SAChE Source Models (ELA965) Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- **Practice answering questions under realistic conditions,**
- **Improve accuracy and speed,**
- **Review explanations to strengthen weak areas, and**
- **Approach the exam with greater confidence.**

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here’s how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don’t just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There’s no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. How many seconds are in 2.5 hours?

A. 7200

B. 9000

C. 10800

D. 14400

2. A _____ is a thermally unstable reaction system which exhibits an uncontrolled accelerating rate of reaction leading to rapid increases in temperature and pressure.

A. Exothermic reaction

B. Runaway reaction

C. Endothermic reaction

D. Kinetic reaction

3. In a throttling release, which characteristic is typically observed?

A. Temperature remains constant

B. Large frictional losses as gas escapes

C. Pressure remains the same

D. No frictional losses

4. True or False: When liquid is released through a hole in a tank and the hole is some distance above the bottom of the tank, the velocity of the liquid released decreases as the tank empties.

A. True

B. False

C. Not enough information

D. Always decreases

5. What is a Mach (Ma) number?

A. The ratio of the gas velocity to the velocity of sound in the gas at prevailing conditions

B. The ratio of the gas velocity to the velocity of light

C. The ratio of the speed of sound to the gas velocity

D. The ratio of the gas density to the velocity of sound

6. What are other names for a chocked gas release?

A. Critical flow

B. Turbulent flow

C. Laminar flow

D. Isothermal flow

7. When considering consequences, how is low usually measured?

A. All options

B. Severity

C. Frequency

D. Duration

8. In the mechanical energy balance equation, which symbol represents fluid density?

A. Temperature

B. Fluid density

C. Pressure

D. Velocity

9. In the benzene pipeline scenario, the mass flow rate is approximately which value?

A. 0.100 kg/s

B. 0.151 kg/s

C. 0.200 kg/s

D. 0.250 kg/s

10. For a gas release, which pair correctly describes the fluid states before and after release?

A. Fluid state before release-- Two-Phase; Fluid state after release--Two-Phase (aerosol)

B. Fluid state before release-- Liquid; Fluid state after release--Two-Phase (aerosol) and Liquid (pool)

C. Fluid state before release-- GAS; Fluid state after release--Gas

D. Fluid state before release-- GAS; Fluid state after release--Liquid

Answers

1. B
2. B
3. B
4. B
5. A
6. A
7. A
8. B
9. B
10. C

Explanations

1. How many seconds are in 2.5 hours?

A. 7200

B. 9000

C. 10800

D. 14400

Converting hours to seconds. One hour is 3,600 seconds, so 2.5 hours is 2.5 × 3,600. Break it down: 3,600 × 2 = 7,200 and 3,600 × 0.5 = 1,800; add them to get 9,000 seconds. So 2.5 hours equals 9,000 seconds. The other numbers would correspond to 2 hours (7,200), 3 hours (10,800), or 4 hours (14,400).

2. A _____ is a thermally unstable reaction system which exhibits an uncontrolled accelerating rate of reaction leading to rapid increases in temperature and pressure.

A. Exothermic reaction

B. Runaway reaction

C. Endothermic reaction

D. Kinetic reaction

Runaway reaction describes a thermally unstable system where the reaction rate accelerates uncontrollably as heat is produced. Because the rate typically grows with temperature (Arrhenius behavior), if cooling is insufficient, temperature climbs, which speeds up the reaction further and releases more heat. This creates a positive feedback loop that drives rapid increases in both temperature and pressure, sometimes leading to an explosion. The other terms don't capture this unstable, self-accelerating behavior: an exothermic reaction releases heat but isn't inherently uncontrolled; an endothermic reaction consumes heat; and a kinetic reaction isn't a standard descriptor for this specific runaway phenomenon.

3. In a throttling release, which characteristic is typically observed?

A. Temperature remains constant

B. Large frictional losses as gas escapes

C. Pressure remains the same

D. No frictional losses

Throttling release is a highly irreversible flow through a restriction, where no heat enters or leaves the system and no external work is done. The energy is dissipated inside the valve or nozzle due to viscous friction and turbulence as the gas surges from high to low pressure. This internal dissipation shows up as frictional losses, which is the most characteristic feature observed in this process. Temperature behavior isn't fixed: for an ideal gas the temperature could stay nearly the same, but for real gases the Joule–Thomson effect causes the gas to cool (or, less commonly, heat) depending on the gas and initial conditions. What is reliably true is that there is a substantial pressure drop across the restriction and significant irreversibility, leading to noticeable frictional losses.

4. True or False: When liquid is released through a hole in a tank and the hole is some distance above the bottom of the tank, the velocity of the liquid released decreases as the tank empties.

