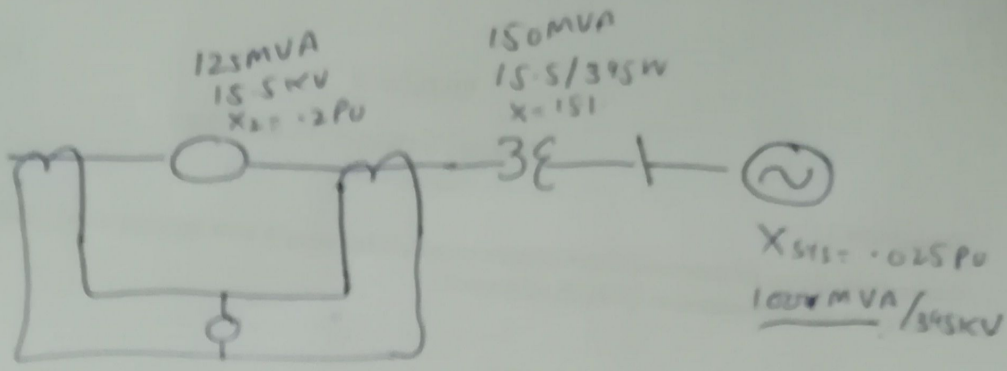
Q-4



Full load Current of

$$\text{Generator} = \frac{125 \times 10^6}{\sqrt{3} \times 15.5 \times 10^3} = 4656.19\,A$$

$$I_L = 4656.19\,A$$

CT Ratio 5000 : 5

↳ (1000 : 1)

