

Department of Electrical Engineering

Assignment

Date: 20/04/2020

Course Details

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

Module: 4th (B Tech)
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.	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 1(a)

Ans

The following are the different factors on the basis of which a power distribution system can be differentiated from a power transmission.

Basis	Transmission Line	Distribution Line
usage	Transmission line helps in the movement of electricity from power plant to substations	The distribution line carries electricity from the substation to the consumers.
Phase	It is carried out electricity in three phase supply system.	It requires a single phase supply system.
Current Conduction Level	The current conduction level at 69kV or more	less than 69 kV.
Thickness	They are thick lines	thin as compared to transmission line
voltage level	Carry very high voltage about 11000 volt	Carries very low and safe level about 220 volts.

Q1 part B)

Ans

Since the electrical field in the three core cable is tangential, the paper insulation and the fibre material are subjected to the tangential electrical stresses. This stresses ~~weakness~~ weakens the fibrous insulation material as well as the resistance and dielectric strength of the insulation along the tangential path. It need insulation for the cables to used under ground because it can not transfer high voltage.

Q2 part (a)

Ans

Now-a-days electrical energy is generated transmitted and distributed in the form of alternating current. Important reason for the widespread use of A.C is preference to D.C are given below

* Alternating devices can be easily stepped up or stepped down by means of a transformer. High transmission and distribution voltage have greatly reduced the current in the conductor and the resulting line losses

* Plant cost for A.C power system is much lower than the equivalent D.C power system

* When a large fault occurs in a network it is easier to interrupt in an AC power system as the line wave current will naturally tend to zero at some point making the current easier to interrupt.

factor On the basis of Over head System may be preferred Over Under ground.

The following are the factors on the basis of which overhead is preferred Over under ground.

- ↳ easily installation
- ↳ faults can easily find
- ↳ maintenance costly is less
- ↳ cheap according to cables.
- ↳ used for long distance
- ↳ ^{used} from low voltage to Extra high voltage
- ↳ low capacitive reactance.

Q3 part (a)

↳ Ring main distribution is more reliable than radial because in this system the load is being fed by more than one feeder there is an alternative path to supply power to the connected load whereas in radial there is no alternative path to supply the load in case of power interruption.

↳ Ring main distribution is less reliable than interconnected system because in interconnected system we have two sub-stations. When fault is occur in one substation so the second sub-station also give supply to all feeder ring.

Q3 part (b)

A considerable amount of effort is necessary to maintain an electric power supply within the requirements of various types of consumers.

Some of the requirements of a good distributor system are.

Proper voltage one important requirement of a distribution system is that voltage variations at consumer's terminals should be as low as possible. The changes in voltages are generally caused due to the variation of load on the system. Low voltages cause loss of revenue, inefficient lighting and possible burning out of motors. High voltages causes lamp to burn out permanently and may cause failure of other appliances. Therefore a good distribution system should ensure that the voltage variations at consumers

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7 should ~~not~~ ensure that the voltage variations at consumer terminal are within permissible limits. The statutory limit of voltage variation is $\pm 6\%$ of the rated value at the consumer terminal. Thus if the de-rated voltage is 230V. then the highest voltage of the consumer should not exceed 244V.

Availability of power on demand.

power must be available to the consumer in any amount that they may require from time to time.

Reliability

Modern industry is almost dependent on electric power for its operation. Homes and office buildings are lighted, heated by electric power. This calls for reliable service.