Quiz 2

An 8-pole D.C shunt generator with 778 wave-connected armature conductors and running at 500 r.p.m . supplies a load of 12.5Ω resistance at terminal voltage of 250 V. The armature resistance is 0.24Ω and the field resistance is 250Ω. Find the armature current, the induced e.m.f and the flux per pole.?

Solution:

Load current

$$I_L = \frac{V}{R} = \frac{250}{12.5} = 20 \text{ A}$$

Shunt current

$$I_f = \frac{250}{250} = 1 \text{ A}$$

Armature current

$$I_a = 20 + 1 = 21 \text{ A}$$

Induce e.m.f $= 250 + (21 \times 0.24) = 255.04$ V

Now

$$E_g = \frac{Zn\phi}{60}\left(\frac{P}{a}\right)$$

$$a = 2 \qquad \text{(wave-wound)}$$

$$255.04 = \frac{778 \times 500 \times \varphi}{60}\left(\frac{8}{2}\right)$$

$$\phi = 9.83 \text{ mWb.}$$