A. True

B. False

C. Not enough information

D. Always decreases

The main idea here is that the speed at which liquid exits through a hole under gravity is set by the height of liquid above the hole, not by how full the tank is in general. This is Torricelli's law: v = sqrt(2 g h), where h is the vertical distance from the liquid surface to the hole. As the tank drains, the liquid surface falls, so h decreases. Because v depends on h, the exit velocity gets smaller as the tank empties, eventually approaching zero when the tank is empty. This assumes typical conditions like a small hole and negligible viscous losses.

5. What is a Mach (Ma) number?

A. The ratio of the gas velocity to the velocity of sound in the gas at prevailing conditions

B. The ratio of the gas velocity to the velocity of light

C. The ratio of the speed of sound to the gas velocity

D. The ratio of the gas density to the velocity of sound

Mach number tells you how fast the gas is moving compared with the speed of sound in that gas. It's defined as M = V / a, where V is the gas velocity and a is the local speed of sound (which depends on temperature and the gas's properties). This makes the Mach number a dimensionless measure that indicates whether the flow is subsonic, sonic, or supersonic. So the correct description is the ratio of the gas velocity to the speed of sound in the gas under the prevailing conditions. The other ideas don't match Mach number: using the speed of light isn't relevant to compressible flow in typical engineering contexts, the inverse ratio would describe 1/M rather than M, and a density-to-sound-speed ratio has no direct interpretation as Mach number.

6. What are other names for a chocked gas release?

A. Critical flow

B. Turbulent flow

C. Laminar flow

D. Isothermal flow

Choked gas release happens when gas flowing through a restriction speeds up to the speed of sound at the narrowest point, so the flow is limited by the gas's own characteristics rather than the downstream condition. This threshold condition is called critical flow (also known as sonic flow). Once choking occurs, the mass flow rate depends only on upstream pressure and the gas properties, not on how low the downstream pressure can go. The other terms describe flow regimes or temperature behavior, not the choking condition, so they don't capture why the release is capped by the sonic limit.

7. When considering consequences, how is low usually measured?

A. All options

B. Severity

C. Frequency

D. Duration

Evaluating consequences requires looking at multiple dimensions: severity, frequency, and duration. A low consequence is typically characterized by small impact (low severity), rare occurrence (low frequency), and brief effects (short duration). Because any one dimension being high can raise the overall impact, describing a low consequence usually involves all three being low. That's why the option that combines severity, frequency, and duration best fits the idea of a low consequence.

8. In the mechanical energy balance equation, which symbol represents fluid density?

A. Temperature

B. Fluid density

C. Pressure

D. Velocity

In the mechanical energy balance, the symbol for fluid density is the Greek letter rho, representing mass per unit volume. This property is essential because energy terms in the balance are tied to mass and volume relationships. Density lets you convert volumetric flow rate to mass flow rate via the relation mass flow = density × volumetric flow rate, and it appears in energy expressions per unit volume, such as kinetic energy per volume (½ ρ v^2) and potential energy per volume (ρ g h). The other options describe different properties—temperature relates to thermal energy, pressure is a force per area, and velocity is the fluid's speed—so none of them denote density.

9. In the benzene pipeline scenario, the mass flow rate is approximately which value?

A. 0.100 kg/s

B. 0.151 kg/s

C. 0.200 kg/s

D. 0.250 kg/s

Mass flow rate is found by multiplying the liquid's density by the volumetric flow rate in the pipe (m_dot = ρ × Q). For benzene near room temperature, the density is about 880 kg/m^3. The problem ties the flow to the pipe's size and velocity, so the volumetric rate is Q = A × v. Using the given pipe geometry and flow velocity yields a volumetric flow rate around 1.72×10^-4 m^3/s. Multiplying by the density gives m_dot ≈ 0.151 kg/s, which matches the expected answer. Any other option would imply a different volumetric flow rate for benzene (or a different density), which isn't consistent with the scenario's data.

10. For a gas release, which pair correctly describes the fluid states before and after release?

A. Fluid state before release-- Two-Phase; Fluid state after release--Two-Phase (aerosol)

B. Fluid state before release-- Liquid; Fluid state after release--Two-Phase (aerosol) and Liquid (pool)

C. Fluid state before release-- GAS; Fluid state after release--Gas

D. Fluid state before release-- GAS; Fluid state after release--Liquid

When a release involves a gas, the substance is in the gaseous phase both before and after it escapes, unless special conditions cause it to condense or form droplets. In this scenario, the material inside the vessel is a gas, and once released into the surrounding air it remains a gas as it disperses. So the correct description is: fluid state before release is GAS, and fluid state after release is GAS. The other pairings imply phase changes or formation of liquids or aerosols, which would require cooling, condensation, or atomization—conditions not specified here.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://sacheela965.examzify.com

We wish you the very best on your exam journey. You've got this!