Department of Electrical Engineering

Assignment

Date: 20/04/2020

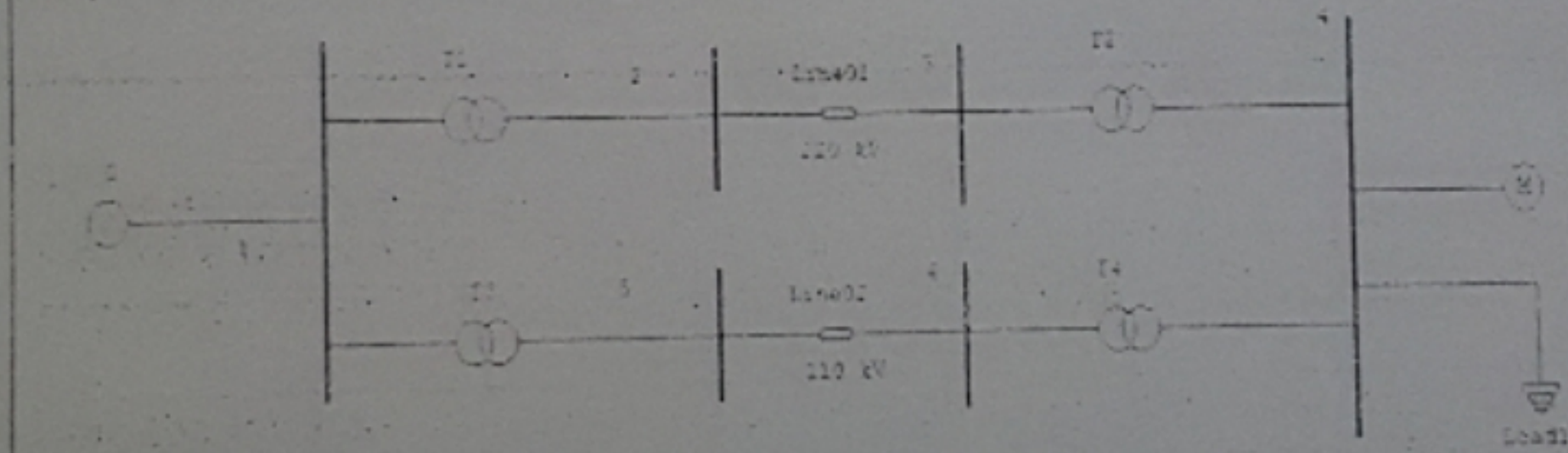
## Course Details

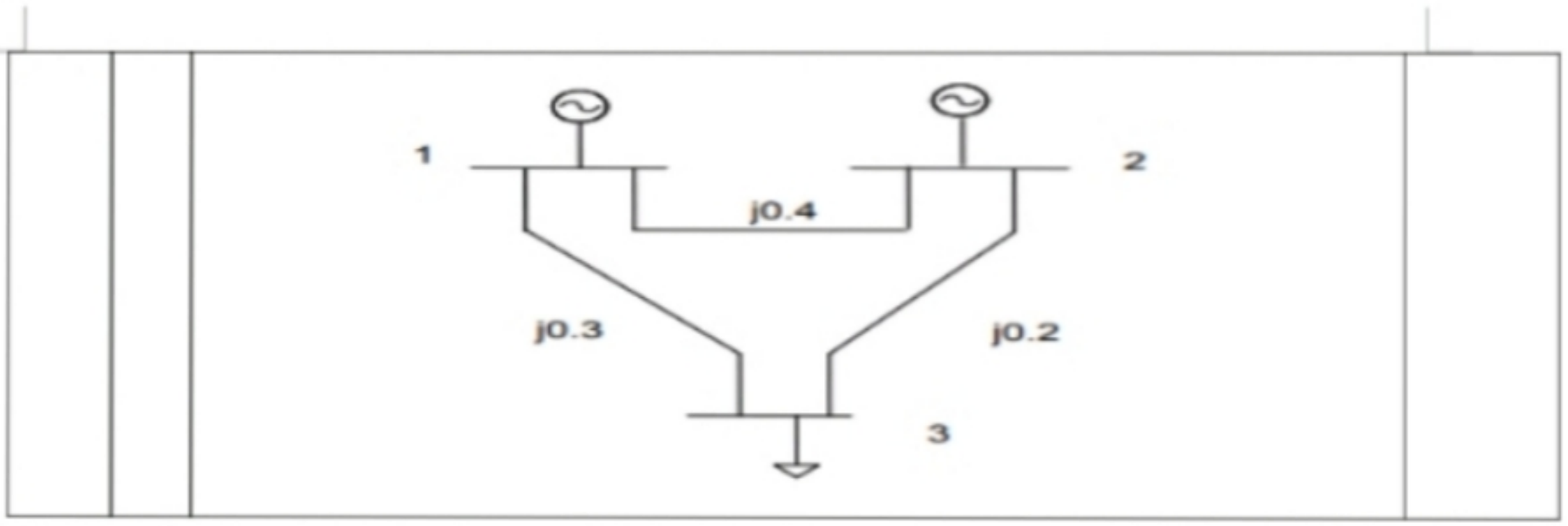
Course Title: Power System Analysis  Module: 6th

