

Thermodynamic processes:

Process in which state of thermodynamic variables like P, V, T changes are called thermodynamic processes.

Given fixed number of moles / closed system ($n = \text{constant}$) under ideal conditions is assumed ($PV = nRT$ is applicable)

Constant volume process / Isochoric process / Isometric process:

Gas is confined in a piston cylinder arrangement having fixed piston.

$$V = \text{constant}$$

$$PV = nRT \Rightarrow \frac{P}{T} = \left(\frac{nR}{V}\right) = \text{const.}$$

Process equation: $\frac{P}{T} = \text{constant}$

Between two states (P_1, V, T_1) and (P_2, V, T_2)

$$\text{one can use: } \frac{P_1}{T_1} = \frac{P_2}{T_2} \quad \left\{ T_1, T_2 \text{ must be in kelvin} \right\}$$

Example: A given mass of an ideal gas is confined in a vessel of fixed volume. At 27°C pressure of the gas is found to be 2.4 atm . Find its pressure if the gas is heated to 52°C .

$$\begin{aligned} \text{Sol: } P_1 &= 2.4 \text{ atm} & , & \quad T_1 = 273 + 27 = 300 \text{ K} \\ P_2 &= ? & , & \quad T_2 = 273 + 52 = 325 \text{ K} \\ \frac{P_1}{T_1} &= \frac{P_2}{T_2} \Rightarrow P_2 = \frac{T_2}{T_1} \times P_1 = \frac{325}{300} \times 2.4 = 2.6 \text{ atm} \\ & & & \quad \text{(answer)} \end{aligned}$$



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Table of Contents Chemical Engineering Lecture Notes

1. Understanding the eBook Chemical Engineering Lecture Notes
 - The Rise of Digital Reading Chemical Engineering Lecture Notes
 - Advantages of eBooks Over Traditional Books
2. Identifying Chemical Engineering Lecture Notes
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Chemical Engineering Lecture Notes
 - User-Friendly Interface
4. Exploring eBook Recommendations from Chemical Engineering Lecture Notes
 - Personalized Recommendations
 - Chemical Engineering Lecture Notes User Reviews and Ratings
 - Chemical Engineering Lecture Notes and Bestseller Lists
5. Accessing Chemical Engineering Lecture Notes Free and Paid eBooks
 - Chemical Engineering Lecture Notes Public Domain eBooks
 - Chemical Engineering Lecture Notes eBook Subscription Services

- Chemical Engineering Lecture Notes Budget-Friendly Options
- 6. Navigating Chemical Engineering Lecture Notes eBook Formats
 - ePub, PDF, MOBI, and More
 - Chemical Engineering Lecture Notes Compatibility with Devices
 - Chemical Engineering Lecture Notes Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Chemical Engineering Lecture Notes
 - Highlighting and Note-Taking Chemical Engineering Lecture Notes
 - Interactive Elements Chemical Engineering Lecture Notes
- 8. Staying Engaged with Chemical Engineering Lecture Notes
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Chemical Engineering Lecture Notes
- 9. Balancing eBooks and Physical Books Chemical Engineering Lecture Notes
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Chemical Engineering Lecture Notes
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Chemical Engineering Lecture Notes
 - Setting Reading Goals Chemical Engineering Lecture Notes
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Chemical Engineering Lecture Notes
 - Fact-Checking eBook Content of Chemical Engineering Lecture Notes
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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