Two rods A and B of identical dimensions are at temperature 30°C. If A is heated upto 180°C and B upto T°C, then the new lengths are the same. If the ratio of the coefficients of linear expansion of A and B is 4 : 3, then the value of T is JEE MAIN 2019

A 200°C

B 270°C

C 230°C

D 250°C

Given, $\frac{\alpha_A}{\alpha_B} = \frac{4}{3}$

$\Delta T_A = 180^\circ - 30^\circ \Rightarrow 150^\circ C$

$\Delta T_B = T^\circ - 30^\circ \Rightarrow (T - 30)^\circ C$

A.T.B. $\Delta L_A = \Delta L_B$

$\Rightarrow L\alpha_A \Delta T_A = L\alpha_B \Delta T_B$ (where 'L' is the original length of rod)

$\Rightarrow \frac{\alpha_A}{\alpha_B} = \frac{T - 30}{150}$

$\Rightarrow \frac{4}{3} = \frac{T - 30}{150}$

$\Rightarrow \boxed{T = 230^\circ C}$