

PART 1 - PHYSICS

Topic : Thermal properties of matter

SECTION-B : (Maximum Marks : 12)

This section contains **THREE** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -0.30, 30.27, -127.30) in the place designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme :

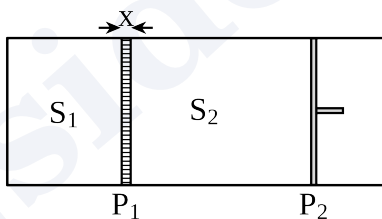
Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

1. As shown in the figure, an insulated container is fitted with a thermally conducting but immovable partition (P_1) and a freely movable but thermally insulated piston (P_2). The partition P_1 with thermal conductivity K , cross sectional area A and width x divides the container into two sections, S_1 and S_2 , each containing one mole of a monoatomic gas. The piston P_2 moves freely such that the gas in S_2 is always at the atmospheric pressure. Initially, the difference between the temperatures of S_1 and S_2 is ΔT_0 . The time it takes for the temperature difference to become $\frac{\Delta T_0}{2}$ is $\frac{nxR}{KA}$, where R is the universal gas constant. The value of n is:

[Given: $\ln 2 \approx 0.7$]

[JEE Advanced 2026 Paper 1]



Scan or tap for the full solution

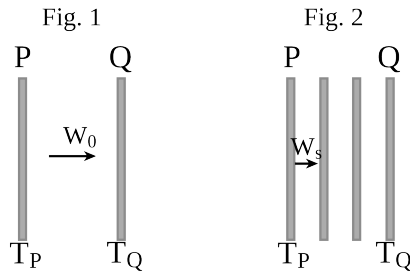


2. Two identical plates P and Q, radiating as perfect black bodies, are kept in vacuum at constant absolute temperatures T_P and T_Q , respectively, with $T_Q < T_P$, as shown in Fig. 1. The radiated power transferred per unit area from P to Q is W_0 . Subsequently, two more plates, identical to P and Q, are introduced between P and Q, as shown in Fig. 2. Assume that heat transfer takes place only between adjacent plates. If the power transferred per unit area in the direction from P to Q (Fig. 2) in the steady state is W_S , then the ratio $\frac{W_0}{W_S}$ is

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[JEE Advanced 2025 Paper 1]

Space for Rough Work



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3. The specific heat capacity of a substance is temperature dependent and is given by the formula $C = kT$, where k is a constant of suitable dimensions in SI units, and T is the absolute temperature. If the heat required to raise the temperature of 1 kg of the substance from -73°C to 27°C is nk , the value of n is ____.

[Given: $0\text{ K} = -273^\circ\text{C}$.]

[JEE Advanced 2024 Paper 1]

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Space for Rough Work

**JEE ADVANCED THERMAL PROPERTIES OF MATTER
— PYQS**

Test Pattern : JEE (Advanced)

ANSWER KEY**SECTION-B**

Ques.	1	2	3							
Ans.	0.63 to 0.70	3	25000							