# Answer on Question #64392, Engineering / Electrical Engineering

A 100-kW, 250-V DC shunt generator has an armature resistance of 0.05Ω and a field circuit resistance of 60 Ω. With the generator operating at rated voltage, determine the induced voltage at full load.

Solution:

In a shunt generator, the field winding is connected in parallel with the armature winding so that terminal voltage of the generator is applied across it.
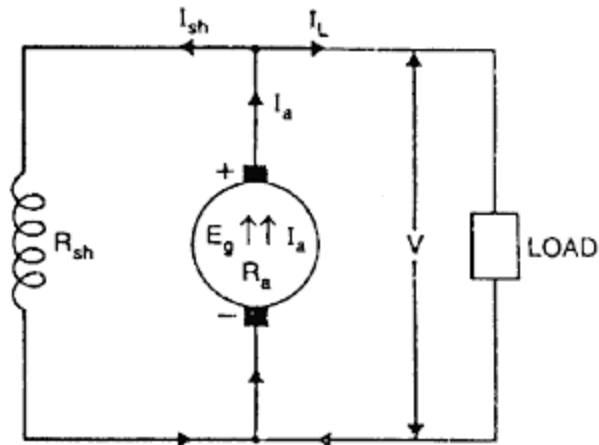
At full load, the terminal voltage

$$V = E_g - I_a R_a$$

Shunt field current,

$$I_{sh} = \frac{V}{R_{sh}} = \frac{250\ V}{60\ \Omega} = 4.17\ A$$

Load current,

$$I_L = \frac{P}{V} = \frac{100,000\ W}{250\ V} = 400\ A$$

Armature current,

$$I_a = I_L + I_{sh} = 400 + 4.17 = 404.17\ A$$

Induced voltage,

$$E_g = V + I_a R_a = 250\ V + (404.17\ A) \times (0.05\ \Omega) = 270.2\ V$$

Answer: 270.2 V