Instructor: Engr. Ramiz Aman  Total Marks: 30

## Student Details

Name: Muhammad Hital Khan  Student ID: 6966

| | | | | |
|---|---|---|---|---|
| Q1. | (a) | A 3Φ transformer is connected with a residential load of 28.56 KV; the primary side of a transformer is connected with 130 KV feeder while secondary side is stepped down to 10 KV. The transformer is rated with 30 MVA. Find impedance $Z_b$. | Marks 05 | CLO 1 |
| | (b) | Find the Per Unit equivalent impedence of an 11/132 KV transformer having 10 Ω and 1440 Ω, the equivalent impedence. The primary and secondary currents are 909 Amp and 75.75 Amps respectively. | Marks 05 | CLO 1 |
| .Q2 | (a) | Single line diagram of a 3Φ power system is shown in the below figure. Draw an impedance and reactance diagram in P.U.  | Marks 10 | CLO 2 |
| Q3 | (a) | For the single line diagram shown below, Generators are connected to high tension buses 1 and 2 and supply to load connected at bus 3. Find the reactance diagram, then convert it into equivalent current sources and shunt admittances. Then find the admittance matrix and find the total current. | Marks 10 | CLO 2 |


1
2
j0.4
j0.3
j0.2
3

Date:_____ P# 1

NAME :- HILAL KHAN

ROLL NO:- 6966

PAPER Power system

QUESTION :- 1

PART:- A

ANSWER:-

SOLUTION:-

Primary = 130 kV

Secondary = 10 kV

Rated = 30 MVA

T/F

$Z_b$ across $V_{base}$ (130 kV)

$$Z_b = \frac{(130 \times 10^3)^2}{30\,MVA} = \frac{1690\,0000000}{30000000}$$

$Z_b = 56.33$ Ans

$\Rightarrow Z_b$ across $V_{base}$ (10 kV)

Date: _____

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$$Z_b = \frac{(10 \times 10^3)^2}{30\ MVA}$$

$$= \frac{100000000}{30000000}$$

$$Z_b = 3.33\ \Omega$$

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# QUESTION :- 1

## PART :- B

ANSWER

SOLUTION:-

Base impedence (primary) $= \frac{11 \times 10^3}{909}$

$= 12.1\ \Omega$

Base impedence (secondary) $= \frac{132 \times 10^3}{75.75}$

$= 1742.57\ \Omega$

$Z_1\ (p.u) = \frac{10}{12.1} = 0.826\ p.u$

$Z_2\ (p.u) = \frac{1440}{1742.57} = 0.826\ p.u$

# QUESTION : 2

P# 4

ANSWER :

