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Question NO # 1.

Ans :→

There are several method of obtaining 3-wire d.c system - However the most important ones is two generator method.

Method of obtaining three wire DC system.

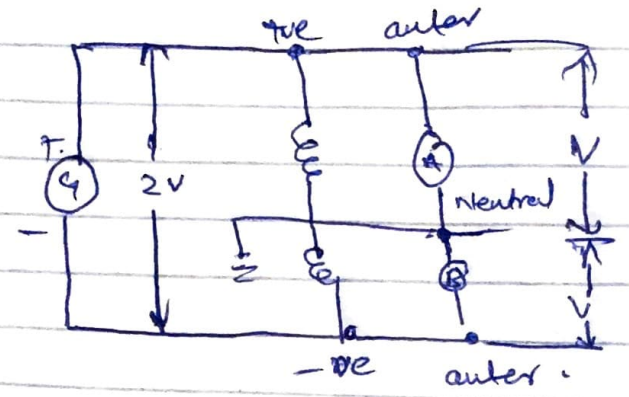
Two generator method:

In this method two Shunt wound dc generator G_1 and G_2 are connected in series and the neutral is obtained from the common point between generator - Each generator supplies load on its own side - thus generator 'G_1' supplies a load current of I_1 where as generator 'G_2' supplies load current of I_2, the different of load currents of the two sides known as out of balance $(I_1 - I_2)$ flows through neutral wire - This principal of this method is that two seperate generators are required

3 wire dc - generator :→

The above method is costly on account of the necessity of two gen for this reason 3-wire dc generator was developed - It consists of a standard 2-wire machine with one or two coils of high reactance and low resistance - connected permently to diametrically

opposite points of armature winding - The neutral wire is obtained from the common point as shown.



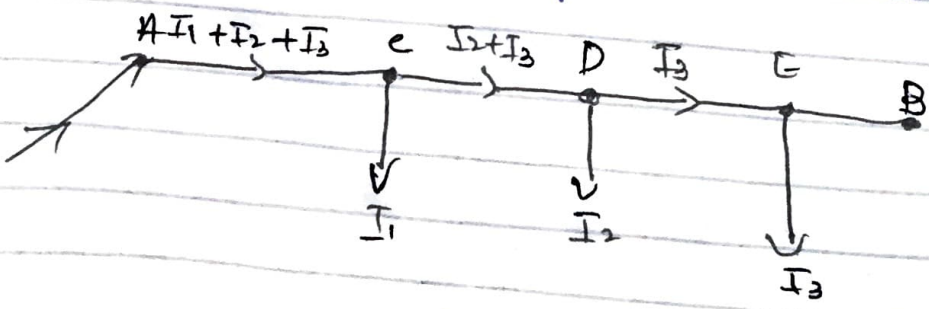
Question # 2 A

Following are the types of DC distributors.

→ Distributor fed at one end
→ Distributor fed at both end
→ Distributor fed at centre.
→ Ring distributor.

① Distributor feed at one end:-

In this type of feeding, the distributor is connected at the supply at one end and loads are taken at different point along the length of the distributor.



↳

the single line diagram of a d.c distributor A B fed at the end A (also known as singly fed distributor) and loads I_1, I_2 and I_3 tapped off at point C, D and E respectively.

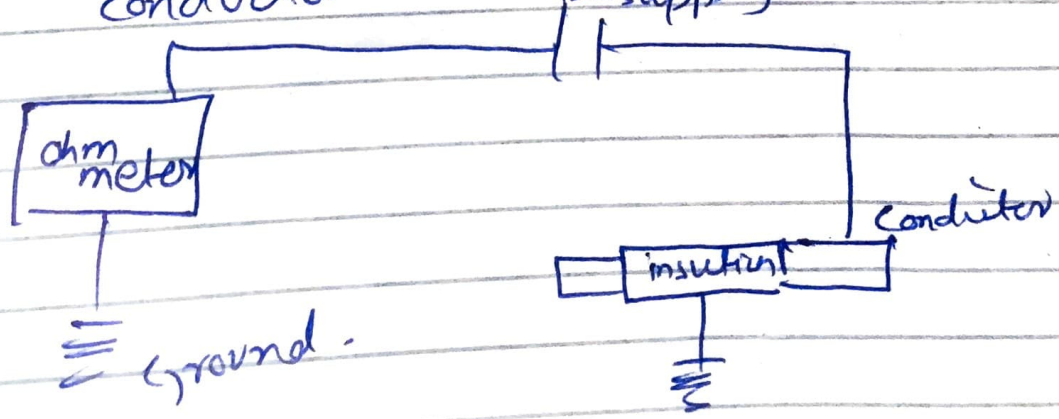
Question #2b.

