JNTU ONLINE Examinations[Mid1-Eds]

In electric power system the major operation and maintainance expenses has been given next to generation sector is **Distribution sector**

The main consideration in the design of a feder is the **Current carrying capacity**

The major part of investment on secondary distribution is made on **Distribution transformers**

The interconnected system the reserve capacity of the systems**Increases**

Loads on a distribution feeder can be modeled as or **Star-connected, Delta connected**

In delta connected load modelling which quantity is changing for every iteration of the analysis **Line to Line voltage**

The relation between coincidence factor (fc) and contribution factor (Ci) is

The coincidence factor is equal to the average contribution factor when individual demands are **equal**

If D1=100, D2=1000, D3=1200 and C1=0, C2=0.6, C3 = 1.0 then FD is **1.278**

If D1=100, D2=1000, D3=1200 and FD = 1.278 then diversified maximum demand of the group is **1800kw**

The ratio of total annual energy to the annual peak load is called as **Annual load factor**

The value of the loss factor is square of the load factor if the load is having **very short lasting peak**

An approximate formula to relate the loss factor (FLS) to the load factor (FLD)

as

The diversity factor for domestic loads is **1.2 - 1.3**

The diversity factor for commercial loads is **1.1-1.2**

In general, load factor, demand factor, power factor, diversity factor etc mainly characterized the of load **nature of load**

The demand factor of residential load is **70-100%**

The demand factor of commercial load is **90 - 100%**

For heavy industries the load factor is **70-30%**

For heavy industries the demand factor is **85-90%**

The diversity factor for agricultural load is **1-1.5**

The load characteristics of a distribution feeder is mainly depends on **its load composition and its electrical characteristic**s

The equation of real power which varies with the voltage is given as

The reactive power varies with the

voltage s**quare**

The relationship between reactive power, nominal voltage is given by

The nature of the load connected mainly varies the of primary

feeder **rating**

A feeder is sectionalised by at various locations to remove the faulted portion of the

system **reclosers**

The design of radial primary feeder is depends on **Current carrying capacity**

Joint use of utility poles is the example for the effect of **Primary feeder voltage level**

The feeders located in high load density areas may be restricted in length and loading by **Thermal limitations**

Feeder routing decisions are decided by **Total cost**

The location and capacity of the distribution substation is the factor, which decides the following **Primary feeder loading**

The number of feeders are decided by the following factor is **load density**

In downtown areas for high-rise buildings with super high load densities network are used**Spot**

In general, secondary mains are connected as type of conductor connection

If single-phase lateral is changed to an equivalent three-phase lateral then the power loss due to load currents in the primary line are approximately **halved**

The power loss due to load currents in the conductors if the single-phase two-wire unigrounded lateral with full capacity neutral is 90 Kw, then the power loss in the equivalent three-phase four wire lateral is **15 Kw**

If the neutral is multigrounded then the power loss due to load currents in the conductors of the 2 -

Φ, 3 - wire lateral and in the equivalent 3 - Φ lateral is

The total power loss per phase in the main of uniformly distributed load due to I2 R losses is

The total power loss can be calculated in balanced main feeder so that the total load current is lumped at a distance of

In general, the difinition of an electric power system includes a generation, a transmission and a system**Distribution**

The part of power system which distrubutes electric power for local use is known as**Distribution system**

is a conductor which connects the substration to the area where power is to be distributed

Feeder

A distributior is a conductor from which tappings are taken for supply to **Consumers**

A small cable which connects the distributor to consumer's terminals is **serivice mains**

The underground distribution system has intial cost than the over head system

more

connect the distributor and the consumer terminals

service mains

The overhead syustem is flexible than the underground system

more

The chance of faults in underground system are as compared to overhead system

less

In constant impedance load model, which quantity is constant throughout the analysis **Impedance**

Constant current load model, which quantity is constant throughout the analysis**Current**

The line currents for constant real and reactive power loads are given by

The load current as a function of the constant load impedance is given by

The equation of constant load impedance is given by

The delta load current as functions of the constant load impedances is

In delta connected loads, the equation of constant load impedance is

Coincidence factor is defined as

The contribution factor (ci) is defined in terms of coincident maximum demand

(Dg) and individual maximum demand (Di) is

Dg=C1 X D1+C2 X D2+ .....+ Cn X Dn

The coincidence factor is equal to the contribution factor when

C1=C2=.....=Cn

The definition of loss factor is

The load factor is defined for particular time period is

The maximum value of load factor is **1.0**

The ratio of units served to the product of peak load and time period is known as**Load factor**

