

Applying Engineering Thermodynamics: A Case Study Approach

Unlock the Secrets of Thermodynamics with Real-World Insights

In the realm of engineering, thermodynamics stands as a cornerstone discipline, providing the foundation for understanding the transfer and transformation of energy. However, grasping the intricacies of this complex subject can be a daunting task. That's where our revolutionary book, *Applying Engineering Thermodynamics: A Case Study Approach*, steps in.



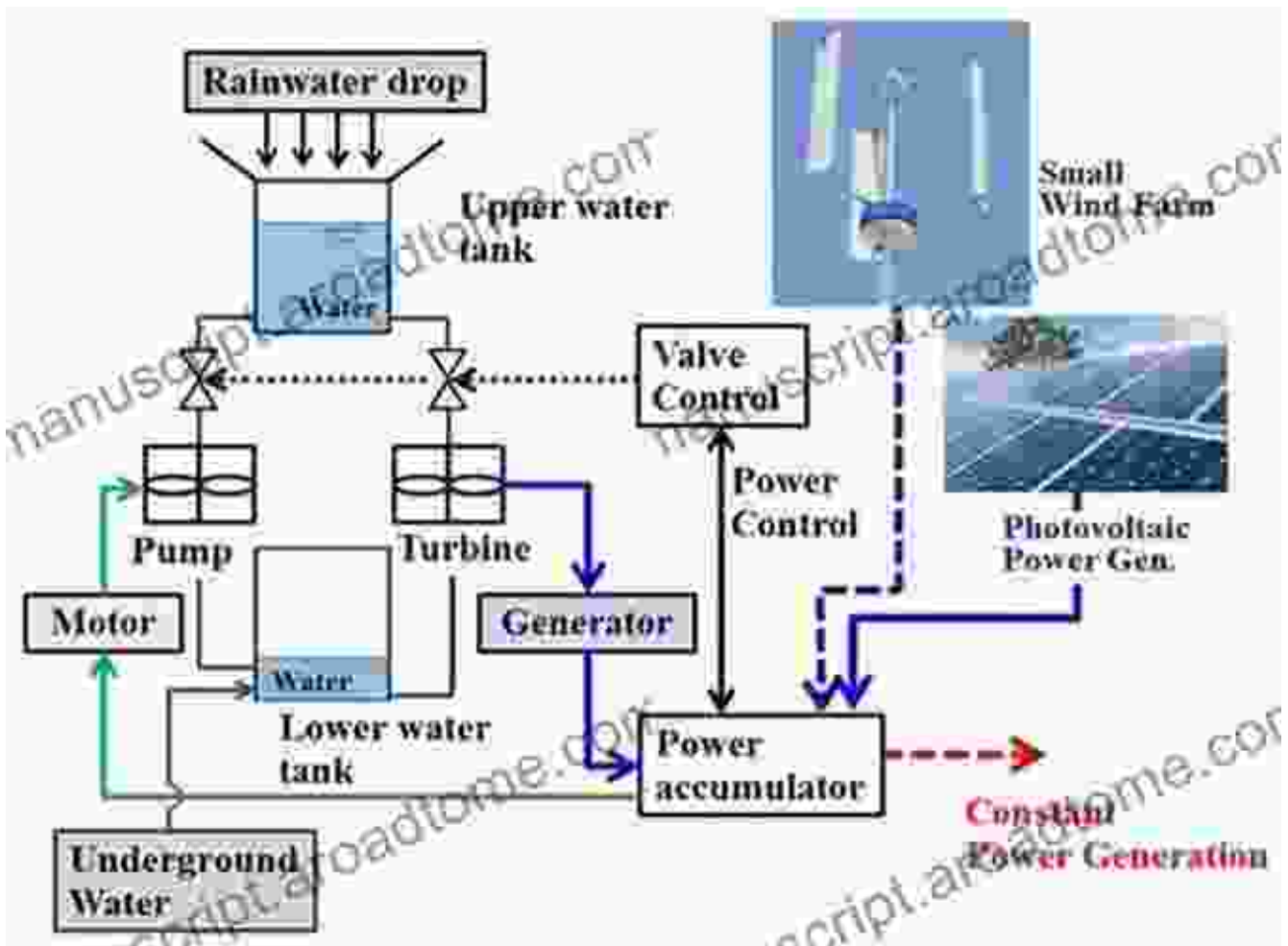
Applying Engineering Thermodynamics: A Case Study Approach by Lynnette Hartwig

★★★★☆ 4.8 out of 5

Language	: English
File size	: 62846 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Word Wise	: Enabled
Print length	: 679 pages



Our innovative approach sets us apart from the crowd. Instead of simply presenting abstract theories, we immerse you in a series of engaging case studies that bring the principles of thermodynamics to life. Through these real-world examples, you'll witness the practical application of thermodynamics in various industries, from power generation to refrigeration and beyond.



Case Study: Optimizing a Power Plant

Explore the intricacies of thermodynamics in a power plant setting. Learn how to analyze and improve efficiency, reduce emissions, and enhance overall performance.