Ground detector:-

It is an instrument which is used to detect conductor insulation resistance to ground - An ohm meter, or a series of light can be used to detect the insulation strength of an underground distribution system- most power system in use today are the grounded variety however some ungrounded systems still exist

ohm meter Ground Deector method.

the ohm meter method a Dc valtage is applied to the conductor - if a leakage path exists between the conductor insulator and ground a correct will flow through the ground to the ohm meter proportional to the insulation resistance of the conductor



Question No #3.

Sol

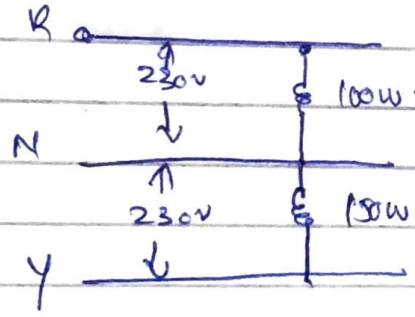
The lamp L_1 of 100 watts is connected b/w phase R and neutral where as lamp L_2 of 150 watts is connected between phase 'y' and the neutral.

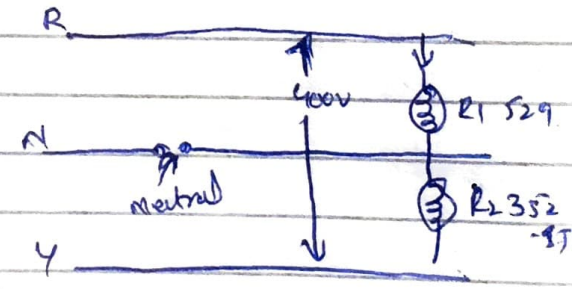
Resistance of L_1

$$R_1 = \frac{(230)^2}{100} = 529\,\Omega.$$

Resistance of L_2 =

$$R_2 = \frac{(230)^2}{150} = 352.67\,\Omega.$$





When the neutral wire disconnected the lamp are connected in series at the p.d across and equal to the line voltage

$$(E_L = 400\,V)$$

Current through lamp $I = \frac{E_L}{R_1 + R_2}$.

$$= \frac{400}{529 + 352.67}$$

$$= 0.454\,A$$

Voltage across $L_1 = IR_1 = 0.454 \times 529$

$= 240.1 V$

Voltage across $L_2 = IR_2 = 0.454 \times 352.67$

$= 160 V$

The voltage across 400-watt lamp is increased to 240 v.

Where 150 watt decrease to 160 V
Therefore 100-watt lamp becomes brighter and 150-watt becomes dim.

Question NO #4

The ring main is

let assume a current of I amperes in section AB and put the total drop around the ring equal to zero

$\therefore$

$0.1I + 0.05(I-10) + 0.01(I-30) + 0.025(I-60) + 0.075(I-70) = 72$

or

$I = 29.04 A$

current distribution now becomes.

Drop in AB $= 29.04 \times 0.1 = 2.9 v$

Drop in BC $= 19.04 \times 0.05 = 0.952 v$

Drop in ED = $30.96 \times 0.025 = 3.77v$

Drop in AE = $40.96 \times 0.075 = 3.07v$

(A)

∴

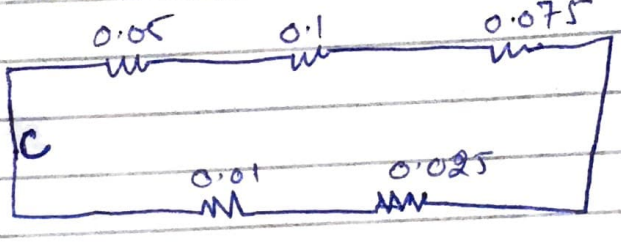
Patential of B = 217.1 v

patential of C = 216.15V

patential of E = 216.93V

patential of D = 216.16v.

The interconnector between paint C and E is shown it may be noted here that the fucsin of the interconnector is to reduce the drop of voltage in various sections.



Now

$$I = \frac{\text{P.d between paint E and C}}{\text{resistance of distribution network + interconnector.}}$$

P.D between paint E an C

$= 216.93 - 216.15 = 0.78v$

$$= \frac{0.225 \times 0.35}{(0.225 + (0.035)}$$

$$= 0.03\ \Omega$$

↳)

∴

Current in Interconnector ⇒

$$\Rightarrow \frac{0.78}{(0.03+0.05)}$$

$$\Rightarrow 9.75A \text{ from E to C}$$

Hence.

$$-0.025 I_1 - 0.01(I_1 - 30) + 0.05 \times 9.75 = 0.$$

or

$$0.035 I_1 = 0.7875$$

$$\therefore I_1 = 22.5A$$

Current in AE = ~~[illegible]~~ $10 + 22.5 + 9.75 = 42V$

Current in AB = $70 - 42.25 = 27.75A$

Drop in AB = $27.75 \times 0.1 = 2775V$.