If annual average loads is 1141kw and peak monthly demand is 3500kw then annual load factor is

0.326

The example for residential load is **heaters, fans, lights**

In general, the loads are mainly divided into types of loads**Residential, commercial,**

Industrial, Muncipal and Agricultureal types of loads

Heaters, mixers, ovens used in house hold applications is the example of load**Domestic**

The example of commercial load is **Lighting for shops**

The example for industrial load is **Small and medium scale Industries**

Irrigation load is the example for type of load **Agricultural**

Street lighting load is example for type of load**Agricultural**

The load factor of agriculture load is **20-15%**

The demand factor for agricultural load is **90-100%**

Most of the loads consists power

factor **lagging p.f**

Load curve is drawn between quantities**load**

and time

The curve is constructed by selecting the maximum peak loads and time is called **load duration**

curve

The part of the system which is between the distribution substation and the distribution transformers is called **primary distribution feeder system**

The laterals of primary distribution system is tapped from **main feeder of primary distribution system**

The laterals located in rural areas are type of circuit**Single phase, neutral**

The rating of primary feeder is mainly depends on **type of regulating equipment used**

Series capacitors are used to improve of the distribution system **voltage**

The simplest and low-cost type of primary feeder is **radial type**

The reliability of service continuity of the radial primary feeder is **low**

In radial type the current magnitude is in the circuit conductors that leave the substation **Maximum**

The size of the conductor is same for type of primary feeder **loop**

The reliability of service is high in type of primary feder system**Loop**

type of primary feeder consists of less voltage fluctuations at consumer's terminals **ring**

The design, cost and operation of the primary feeder system depends on **Voltage level**

type of primary feeder systems are commonly used for distribution**3- , 4-wire**

The voltage-square factor is defined as

For a constant percent voltage drop and a uniformly distributed load, the feeder service area is proportional to voltage levels

The primary feeder loading mainly affected by the factor of **Load growth rate**

Physical barriers is the factor which decides the following **Feeder routing decisions**

Power losses is the factor affect the feeder selection**Conductor-size**

Conductor size is the factor which decides of the primary feeder **No. of conductors**

Primary feeder loading is defined as the of a feeder during peak-load conditions, as measured at the substation **Loading**

The standard voltage level for single-phase residential load is **120/240V**

The secondary distribution systems are designed in for areas of residential customers **single phase**

The secondary distribution systenms are designed in for areas of industrial customers with highload density**3-phase**

type of design is used for secondary system to supply rural loads**Radial**

The system with a common secondary main that is supplied by serval distribution transformers which are all fed by the same primary feeder**Secondary-bank**

The main advantage of secondary banking is**Improved voltage regulation**

The primary function of a distribution substation is to **reduce the voltage to the distribution voltage level**

The 'Standard' distribution voltage level at substation is **13.2kv**

The change of voltage level when change of load at substation is carried out by **Load tap changing transformer**

The range of voltage limit for high-voltage winding of substation transformer is

The substations must be protected from faults **short-circuit fault**

meters are usd to measure substation currents for specific time period**Digital recording meters**

The assembly of apparatus used to change some characteristic (eg. voltage, pf, frequency etc) of electric supply is called **Substation**

The selection criteriator for the location to install a substation is **safe reliable easy maintenance and regulation facility**

Which of the component is not related to the substation Generator

In thickly populated areas the substation is installed at areas**Underground**

Single bus bar arrangement in substations is used for voltages less than **33kV**

Majority of distribution substations are of type**Pole mounted**

The voltage rating of the transforner in distribution substation is **11KV**

The voltage rating between any two phases in distribution substation is **400V**

The voltage between any phase and neutral in distribution substation is **230V**

In rating of distribution substation Kdrop factor defined as **Percent voltage drop/KVA. mile**

The factor Krise in rating of distribution substation is defined as

What type of load is assumed while considering the surface area with 'n' primary feeders?

uniformly distributed loads

The load in the service area is uniformly distributed and each feeder serves an area of triangular shape. The total service area of the feeder can be calculated as (in-total length of feeder)

If area served by four primary feeders the percent voltage drop in the main feeder is

If area served by four primary feeders, the load current in the main feeder at the feed point is

