765 kV are referred to U.H.V. ultra-high-voltage

=> Presently the highest transmission system voltage is 1150 kV. used in Kazakhstan for U.H.V. transmission system

=> In Japan and China the highest transmission voltage at U.H.V. level is 1000 kV

PAKISTAN - High - Voltage SYSTEM

PAKISTAN the transmission line system operating up to 220 kV compared to H.V. High-voltage and voltage above in 220 kV
So let compare to E.H.V.

=> So the highest Transmission we
in Pakistan is 500 kv so
they considered in U.H.V. Ultra-
High - Voltage

=> High Voltage of power system
is also categorized in subsystem

1) primary Transmission

2) Secondary Transmission

3) primary distribution

3) Secondary distribution

Primary Transmission system :-

Primary Transmission

System connect generation station

with the transmission substation

Secondary Transmission system :-

=> The secondary Transmission Connect
a transmission Substation to a
distribution Substation.

primary Distribution \Rightarrow

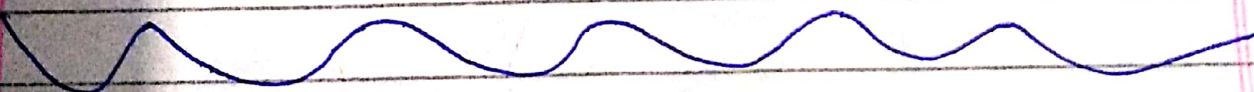
The primary distrib-
ution system connect a distribution
Substation with Consumer transformer

Secondary Distribution \Rightarrow

The secondary
Distribution system connect the
Consumer transformer to the
Supply service main.

Subsystem and their Voltage level

Subsystem	Voltage level
Primary Transmission	500 kV to 220 kV
Secondary Transmission	132 kV to 66 kV
Primary Distribution	11 kV
Secondary Distribution	220-230V single phase 380-400V 3-phase



Q

Question Number "2"

Compare the pros and Cons
of over head Line and underground
Cable...

OVER-Head Line \therefore

An overhead power
Line is a structure used in
electric power transmit electrical
Energy across large distance. It
Consist of one or more conductor
Suspended by tower or pole.

Advantages \therefore

- \rightarrow High power transmission
- \rightarrow Low installation and
material cost
- \rightarrow Long distance transmission
- \rightarrow The fault or damage in
over head lines can easily locate.

- > maintenance of the line is easier
- > Extension or joining on overhead lines can be performed easily and also it facilitates easy replacement

Disadvantages. ∴>

- AS it is exposed to the surrounding safety risks is high
- > A Conduit pathway for the line creates obstruction
- > Vulnerable to lightning strikes
- > more chance of supply interruption
- > Less safe for public safety

Under ground Cable :-



An underground

Line consist of Thick conductor

This conductor or cable below the ground and transmitting electricity from place to other

Advantages :-

Have Less maintenance

fetch

→ most safe for public safety.

→ very little chance of being being

subjected to lightning. Thunder

⇒ very little chance of supply

interrupt

⇒ Low maintenance

Dis Advantage →

- > maintenance cost is high.
 - > initial cost is high.
 - > fault point can not easily locate
 - > fault cannot easily repair.
 - > It works only upto 66 kv.
- ⇒ I prefer as an electrical

engineer is over head Transmission

Cable

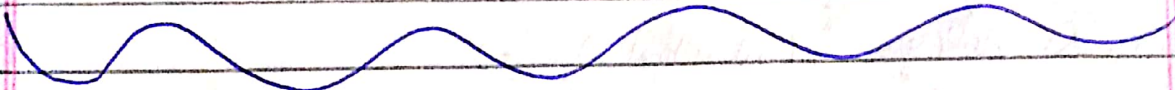
⇒ Because the under ground line is too much expensive on over head transmission line.

⇒ If the fault occur in underground system. then the fault is repairing time is more than over head line for me ~~over~~ over head line

=> is better. then fault occur
in over head line. so it
can be remove easily. easily

=> ~~for~~ ^{under ground} The initial cost is very large
As well as overhead system.

=> So these reason we will prefer
the over head line system



Q3

Primary Transmission \Rightarrow

The primary Transmission System Connect generation station with the transmission substation.

Secondary Transmission \Rightarrow

The secondary Transmission System Connect a transmission substation to a distribution substation.

Primary Distribution \Rightarrow

A primary distribution System Connect a distribution substation with the consumer transformer.

Secondary Distribution \Rightarrow

The secondary distribution System Connects the consumer transformer to the supply service main.

