Queston#21065

A square plate of side 10 cm is made of a metal of linear expansivity 210−5/K. As the plate is heated from 30oC to 100o, the area of one face of the plate will increase to ----------

1056cm2

1042cm2

1028cm2

1014cm2

Solution:

Let:

$L = 10\ cm$

$T_1 = 30°C$

$T_2 = 100°C$

$\alpha = 2 * 10^{-5}\ K^{-1}$

S - ?

$S = L_t{}^2$

$L_t = L(1 + \alpha(T_2 - T_1)$

$S = (L(1 + \alpha(T_2 - T_1))^2$

$S = (10(1 + 2 * 10^{-5}(100 - 30))^2 = 100.28\ cm^2$

Answer: 100.28 cm^2