

# SOLVED PROBLEMS IN CHEMICAL ENGINEERING THERMODYNAMICS

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### Solved Problems in Chemical Engineering Thermodynamics

Chemical engineering thermodynamics is a branch of thermodynamics that deals with the application of thermodynamic principles to chemical processes. It is used to design and optimize chemical plants, as well as to predict the behavior of chemical systems.

**Problem 1:** A gas has a volume of 1 m<sup>3</sup> and a pressure of 1 atm. What is its volume if the pressure is increased to 2 atm?

**Answer:**

$$P_1V_1 = P_2V_2$$

$$V_2 = (P_1V_1)/P_2 = (1 \text{ atm} * 1 \text{ m}^3)/2 \text{ atm} = 0.5 \text{ m}^3$$

**Problem 2:** A liquid has a density of 1 g/cm<sup>3</sup> and a specific heat capacity of 1 J/g K. What is the heat capacity of 1 L of the liquid?

**Answer:**

$$\text{Density} = \text{mass}/\text{volume}$$

$$\text{Mass} = \text{density} * \text{volume} = 1 \text{ g/cm}^3 * 1 \text{ L} * (1000 \text{ cm}^3/\text{L}) = 1000 \text{ g}$$

$$\text{Heat capacity} = \text{mass} * \text{specific heat capacity} = 1000 \text{ g} * 1 \text{ J/g K} = 1000 \text{ J/K}$$

**Problem 3:** A gas is heated from 25°C to 100°C at a constant pressure of 1 atm. What is the change in enthalpy?

**Answer:**

$$\Delta H = C_p \Delta T = (7/2 R * T) = (7/2 * 8.314 \text{ J/mol K} * (100-25)^\circ\text{C}) = 405 \text{ J/mol}$$

**Problem 4:** A liquid is vaporized at its boiling point. What is the change in entropy?

**Answer:**

$$\Delta S = \Delta H_{\text{vap}} / T_b$$

$T_b$  = boiling point temperature

$\Delta H_{\text{vap}}$  = enthalpy of vaporization

**Problem 5:** A mixture of two gases has a total pressure of 1 atm. The partial pressure of one gas is 0.5 atm. What is the mole fraction of this gas?

**Answer:**

$$\text{Mole fraction} = \text{partial pressure of gas} / \text{total pressure} = 0.5 \text{ atm} / 1 \text{ atm}$$

## Television Production and Broadcast Journalism Workbook Answers: Uncovering the Secrets

### 1. What are the key elements of a television news story?

Answer: A television news story typically consists of a lead-in, body, and kicker. The lead-in provides a brief introduction to the story, the body expands on the details, and the kicker wraps up the story with a concluding statement or call to action.

### 2. What are the different types of camera shots used in television production?

Answer: Television production uses a variety of camera shots, including wide shots, medium shots, close-ups, and extreme close-ups. Wide shots capture a broad view of the scene, medium shots focus on specific individuals or objects, close-ups zoom in for detail, and extreme close-ups provide a highly magnified perspective.

### 3. How is sound used to enhance television storytelling?

Answer: Sound plays a crucial role in television storytelling. Ambient sound creates realism, while music underscores emotions and enhances atmosphere. Voiceovers narrate the story, while sound effects and interviews provide additional depth and context.

#### **4. What is the role of a broadcast journalist?**

Answer: Broadcast journalists gather, verify, and report news stories for television audiences. They research topics, conduct interviews, write scripts, and produce news segments. Their primary goal is to inform and engage viewers with timely and accurate information.

#### **5. What are the ethical considerations for television broadcast journalists?**

Answer: Broadcast journalists have a responsibility to uphold ethical standards, including truthfulness, fairness, objectivity, and integrity. They must ensure that their reporting is accurate, unbiased, and respectful of all individuals involved. Ethical guidelines also include avoiding conflicts of interest, protecting sources, and adhering to privacy laws. By adhering to these principles, broadcast journalists maintain public trust and credibility.

#### **The Case of Mistaken Identity: The Brixton Brothers #1 by Mac Barnett**

##### **Paragraph 1:**

- **What is the Brixton Brothers series about?**
  - The Brixton Brothers series follows the adventures of Malcolm and Marcus Brixton, two eccentric detectives who solve mysteries in their hometown of Clapham Junction, London.

##### **Paragraph 2:**

- **What is the plot of The Case of Mistaken Identity?**
  - In this first installment, Malcolm and Marcus encounter a case of mistaken identity when a local businessman is arrested for a crime he didn't commit. The brothers must use their keen detective skills to clear the businessman's name.

##### **Paragraph 3:**

- **Who are the main characters?**

- Malcolm Brixton: The older brother who is a master of disguise and deduction.
- Marcus Brixton: The younger brother who is technologically savvy and resourceful.
- Mrs. B: The Brixton brothers' wise and eccentric housekeeper.

**Paragraph 4:**

- **What makes the Brixton Brothers series unique?**

- The series combines classic detective tropes with a modern and humorous twist.
- The brothers' unique personalities and quirks add to the charm and entertainment value.
- Mac Barnett's writing style is witty, engaging, and accessible to young readers.

**Paragraph 5:**

- **What are some themes explored in The Case of Mistaken Identity?**

- The importance of justice and fair play.
- The power of perception and the dangers of assumptions.
- The value of family and teamwork.

## **Which Purses Pickpockets Love to Pick: Travel Tips**

As you embark on your travels, it's essential to be aware of the tactics employed by pickpockets. Certain types of purses are more susceptible to theft, making it crucial for you to take proactive measures to protect your belongings.

### **1. What purse styles are most targeted?**

Pickpockets often favor purses with easy-to-open zippers or flaps, allowing them to quickly grab objects without detection. Large, bulky purses can also be a magnet for thieves, as they provide ample space to conceal stolen items.

## **2. What materials are least resistant to theft?**

Soft materials like canvas, leather, or nylon are easier to tear or cut, making them vulnerable to pickpockets. Purses made from durable materials such as slash-resistant fabric or metal are less likely to be targeted.

## **3. How can I protect my purse from pickpockets?**

Consider using a crossbody bag with a wide strap that you can wear diagonally across your body. Keep your purse close to your body and avoid placing it on the ground or on the backs of chairs. Additionally, secure the contents of your purse with RFID-blocking material to prevent contactless card theft.

## **4. What should I do if my purse is stolen?**

If your purse is stolen, it's crucial to take immediate action. File a police report to document the incident and notify your bank to cancel any stolen credit or debit cards. Additionally, consider freezing your credit to prevent identity theft.

## **5. What other precautions can I take?**

Be aware of your surroundings and avoid crowded areas where pickpockets may operate. Keep your valuables in a secure location, such as a money belt or an inner pocket. Avoid carrying large amounts of cash and only take the essentials with you when leaving your hotel room.

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