The percent voltage drop in the main feder when area is served with 6 primary feeders

The 6 feeders service area can carry times as much load as the 4 feeders service area if they are thermally loaded **1.5**

If 6 feeder service area and 4 feeder service area are voltage drop limitd, then 6 feeder can carry times as much load as 4 feeders **1.25**

The reliability of the substation by installing a substation at optimal location **increases**

By selecting optimal location to install the substation the voltage profile is **improved**

"Further expansion" is another consideration for to install at optimal location **sub station**

"Either keeping the service area of a given substation constant and increasing its capacity'" is an example for distribution

planning **short-term**

"Developing new distrubution substation and there by keeping the rating of the given substation as standard" is an example type of distribution planning

long-term

The design of primary & secondary system includes

optimal distribution substation allocation

The voltage drop is defined between source voltge and load voltage is

The value of source voltage in a R-L series equivalent circuit supplied a 3-phase balanced load is

VS= 0

What is the load power factor for which the voltage drop is maximum

If I = 30A, R - 0.05Ω, X = 0.01&Omega and cos θ =1.0 then the voltage drop is

1.5 V

If R = 0.0334Ω, X = 0.00299&Omega, kVA=120 per mile VD = 3.136 V then the constant Kdrop is **0.0261pu**

The total 3 - phase power loss of the line shown in figure is ('R' is total resistance of the line

If 'R' is the total 3 - Φ resistance of the line, then the total power loss in the circuit shown in figure is

If PLS = power loss of a circuit, Kw, Pr = power delivered by the circuit Kw then percent power loss of a circuit can be expressed as

If I2 R loss = 100 kw, Pr = 200 kw then percent conductor power loss is given by **50%**

If % I2 R = 20, % VD = 0.5 then = **40**

If a power factor angle is 300 and impedance angle is 600 then ratio =

The per unit voltage drop in the single phase ungrounded lateral is times larger than the one in the equivalent three phase lateral **2**

The ratio of power loss due to load currents in the conductors of the single-phase lateral and the equivalent three-phase lateral is **2.0**

The ratio of p.u. voltage drop in the single - phase two=wire unigrounded lateral with full capacity neutral and in the equivalent three-phase four-wire balanced lateral is **6**

The in single-phase two-wire laterals with multigrounded common neutrals converted to equivalent of carson's grounded neutral conductor and neutral wire**4.0**

If = **72 Kw**

The ratio of 0 **2.0**

If the neutral is unigrounded and the neutral conductor impedance (Zn) is larger than zero then the ratio of is

If **2**

If = **3.28 Kw**

The most common, balanced system for secondary distribution is 400/ V, 3 - phase,

wire system**230v.4**

In a 3 - phase, 4 - wire ac system, if the loads are balanced, then the current in the neutral wire is **zero**

The 3 - phase, 3 - wire ac system of distribution is used for loads **balanced**

The total voltage drop in a three-phase main feeder with non-uniformly distributed load is

The total voltage drop in a uniformly loaded distributor fed at one end is

The second highest investment in electric power system has been given to **Distribution**

In which part of the distribution system consider the voltage drop is the main criteria for design **distributor**

The distribution system may be classified as A.C & D.C distribution systems according to **nature**

of current

The statutory limit for voltage variations at the consumer's terminals is % of rated value

± 6%

Now a days system is used for distribution

ac

The distribution transformer links the primary and distrubution

systems **secondary**

The most common system for secondary distribution is wire system **400/230V, 3 - , 4 wire**

In constant power load model, which quantities are constant through out the analysis **Real and reactive**

power

In star-connected load modelling which quantity is changing for every iteration**Line to neutral voltage**

The line currents for constant PQ loads in delta connected loads are

The relation between coincidence factor (Fc) and diversity factor (FD)is **FC =**

If C1=C2= .... = Cn=C then coincidence factor is**Fc=C**

If diversity factor is 1.33 then coincidence factor is **0.752**

If FD=0.278 then FC is **0.7825**

If D1=D2= ..... = Dn=D then coincidence factor (FC) is equal to

The loss factor is mainly applicable for losses of the system **Copper losses**

The relationhshi[p between load factor (FLD) and loss factor (FLS) when off- peak load is zero when

