AL-IMAM MOHAMMAD IBN SAUD
ISLAMIC UNIVERSITY
EE371 ELECTRIC DRIVES
QUIZ I -SEMESTER 2, 1437/1438

COLLEGE OF ENGINEERING
Electrical Engineering Dept.
Time allowed 40 minutes

Quiz Score: /5

إسم الطالب ..... Model Answer .....

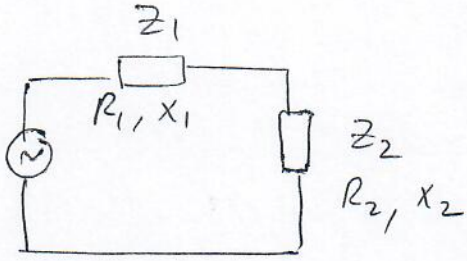
Problem I

Two single phase loads connected in series have the following

P_1= 300W Q_1=400 VAR (inductive)

P_2=200W Q_2=300 (capacitive)

Find the total PF



$I^2 R_1 = P_1$

$I^2 R_2 = P_2$

$\frac{R_1}{R_2} = \frac{1}{2}$

$\frac{X_1}{X_2} = \frac{4}{3}$

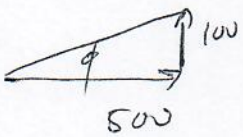
$P_t = P_1 + P_2 = 500\,W$

$I^2 X_1 = Q_1$

$I^2 X_2 = Q_2$

$Q_t = Q_1 - Q_2 = 100\ VAR$

2

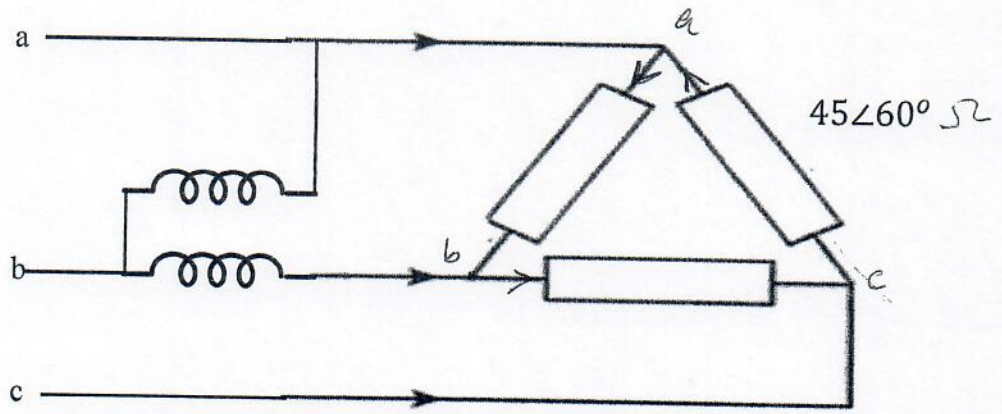


$PF = \cos\left(\tan^{-1}\frac{1}{5}\right) = 0.98$

Problem II

A wattmeter is connected to a balanced delta load as shown. If the source is 400 V with abc phase sequence, find the reading of the power meter.

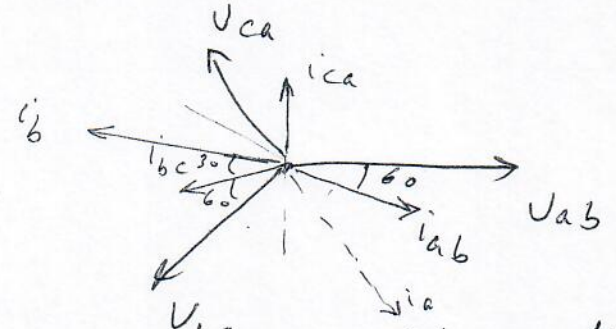
$i_a = i_{ab} - i_{ca}$



$i_b = i_{bc} - i_{ab}$

$V_{ba} = 400 \angle 180°$

$i_b = \frac{400}{45}\sqrt{3} \angle -120-90$



(3)

$|i_{ab}| = \frac{400}{45}$ A

$|i_b| = \frac{400}{45}\sqrt{3}$ A

$P = \frac{400}{45}\sqrt{3} * 400 \cos(180 + 120 + 90)$

$390° = 30°$

$= \frac{400}{45} \times \frac{3}{2} * 400$

$= \cancel{3.33\ kW}$ 5333 W

angle 30° (2)

(1)

← power

or current