

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
ELECTRICAL ENGINEERING DEPARTMENT
Dr. Ibrahim O. Habiballah
EE-463

Key Solution

Quiz # 5 Sec. 1 Serial # Name: I.D.#

A generator has its terminal "a" open and the other two terminals are connected to each other with a short circuit to ground. The typical values for the symmetrical components of current in phase a are $I_{a1} = 600 \angle -90^\circ$ A, $I_{a2} = 250 \angle 90^\circ$ A, and $I_{a0} = 350 \angle 90^\circ$ A. Find the current into the ground and the current in each phase of the generator.

Solution:

$$\begin{aligned}I_a &= -j600 + j250 + j350 = 0 \\I_{b1} &= 600 \angle 150^\circ = -519.6 + j300 \\I_{b2} &= 250 \angle 210^\circ = -216.5 - j125 \\I_{b0} &= 350 \angle 90^\circ = 0 + j350 \\I_b &= -736.1 + j525 = \underline{\underline{904.1 \angle 144.5^\circ A}} \\I_{c1} &= 600 \angle 30^\circ = 519.6 + j300 \\I_{c2} &= 250 \angle 330^\circ = 216.5 - j125 \\I_{c0} &= 350 \angle 90^\circ = 0 + j350 \\I_c &= 736.1 + j525 = \underline{\underline{904.1 \angle 35.5^\circ A}} \\I_n &= I_b + I_c = j1050 \text{ A} \\ \text{or } I_n &= 3I_{a0} = 3 \times j350 = \underline{\underline{j1050 \text{ A}}}\end{aligned}$$