Master Essential Concepts

As you delve into the case studies, you'll gain a deep understanding of the fundamental concepts of thermodynamics, including:

- The first law of thermodynamics: Energy cannot be created or destroyed, only transferred or transformed.
- The second law of thermodynamics: Entropy always increases in an isolated system.
- Thermodynamic properties: Enthalpy, entropy, and specific heat, and their role in energy exchange.
- Thermodynamic cycles: Power cycles, refrigeration cycles, and heat pump cycles, and their applications.

Develop Problem-Solving Skills

Beyond theoretical knowledge, our book empowers you with exceptional problem-solving skills. Each case study presents a distinct challenge, requiring you to apply the principles of thermodynamics to find practical solutions.

Ferreer, Jesta E.
BSME '88

Refrigeration System
July 1, 2022

LEARNING ACTIVITIES Module 4

CASCADE SYSTEMS

(2) A two-stage cascade refrigeration system uses ammonia as the working substance. The evaporator is at -35°C and the high-pressure condenser is at 1519.2 kPa. The cascade condenser is a direct-control type. The refrigeration load is 90 tons. Determine (a) the mass flow rate in the high-pressure loop, (b) the power required, (c) the COP, and (d) the quantity of the fluid entering the evaporator.

Solution:

for the cascade condenser pressure,

$$P_3 = \sqrt{P_1 P_2}$$

$$P_3 = 1519.2 \text{ kPa}$$

$$P_1 = 1013 \text{ kPa} \quad -35^\circ\text{C} \rightarrow 258.47 \text{ kPa}$$

$$P_2 = \sqrt{(1519.2 \text{ kPa})(258.47 \text{ kPa})}$$

$$P_2 = 396.248 \text{ kPa}$$

$$h_1 = h_g @ -35^\circ\text{C} = 1415.20 \text{ kJ/kg}$$

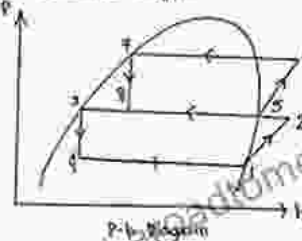
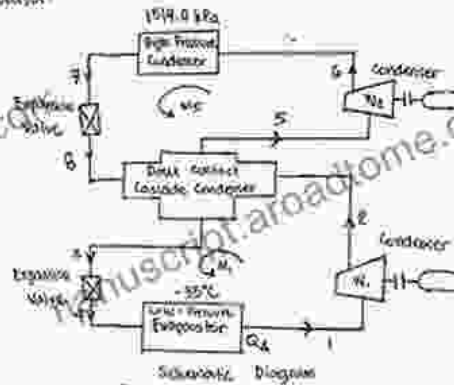
$$h_2 = 1639.365 \text{ kJ/kg}$$

$$h_3 = h_4 = h_f @ 396.248 \text{ kPa} = 107.1297 \text{ kJ/kg}$$

$$h_5 = h_g @ 396.248 \text{ kPa} = 1482.82 \text{ kJ/kg}$$

$$h_6 = 1459.194 \text{ kJ/kg}$$

$$h_7 - h_8 = h_2 @ 1519.2 \text{ kPa} = 385.664 \text{ kJ/kg}$$



Problem-Solving Example: Designing a Refrigeration System

Put your thermodynamics knowledge to the test by designing a refrigeration system that meets specific temperature and efficiency requirements.

Benefits of Our Case Study Approach

Our case study approach offers numerous advantages over traditional textbooks:

- **Real-world relevance:** Case studies provide context and make thermodynamics relatable to your future career.
- **Enhanced understanding:** By applying principles to practical scenarios, you'll develop a deeper and more intuitive grasp of thermodynamics.
- **Improved problem-solving skills:** Case studies challenge you to think critically and find solutions to real-world problems.
- **Career preparation:** The hands-on approach prepares you for the challenges you'll face as a practicing engineer.

Who Should Read This Book?

Our book is an essential resource for:

- Engineering students seeking a comprehensive and engaging text on thermodynamics.
- Practicing engineers who want to refresh their knowledge or expand their expertise.
- Anyone interested in understanding the fundamental principles of thermodynamics and its practical applications.

Free Download Your Copy Today!

Don't miss out on the opportunity to unlock the secrets of engineering thermodynamics. Free Download your copy of *Applying Engineering Thermodynamics: A Case Study Approach* today and embark on an

enlightening journey that will transform your understanding of this essential discipline.

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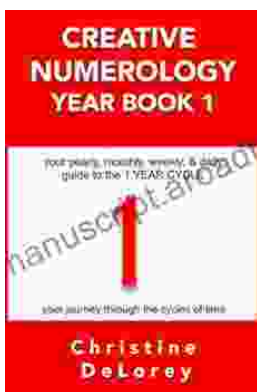
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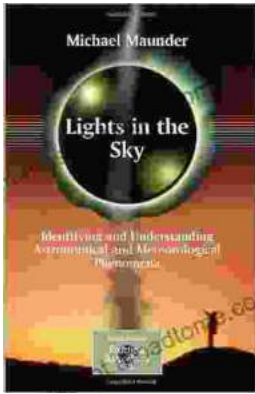
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