

Department of Electrical Engineering

Assignment

Date: 20/04/2020

Course Details

Course Title: Electric Power Distribution and Utilization  
Instructor: Engr waleed jan

Module: 4<sup>th</sup> (B Tech)  
Total Marks: 30

Student Details

Name: Jehad muhammad

Student ID: 14913

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.	Marks 05
	(b)	Underground electrical system cannot be used for very large voltages. Justify this statement.	Marks 05
Q2.	(a)	Now-a-days, electrical energy is generated, transmitted and distributed in the form of alternating current. Justify this statement.	Marks 05
	(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?	Marks 05
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.	Marks 05
	(b)	Why is it important requirement of a good distribution system that voltage variations at consumer's terminals should be as low as possible?	Marks 05

## Question 2 (a)

Answer:

The difference between transmission and distribution line are explained on the basis of the factors like basic usage of the transmission and distribution line, their working supply phase, voltage level and level of conduction.

### BASIS

### TRANSMISSION LINE

### Distribution line

(1) Usage

Transmission line helps in the movement of electricity from power plant to the substation.

The distribution line carries electricity from the substation to the consumer's end.

(2) Phase

It is carried out electricity in three phase supply system.

It requires a single phase supply system for carrying electricity.

(3) Voltage level

Voltage level about 11 kV

Voltage level about 220 V

(4) Current conduction level

They conduct current at 69 kV or more

They conduct less than 69 kV.

\* Thickness

They are  
thick lines

thin as  
compared to  
transmission  
line.

## Question 2 part (B)

Answer:

The factor due to which overhead system is preferred over underground system are the following -

- ① Initial cost is less
- ② It is flexible.
- ③ It is easy to determine a fault in overhead system.
- ④ It is used for high voltages (400kV)
- ⑤ Used for long distance.
- ⑥ Simple installation etc.

## Question 2 (a)

Answer:

Electrical energy is generated transmitted and distributed in the form of Alternating Current because;

\* A.C voltage may be increase and decrease with transformer. this allows the power to be transmitted through power lines efficiently at high voltage, which reduces the energy lost as heat due to resistance of the wire.

\* The output of power stations comes from a turbine, which by its nature is A.C and therefore requires the power electronic to convert D.C to D.C.

\* It is easier to change the voltage of A.C electricity for transmission and distribution and the cost of plant associated with A.C transmission is much lower than the D.C transmission.

\* In An A.C distribution and transmission it is easier to interrupt, because as the sine wave current will naturally tend to zero at some point making the current easier to interrupt.

---

---

### Question 1 part (B)

Answer: underground electrical system can not be used for very large voltage because of insulation difficulties.

In underground system we have to use insulated cables as earth is a conductor. Insulating the underground lead cables to high voltages like (400 kv) is very expensive proposition hence therefore underground system is not used for high voltages.

---

---

## Question 3 (a)

Answer:

\* Ring Main schemes of connection is more reliable than radial system because in ring main system each distributor is fed via two feeders; thus in the event of fault on any section of the feeder, the continuity of supply is maintained.

While in radial system each distributor is fed by a single feeder; thus if fault is occurs in the system then the supply will be disconnected.

\* Ring main scheme of connection is less reliable than interconnected systems because in ring main system there is only one substation used to feed the distributor, so in case of fault in substation then all distributors will stop.

while in interconnected system two substations are used to

feed the distributor; So when fault  
occur in any one of substation  
then the other substation is still  
used to give supply to the  
feeder.



## Question 3 (B)

Answer:

It is important requirement of a good consumer that distribution system of voltage variation should be low as possible.

Because if the voltage is increase from its limits then our appliances will damage due high voltage.

And if voltage is decrease from its limits then the appliances will not glow.

\* Let suppose the load of consumer terminal is increase its means that its current is increase.

So from the law  $P = VI$  or  $I = P/V$

when current increase then the voltage is decrease because there is inverse relationship between voltage and current.

So therefore, a good distribution system should ensure that the voltage variation at consumer terminal are within permissible limits.

