Q5: A power transmission line feeds input power at 2300 V to a step-down transformer with its primary windings having 4000 turns. The output power is delivered at 230 V by the transformer. If the current in the primary of the transformer is 5 A and its efficiency is 90%, the output current would be

(a) 25 A

(b) 50 A

(c) 45 A

(d) 35 A

Solution

Given ϵ_p = 2300 V, N_p = 4000

ϵ_s = 230 V,

I_p = 5 A,

η = 90% = 0.9

$\eta = P_o/P_i = (\epsilon_s I_s)/(\epsilon_p I_p)$

$I_s = \eta\epsilon_p I_p/\epsilon_s = (0.9 \times 2300 \times 5)/230 = 45$ A

Answer: (c) 45 A