The relation between loss factor and load factor if the load is steady is

If FLD=0.32 then the value of FLS using approximate formula is **0.1681**

Fans and airconditioning etc used in shops are example of load **Commercial**

The load factor for residential types of loads is **10-15%**

The load factor for commercial loads is **25-30%**

For large-scale industrial loads the demand factor may be taken as **70-80%**

For large scale industrial loads the load factor is **60-65%**

The demand factor is 100% for type of load**Municipal load**

The diversity factor is taken as 1 for type of load

municipal

The main feeder of primary distribution system is usually type of circuit**3-phase, 4-wire**

The voltage conditions on distribution system can be improved by using **shunt capacitors**

The main disadvantage of series capacitors used to improve the voltage on distribution system **I2 R losses**

The section of the feeder between the substation low-voltage bus and the load center of the service area is called

Express feeder

type of primary feeder system, the size of the conductor is reduced when move towards end of the conductor **Radial**

A ring main system of distribution is reliable than the radial system

more

The example of design aspect which is affected by the primary-feeder voltage level is **Primary feeder length**

For underground residential distribution system uses type of primary feeder system **4-wire**

If the new feeder voltage level is increased to twice the previous voltage level, the new load and area that can be served with the same percent voltage drop is times the original load and area.

2.52

If the new feeder voltage level is increased to three times the previous voltage level , the new load and area that can be served with the same percent voltage drop is times the original load and area

4.32

Feeder conductor size selection is decided by the following factor is **Voltage drops**

Quality of service and reliability of service decides of the primary feeder**Loading levels**

Transmformer rating is the factor which decides **Conductor size**

The density of the feeder load is the factor which affect of the primary feeder **Loading**

The gridor mesh-type secondary network system used in areas **Residential and commercial with high load density**

The voltage levels in high-load density areas is **208Y/120V**

The voltage levels for areas of industrial/Commercial customers is **480Y/277V**

The secondary systems may be designed in grid or mesh type network for the areas of type of loads

Emergency loads like hospitals and miltary installations

The selection of conductor size for secondary mains mainly consider criterion **Voltage drop**

are used to protect occurrence of short circuit outside the substation **Circuit breakers (or) reclosers**

The type meters may monitor the output of each substation transformer and the output of each feeder **Digital metrs**

The rating of transformer located in the foreground is **15/20/28MVA, 115/4.16KV, 8.8% impedance**

The substation should be located at the centre of **Gravity of load**

For voltages of 11kV range, the sub station installed at **Indoor**

The cheapest substation among all other substations is **Pole mounted**

An ideal location for the substation would be at the of load **Centre of gravity**

The KVA rating of transformer in a pole mounted substation does not exceed **200**

What is an advantage of Kdrop factor?

Easy computation of approximate voltage drop from a source to load

The total kilo voltampere load served by one of 'n' feeders can be calculated as

The load current in the main feeder at the feed point when area ios served with 6 primary feeders is

The main considerations for installing substations at optimal location

are **reliability & economics**

Mainly the distribution substation is installed to and of the distribution

Network **have control and protection**

In substation, the bus-bar scheme is selected by the degree of of supply during maintanance & fault

reliabili

ty

If Z12 = (3+j4)Ω, I12 = then the voltage drop between nodes 1,2 is

If the angle between the source voltage and load voltage (δ) is very small, then voltage drop between the source and load voltage is approximately equal to **Vdrop = Re (Z.I)**

In a balanced distribution system, the system voltage regulation is improved by **equally loading in each phase**

An overloaded single - phase lateral is changed to an equivalent 3 - phase, 3 - wire with balanced lateral, then the voltage drop in three-phase lateral can be expressed as

The total power loss in a circuit shown in figure is

The total power loss in the circuit shown in figure is Let resistance/m = 5Ω

 1500 W

If resistance/m of the line is 8Ω, then find the total power loss if the current carrying by the line of 10m is 10A. **8 Kw**

If the per unit voltage drop in the equivalent three - phase lateral is 0.05 then the value of perunit voltage drop in the single phase ungrounded lateral is **0.1**

If the neutral is unigrounded and the neutral conductor impedance (Zn) is zero then

3/2

In the view of economic and operating advantages, the most commonly used distribution system is

four wire, multigrounded common neutral distribution system

The total series voltage drop in main having uniformly distributed load over the total length 'l' is 'Z' impedance of length

If the total load current is lumped at a distance to calculate the total voltage drop in the main feeder with uniformly distributed load **x = l/3**

The total power loss per phase due to load current in non-uniformly distributed 3 - Φ main feeder is