Drop in ED = $32.25 \times 0.025 = 0.806V$

Drop in BC = $17.75 \times 0.05 = 0.88V$

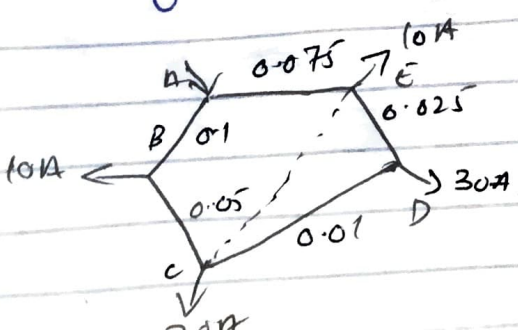
Drop in AE = $42.25 \times 0.075 = 3.169V$

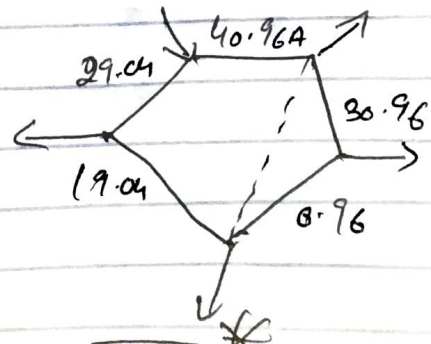
Potential of B = $217.225V$

" of C = $216.337V$.

" of E = $220 - 3.169 = 216.83V$

" of D = $216.83 - 0.806 = 216.02$ V



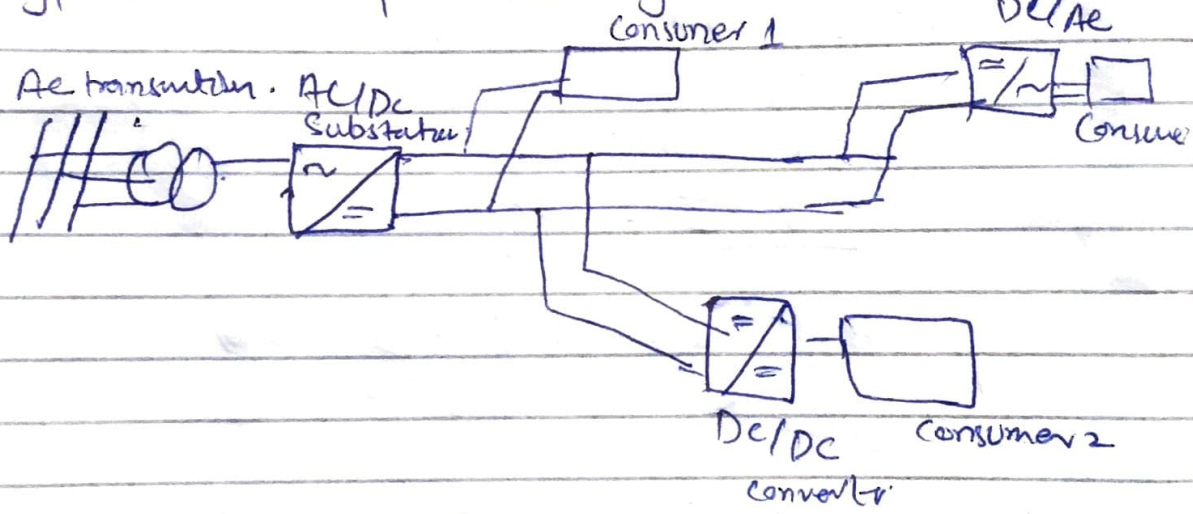


Question No # 5A.

2 wire DC System :→

This system uses two conductor, one is positive and the other one is negative conductor the energy transmitted at only one voltage level. to all the consumer using this system.

A typical dc power system as shown.



Types of DC Distributor.

→ Fed at one end
→ Fed at both end
→ Fed at center.
→ Ring distributor.

* * *

Question # 5b

Booster :->

Booster is low valtage high currat series wound Dc generater inserted in to a Dc circuit to add or inject a certain vallage proportional to the circuit currat. The main purpese of providing booster in power system is to compensate the vallage drop of feeder.

Booster add valtage to the feedar and compensate the valtage drop. Hence it increase the efficiency and reliability of the system That is why it is one of the important device of power system