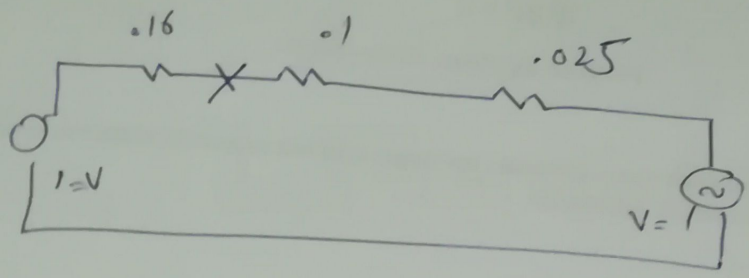
2

The per unit Reactance on 100 MVA

$$X_{SYS} = .025\,PU$$

$$X_1 = .15 \times \frac{100}{150} = .1\,PU$$

$$X_2 = .2 \times \frac{100}{125} = .16\,PU$$



$$X_{total} = \frac{.16 \times .125}{.16 + .125}$$

$$\boxed{X_{total} = .07}$$

$$I_f = \frac{1}{.07} = 14.29 \text{ A}$$

$$I_{base} = \frac{100 \text{ MVA}}{\sqrt{3} \times 15.5} = 3724.9 \text{ A}$$

2

$$\boxed{I_f = 14.29 \times 3724.9 = 53228.82}$$

$$I_{gen} = \frac{1}{.159} = 6.289$$

2

$$I_{gen} = 6.289 \times 3724.9 = 23346 \text{A}$$

$$I_{gen} = \frac{23346}{1000} = 23.35 \text{ A}.$$

$$I_{sys} = \frac{1}{.125} = 8$$

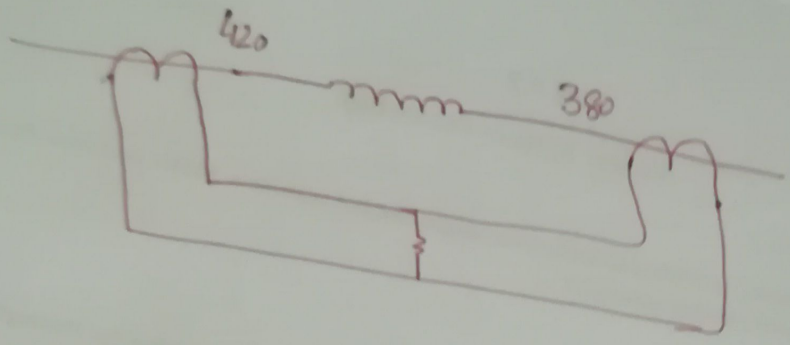
2

$$I_{sys} = 8 \times 3724.9 = 29883\,A$$

$$I_{syst\ on\ secondary} = \frac{2988.3}{1000}$$

$$= \boxed{29.89\,A}$$

Q=5



$$I_1 = \frac{420}{400/5} = 5.25A$$

$$I_2 = \frac{380}{400/5} = 4.75A \quad \frac{2}{}$$

$$I_1 - I_2 = 5.25 - 4.75 = .5A$$

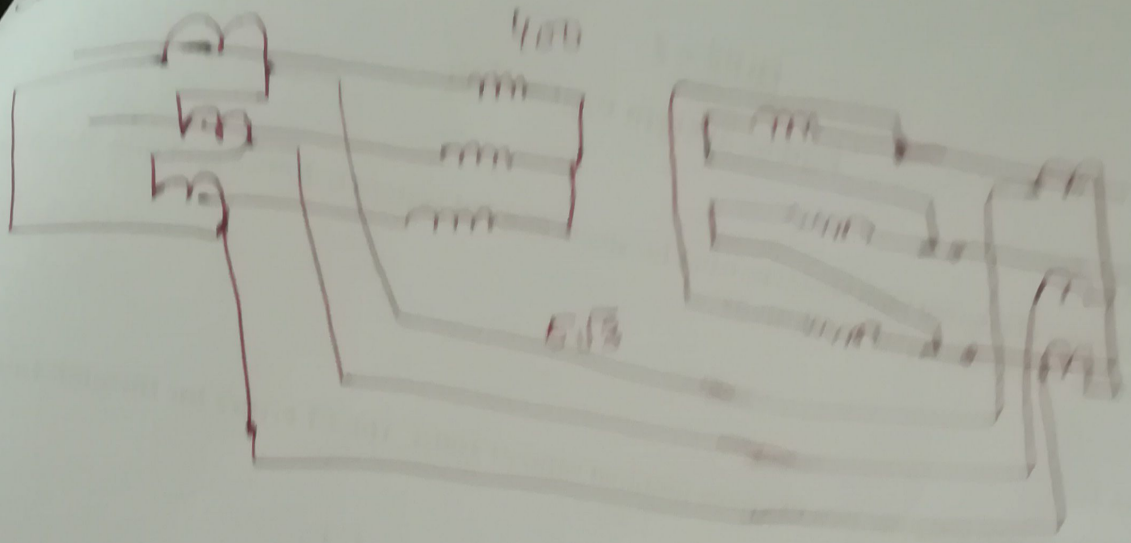
$$\frac{I_1 + I_2}{2} = \frac{5.25 + 4.75}{2}$$

$$I_1 - I_2 = K\left(\frac{I_1 + I_2}{2}\right) + K_0 \quad \frac{4}{}$$

$$= .1\ (5) + .25$$

$$= .75$$

So for the operation of the Relay $I_1 - I_2 > .75$ when $\frac{I_1 + I_2}{2} = 5A$. But $I_1 - I_2$ is $\frac{2}{}$ only $.5A$.



$$\sqrt{3} \times 400 \times 1000 = \sqrt{3} \times 33000 \times I_{12}$$

$$I_{12} = \frac{400 \times 1000}{33000}$$

$$\boxed{I_{12} = \frac{400}{33}}$$

The Current through Secondry of CT will be delta Connected.

Current through it will be $5\sqrt{3}$ A.

The CT on secondry will be.

$$33000\ V\ Side = \frac{400}{33 \times 5\sqrt{3}}$$

$$= \frac{7}{5}$$