



(a) un-finned: thermal resistance of wall = $\frac{x}{\lambda} = \frac{0.010}{225}$
= 0.000044 K/W

thermal resistance wall-to air = $\frac{1}{h} = \frac{1}{57}$
= 0.017544 K/W

$\therefore \dot{Q}'' = \frac{\Delta T}{\text{total resistance}} = \frac{120-15}{0.000044 + 0.017544} = 5970 \text{ W/m}^2$

\therefore for an 18 mm strip $\dot{Q} = 5970 \times 0.018 = \underline{\underline{107.5 \text{ W}}}$

(b) finned: $\dot{Q} = \dot{Q}_{\text{flat surface}} + \dot{Q}_{\text{root}}$

= $\frac{18-4}{18} \times 107.5 + \lambda A m \theta_0 \tanh mL$
(See Q.2)

$m = \sqrt{\frac{2h}{\lambda t}} = \sqrt{\frac{2 \times 57}{225 \times 0.004}} = 11.25$ (See Q.1)

$\therefore \dot{Q} = \frac{14}{18} \times 107.5 + 225 \times 0.004 \times 11.25 (120-15)$
 $\tanh(11.25 \times 0.050)$

= 83.6 + 542.2 = 626 W