Physics Formula Sheet

Chapter by chapter, topic by topic. Written by the PadhoNa team for quick revision.

Unlock the full PadhoNa Test Series
Every chapter-wise JEE Main test on the real exam screen, with full solutions and automatic analysis. Plans from ₹99 a month.
padhona.com/go/test-series →

CHAPTER 14

Thermodynamics

First law and processes

FIRST LAW

$$\Delta Q = \Delta U + W, \qquad \Delta U = nC_v\,\Delta T, \qquad W = \int P\,dV$$

ISOTHERMAL

$$W = nRT\ln\frac{V_2}{V_1}, \qquad \Delta U = 0$$

ADIABATIC

$$PV^{\gamma} = \text{const}, \qquad TV^{\gamma-1} = \text{const}, \qquad W = \frac{P_1V_1 - P_2V_2}{\gamma - 1}$$

ISOBARIC / ISOCHORIC

$$W = P\,\Delta V,\ \ Q = nC_p\Delta T\ \ (P\ \text{const}); \qquad W = 0,\ \ Q = nC_v\Delta T\ \ (V\ \text{const})$$

POLYTROPIC

$$PV^{x} = \text{const}: \qquad W = \frac{nR\,\Delta T}{1-x}, \qquad C = C_v + \frac{R}{1-x}$$

SLOPES ON P–V

$$\text{adiabatic slope} = \gamma \times \text{isothermal slope}$$

Heat engines, refrigerators and second law

EFFICIENCY

$$\eta = \frac{W}{Q_1} = 1 - \frac{Q_2}{Q_1}; \qquad \eta_{\text{Carnot}} = 1 - \frac{T_2}{T_1}$$

REFRIGERATOR

$$\beta = \frac{Q_2}{W} = \frac{T_2}{T_1 - T_2}\ (\text{Carnot})$$

Unlock the full PadhoNa Test Series

Every chapter-wise JEE Main test on the real exam screen, with full solutions and automatic analysis. Plans from ₹99 a month.

padhona.com/go/test-series →

Keep going with PadhoNa

Unlock the full PadhoNa Test Series

Every chapter-wise JEE Main test on the real exam screen, with full solutions and automatic analysis. Plans from ₹99 a month.

padhona.com/go/test-series →

PadhoNa Pro Physics notes

Complete, exam-focused Physics notes by the PadhoNa team: ₹99 for a year.

padhona.com/go/notes/physics →

Physics, Chemistry and Maths notes together

PadhoNa Pro · JEE: all three subjects for ₹249 a year, for JEE Main and Advanced.

padhona.com/go/pro →

© PadhoNa · padhona.com · This sheet is for personal study.