⇒ Single line diagram of a 30 bus power system in the figure below

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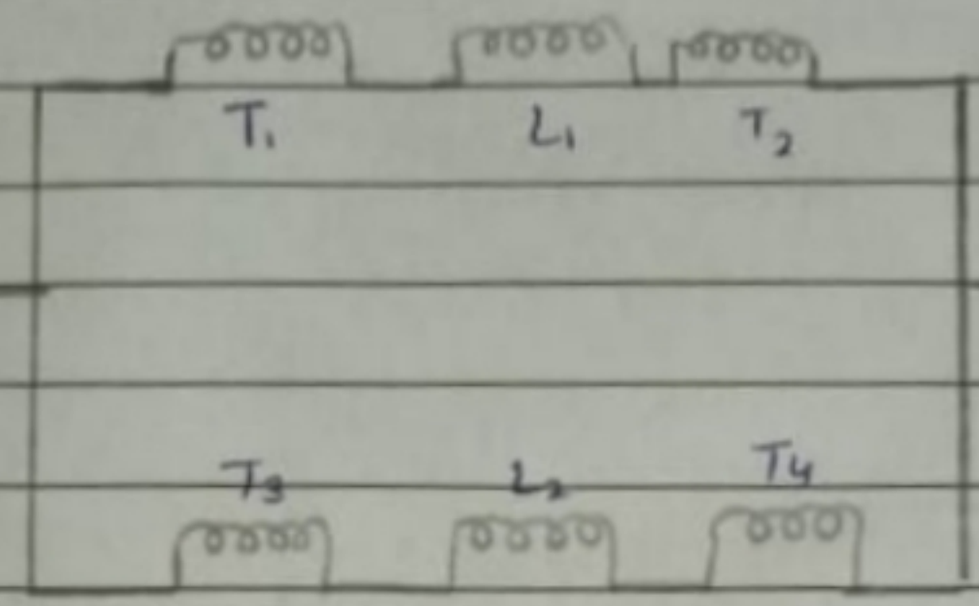


Single line diagram convert into reactance diagram.

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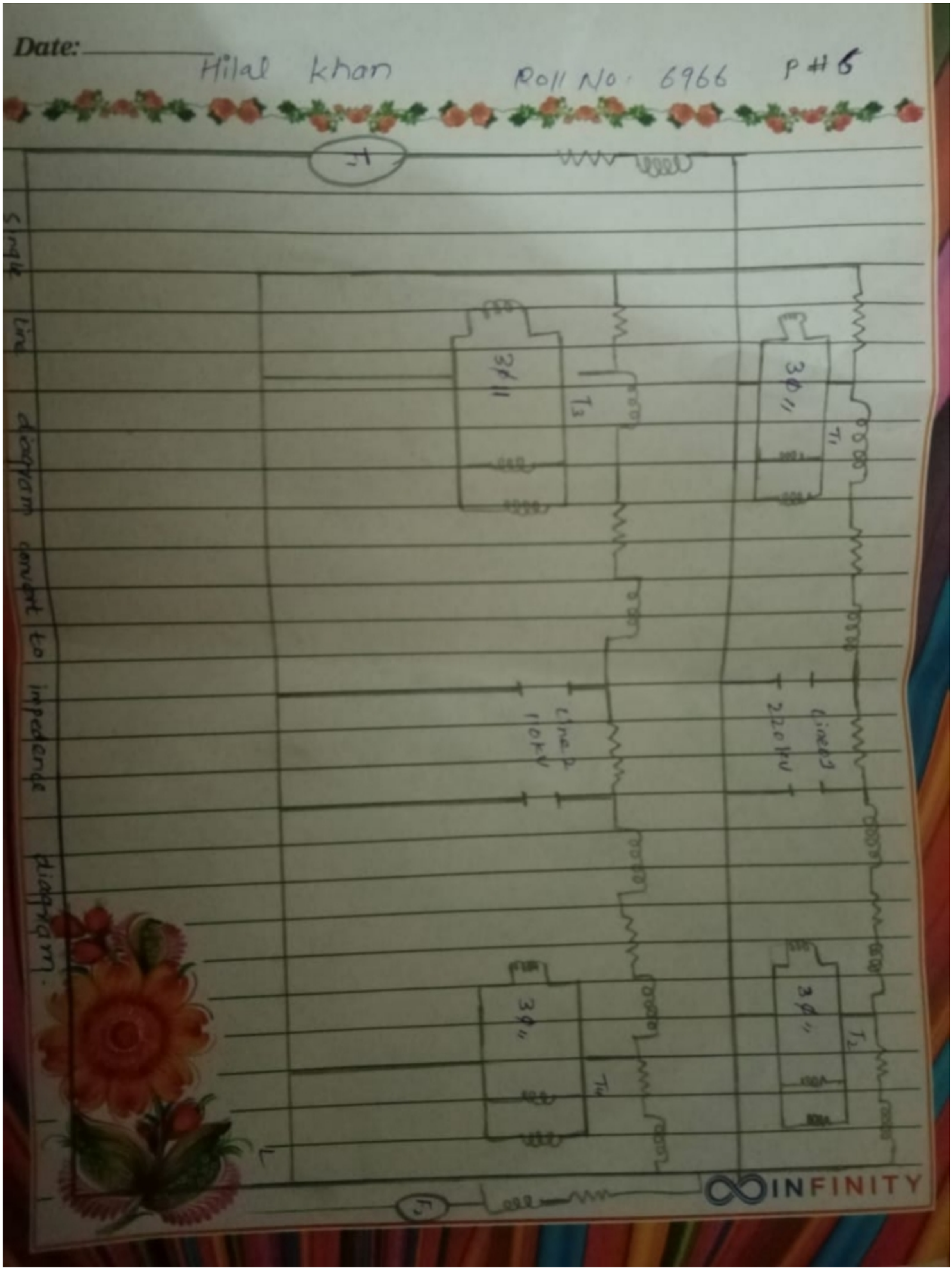

