KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

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EE-360

Key Solution

Quiz 1 ser#: I.D.: Name:

A three-phase substation bus supplies two wye-connected loads that are connected in parallel through a three-phase feeder with impedance of 0.5 + j 2.0 Ohm per phase. Load 1 draws 50 kW at 0.866 lagging power factor, and load 2 draws 36 kVA at 0.9 leading power factor. The line-to-line voltage at the loads is 460 V.

1) Impedance of each load is

a. $Z_{L1} = 3.66\angle 30^o\,\Omega$; $Z_{L2} = 5.88\angle -25.8^o\,\Omega$

b. $Z_{L1} = 3.66\angle 30^o\,\Omega$; $Z_{L2} = 5.29\angle -25.8^o\,\Omega$

c. $Z_{L1} = 6.34\angle 30^o\,\Omega$; $Z_{L2} = 10.18\angle -25.8^o\,\Omega$

d. $Z_{L1} = 3.66\angle -30^o\,\Omega$; $Z_{L2} = 5.88\angle 25.8^o\,\Omega$

2) Line-to-line voltage at the substation bus is

a. $V = 693.2\angle 58.2^o\,\Omega$

b. $V = 696.5\angle 59.5^o\,\Omega$

c. $V = 696.5\angle 29.5^o\,\Omega$

d. $V = 693.2\angle 28.2^o\,\Omega$