Each side of a box made of metal sheet in cubic shape is 'a' at room temperature 'T', the coefficient of linear expansion of the metal sheet is 'α'. The metal sheet is heated uniformly, by a small temperature ΔT, so that its new temperature is $T + \Delta T$. Calculate the increase in the volume of the metal box. (JEE MAIN 2021)

A $3a^3\alpha\Delta T$

B $4\pi a^3\alpha\Delta T$

C $\frac{4}{3}\pi a^3\alpha\Delta T$

D $4a^3\alpha\Delta T$

∴ We know that $\boxed{\gamma = 3\alpha}$

Also, $\Delta V = V\gamma\Delta T$ = Increase in volume

$= (a)^3(3\alpha)(\Delta T)$

[$V = a^3$ is volume of cube of side 'a']

$\Rightarrow \boxed{\Delta V = 3a^3\alpha\Delta T}$