Page = 13 ID = 6988 Q = 3,

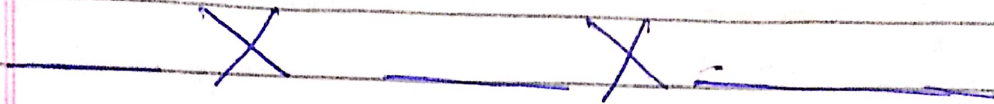
Substern Voltage Level

Primary Transmission 500 kV / 220 kV

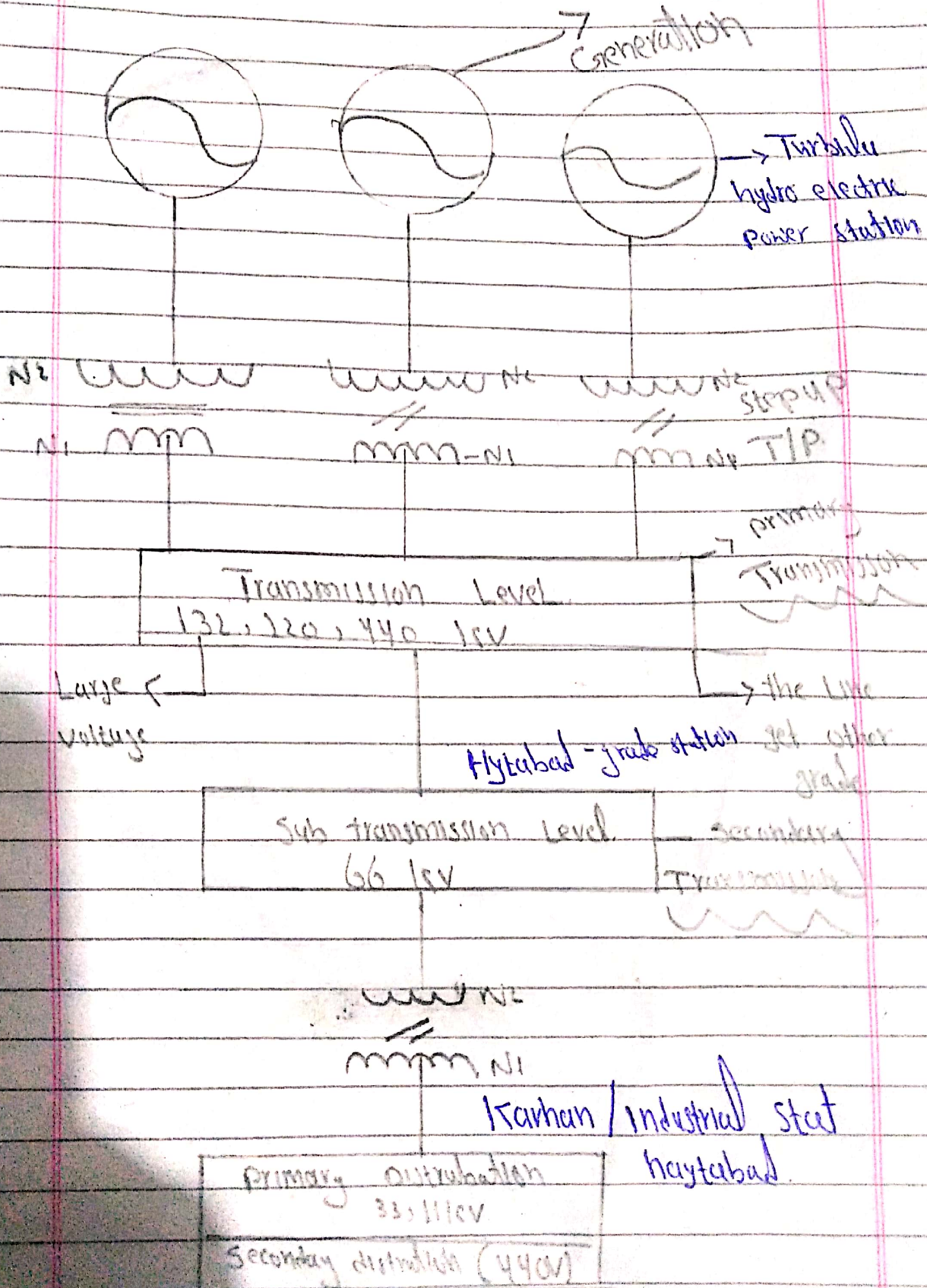
Secondary Transmission 132 kV / 66 kV

primary distribution 11 kV

Secondary distribution
220 - 230 V 1 ϕ
380 - 400 V 3 ϕ



=> My home town Diagram generation station
Turbula to peshawer..



=> Differentiate between Conductor
and Insulator

Conductor

Conductor is a material

which allow electric current to pass

In the conductor electric current

can flow easily.

for e.g. = Gold, Aluminium, Copper
Gold is the best conductor

Insulator :-

Insulator is a material

which cannot allow electric current

to pass. In the insulator current can

not flow.

for e.g. Paper, glass, wood