# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
## ELECTRICAL ENGINEERING DEPARTMENT
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### EE 360
### Key Solution

Quiz # 4    Serial #           Name:                          I.D.#

Two separately excited dc generators with compensating windings are to be connected in parallel to supply a power system. Generator I is a 20-kW, 230-V dc generator with an armature resistance of 0.03 ohm, and generator 2 is a 15-kW, 240-V dc generator with an armature resistance of 0.06 ohm. Both generators are adjusted to have no-load terminal voltages of 230 V. If a 100-A load is placed on this power system, what will the resulting terminal voltage of the system be? What portion of the load will be supplied by each generator?

The current supplied by Generator 1 is given by

$$I_1 = \frac{E_{A_1} - V_T}{R_{A_1}}$$

The current supplied by Generator 2 is given by

$$I_2 = \frac{E_{A_2} - V_T}{R_{A_2}}$$

The total current supplied to the loads must be the sum of the currents from each generator. Therefore,

$$I_1 + I_2 = 100A$$

$$\frac{230V - V_T}{0.03\,\Omega} + \frac{230V - V_T}{0.06\,\Omega} = 100$$

$$2(230 - V_T) + (230 - V_T) = 6$$

$$690 - 3V_T = 6$$

$$V_T = \frac{684}{3} = \boxed{228\ V}$$

$$I_1 = \frac{230V - 228V}{0.03\,\Omega} = \boxed{66.7\ A}$$

$$I_2 = \frac{230V - 228V}{0.06\,\Omega} = \boxed{33.3\ A}$$