2 In the Stefan-Boltzmann law, the net radiated power P emitted from an object of surface area A and at temperature T, placed in an environment of temperature T_0 can be obtained from the equation

$$P = \varepsilon\sigma A\left(T^4 - T_0^{\,4}\right)$$

where emissivity ε is a dimensionless property of the object, σ is the Stefan constant, and the value of each quantity used is expressed in SI unit.

What unit, if any, should be used for the constant σ?

A $\mathrm{J\ m^{-2}\ s^{-1}\ K^{-4}}$ **B** $\mathrm{W\ m^{-2}\ {}^{\circ}C^{-4}}$ **C** $\mathrm{W\ m^{-2}}$ **D** no unit