

TOPIC

Thermodynamics – Section XII – Question 3

QUESTION

A Carnot refrigerator operates between 10°C and 25°C . The coefficient of performance most nearly is

- (A) 0.0500
- (B) 0.667
- (C) 18.9
- (D) 19.9

HINTS

- For a Carnot refrigerator, COP depends only on T
- Make sure you use the absolute temperature
- Do not confuse a refrigerator with a heat pump or heat engine

SOLUTION

$$\begin{aligned}\text{COP} &= \frac{T_L}{T_H - T_L} \\ T_H &= 25 + 273 \\ &= 298\text{K} \\ T_L &= 10 + 273 \\ &= 283\text{K} \\ \text{COP} &= \frac{283}{298 - 283} \\ &= 18.9\end{aligned}$$

ANSWER

(C)

CONTRIBUTOR

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