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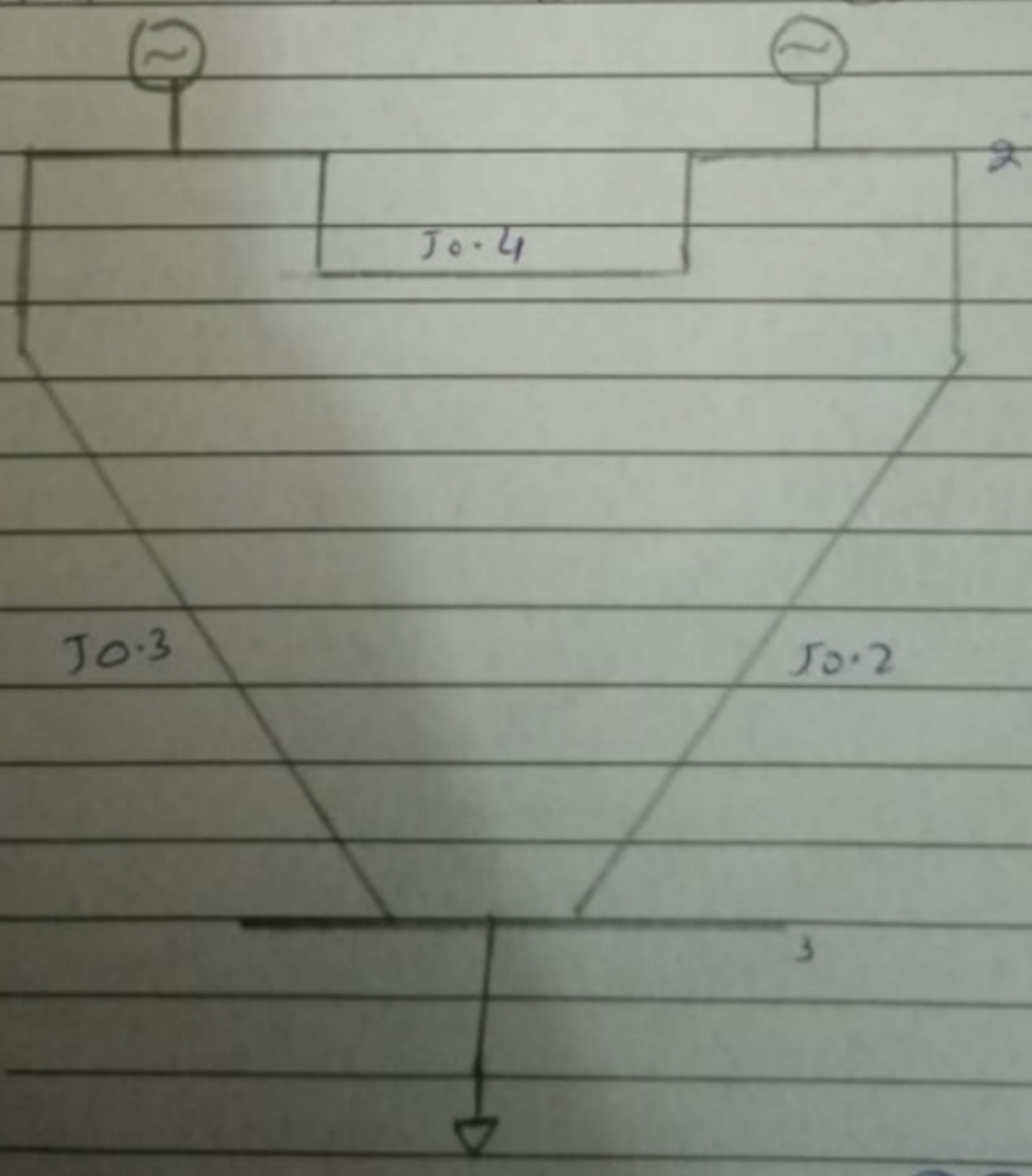
QUESTION: 3

ANSWER:

SOLUTION:-

Find the reactance diagram, then convert it into equivalent current source of shunt admittances. Then find that admittance matrix and find the total current.



