TOPIC
Thermodynamics

QUESTION
The specific heat of graphite over a temperature range of 200K to 800K is given by

\[ C = 0.05749T^2 - 31.25T + 4370 \]

where \( C \) is given in J/kg-K and temperature \( T \) is given in K. The amount of heat required in Joules to raise the temperature of 5 grams of graphite in an inert atmosphere from 400 K to 600K most nearly is

(A) 420
(B) 3309
(C) 3692
(D) 6316

HINTS
Note that the specific heat is not a constant but a function of temperature. The heat required, \( W \) is

\[ W = m \int_{T_0}^{T_f} c \, dt \]

where

- \( m = \) mass,
- \( T_0 = \) initial temperature,
- \( T_f = \) final temperature,
- \( c = \) specific heat as a function of temperature, \( T \).

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