

**Department of Electrical Engineering**

**Assignment**

**Date: 20/04/2020**

**Course Details**

**Course Title:** Electric Power Distribution and Utilization

**Module:** 4<sup>th</sup> (B Tech)

**Instructor:** \_\_\_\_\_

**Total Marks:** 30

**Student Details**

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Q1.	(a)	It is often difficult to draw a line between the power transmission and power distribution systems. However, what are the different factors on the basis of which a power distribution system can be differentiated from a power transmission system? Explain briefly.	<b>Marks 05</b>
	(b)	Underground electrical system cannot be used for very large voltages. Justify this statement.	<b>Marks 05</b>
Q2.	(a)	Now-a-days, electrical energy is generated, transmitted and distributed in the form of alternating current. Justify this statement.	<b>Marks 05</b>
	(b)	It is evident from comparison that both overhead and underground system has its own advantages and disadvantages. However, what are the few factors on the basis of which overhead system may be preferred over underground system?	<b>Marks 05</b>
Q3.	(a)	Ring main scheme of connection is more reliable as compared to radial system but is less reliable as compared to interconnected system. Justify this statement.	<b>Marks 05</b>
	(b)	Why is it important requirement of a good distribution system that voltage variations at consumer's terminals should be as low as possible?	<b>Marks 05</b>



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Question 1(a) :- It is often difficult to draw a line b/w the Power transmission and Power distribution system. However, what are the different factors on the basis of which a Power distribution system can be differentiated from a Power transmission system? Explain briefly.

Answer 1(a) :-

BASIS	TRANSMISSION LINE	DISTRIBUTION LINE
Usage	Transmission line helps in the movement of electricity from power plant to the substations.	The Distribution line carries electricity from the substation to the consumer's end.
Phase	It is carried out electricity in three phase supply system.	It requires a single phase supply system for carrying electricity.
Voltage level	Carries electricity at a very high voltage about 11000 volts.	Carries electricity at a very low and safe level of about 230 volts.
Current conduction level	They conduct current at 69 KV or more.	The conduct less than 69 KV.

Thickness

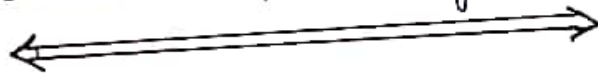
If Transmission Lines are thick lines

then line are thin as



Question 1(B): Underground electrical system cannot be used for very large voltages justify this statement

Answer :- Since the electrical field in the three core cables is tangential, the paper insulation and the fibrous materials are subjected to the tangential electrical stresses. This stresses weakness the fibrous material as well as the resistance and dielectric strength for the insulation along the tangential path. It need insulation for the cables to use under ground because it can not transfer voltage.



Question 2(a) :- Now a days electrical energy is generated transmitted and distributed in the form of alternating current. justify this statement.

Answer :- The alternating current is generated in power plant then power is transmitted

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and distributed through AC

The current which is transmitted from Power station is alternating current (AC)

Alternating current is used for electric power distribution because it can easily be transformed to a higher or lower voltage. Electrical energy losses are dependent on current flow.



Question 2(b) it is evident from comparison that both overhead and underground system has its own advantages and disadvantages. However what are few factors on the basis of which overhead system may be preferred over underground system?

Answer :-

Between 1000 volts (1-kV) and to about 33kV

used for distribution in urban and rural areas

used for connection b/w residential or small commercial customer and utility.

High voltage (subtransmission if 33-115kV and transmission if 115kV+)

between 33kV and about 230 kV

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Extra High Voltage (Transmission)	Over 230kV, up to about 800kV	Used for long distance, very High Power transmission
Ultra High Voltage	higher than 800kV	



Question No 3(a)

Ring main Scheme of Connection is more reliable as compared to radial system but is less reliable as compared to Interconnectual system.

Interconnected System ensures reliability in an event of transmission failure. Also any area fed from one generating station during peak load hours can be fed from the other generating station or substation for meeting power requirements from increased load.

### Question 3 (b)

Why is it important requirement of a good distribution system that voltage variations at consumer's terminals should be as low as possible?

### Answer:

Following are the good distribution system

### Proper Voltage:

- I = The lowest voltage of the consumer should not be less than 216V.
- II = The highest voltage of the consumer should not be less than exceed 241V
- III = The statutory limit of voltage variations is  $\pm 6\%$  of the rated value of the consumer's terminals
- IV = Good distribution system should ensure that the voltage variations at consumer's terminals are within permissible limits
- V = Voltage causes loss of revenue, inefficient lighting and possible burning out of motors.