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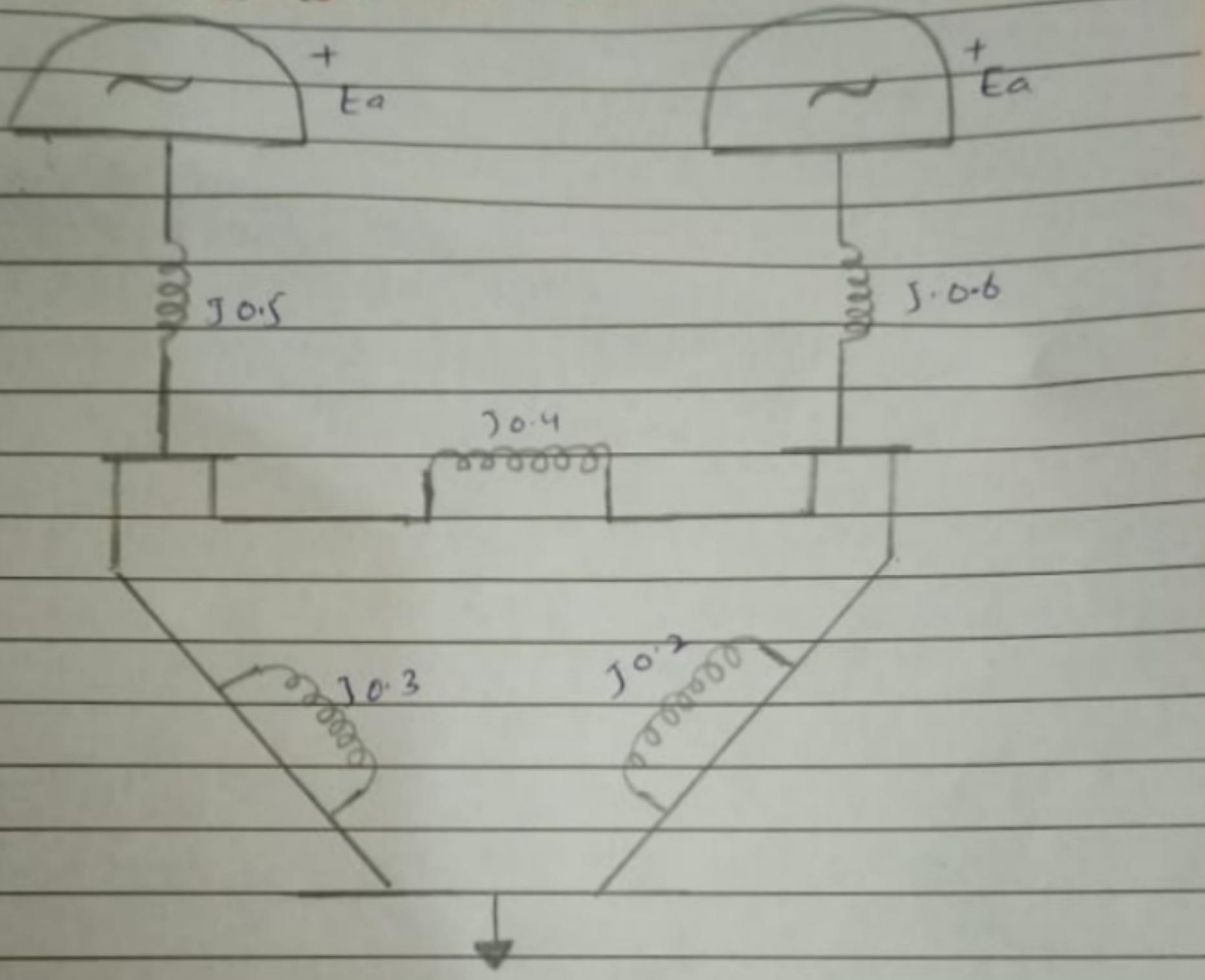


Now calculation ⇒

$\frac{1}{J06} = 160 \quad \frac{1}{J\cdot05} = 2 \quad \frac{1}{J0\cdot4} = 25 \quad \frac{1}{J03} = .333$

$\frac{1}{J02} = 5$

⇒ So Now we convert the reactance diagrame into Admittance.

Date: _____

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