KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

Dr. Ibrahim O. Habiballah

EE-306

Key Solution

Quiz 1 Sec.: 4 I.D.: Name:

A three-phase substation bus supplies a wye-connected load through a three-phase feeder with impedance of 0.5 + j 2.0 Ohm per phase. The load draws (absorbs) 50 kW at 0.866 lagging power factor. The line-to-line voltage at the load is 460 V.

The impedance of each phase of the load is

a. $Z_L = 3.66\angle 30^o\,\Omega$;

b. $Z_L = 3.66\angle -30^o\,\Omega$;

c. $Z_L = 2.12\angle 30^o\,\Omega$;

d. $Z_L = 2.12\angle -30^o\,\Omega$;

I = 50 / (sqrt(3)*460*.866) = $72.47\angle -30^o$ A

Z_L = (460 / sqrt(3)) / $72.47\angle -30^o$ = $3.66\angle 30^o\,\Omega$