KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

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EE-463

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) Total line current flowing through the feeder is

   a. $I = 104.8\angle - 9.1^o\,\Omega$

   b. $I = 101.13\angle - 10.7^o\,\Omega$

   c. $I = 157.3\angle - 13.64^o\,\Omega$

   d. $I = 100.75\angle 9.46^o\,\Omega$

2) Total real and reactive power supplied by the substation bus is

   a.   P = 98.8 kW   ;   Q = 78.9 kVAR (capacitive)

   b.   P = 98.8 kW ;   Q = 78.9 kVAR (inductive)

   c.   P = 80.9 kW   ;   Q = 71.01 kVAR (capacitive)

   d.   P = 80.9 kW   ;   Q = 71.01 kVAR (inductive)