SAChE Atmospheric Dispersion (ELA967) Module 2 Practice Test (Sample)

Study Guide

BY EXAMZIFY

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. **In Briggs' rural parameterization for passive plume dispersion, the surface roughness is approximately:**
   - **A. 1 cm**
   - **B. 3 cm**
   - **C. 5 cm**
   - **D. 10 cm**

2. **Passive dispersion coefficients are typically not provided for distances:**
   - **A. Less than 10 meters**
   - **B. 10 meters or more**
   - **C. Exactly 10 meters**
   - **D. All distances**

3. **True or False: The lowest wind speed that can typically be measured with a modern cup anemometer is 0.5 m/s (1.6 ft/s).**
   - **A. True**
   - **B. False**
   - **C. Not sure**
   - **D. Cannot determine**

4. **What is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing irreversible or serious health effects?**
   - **A. ERPG-1**
   - **B. ERPG-2**
   - **C. ERPG-3**
   - **D. IDLH**

5. **Which action would improve the accuracy of puff predictions?**
   - **A. Using a fixed stability class regardless of conditions**
   - **B. Specifying an appropriate stability class**
   - **C. Ignoring stability altogether**
   - **D. Increasing release height only**

6. **The predicted values of sigma_y and sigma_z for puff models are sensitive to the specification of atmospheric stability class.**

   A. True

   B. False

   C. Depends on wind speed

   D. Only for high wind speeds

7. **The ALOHA hazard modeling program can accommodate which hazardous gas cloud sources?**

   A. A single gas cloud source

   B. A gas cloud source with multiple releases

   C. A complex gas cloud with variable release rates

   D. All of the above

8. **The Pasquill-Gifford model is used for which type of atmospheric scenarios?**

   A. Passive COTAs

   B. Dense gas releases

   C. Turbulent jet emissions

   D. Fire smoke plumes

9. **In the atmosphere, if the mean wind direction is constant, the wind direction must be zero.**

   A. True

   B. False

   C. Not necessarily

   D. Depends on stability

10. **ERPG-2 is defined as the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms.**

    A. ERPG-1

    B. ERPG-2

    C. ERPG-3

    D. IDLH

Answers

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

Explanations

1. In Briggs' rural parameterization for passive plume dispersion, the surface roughness is approximately:

A. 1 cm

B. 3 cm

C. 5 cm

D. 10 cm

Surface roughness length is a parameter that describes how rough the ground is to moving air, setting the near-surface wind profile and the intensity of mechanical turbulence that controls how a plume mixes close to the ground. In Briggs' rural parameterization for passive plume dispersion, a modest, typical rural surface is represented by a roughness length around 0.03 meters, i.e., about 3 centimeters. This value reflects surfaces like short grass or bare soil and provides a realistic level of turbulence just above the ground, producing plume spreading that matches rural observations. If the roughness were much smaller, the surface would be smoother (like smooth soil or paved areas), and mixing near the ground would be weaker than typical rural conditions. If it were much larger, the surface would be rougher (taller vegetation or rough crops), leading to stronger near-ground mixing and greater dispersion than is average for a rural site. Hence, 3 centimeters is the standard representative rural roughness used in this parameterization.

2. Passive dispersion coefficients are typically not provided for distances:

A. Less than 10 meters

B. 10 meters or more

C. Exactly 10 meters

D. All distances

Passive dispersion coefficients describe how quickly the air near the release spreads under a simple, near-field diffusion assumption. That view works only for a short distance from the source, where turbulence is relatively uniform and advection hasn't yet shaped the plume. As you move to distances of about ten meters or more, the plume's spread is increasingly controlled by wind transport, changing atmospheric stability, and obstacles, so a single fixed passive coefficient no longer represents the spreading reliably. Because of that, these coefficients are not provided for longer distances; you instead use distance-dependent dispersion parameters or standard sigma_y and sigma_z formulations that account for how dispersion changes with downwind distance. So the statement that they're not provided for distances 10 meters or more reflects the shift from a simple near-field coefficient to more complex, distance-aware dispersion descriptions.

3. True or False: The lowest wind speed that can typically be measured with a modern cup anemometer is 0.5 m/s (1.6 ft/s).

A. True

B. False

C. Not sure

D. Cannot determine

Start-up threshold for a cup anemometer is the key concept here. Because the rotor must overcome static friction and bearing inertia, there is a minimum wind speed at which it will begin to rotate and produce a measurable signal. In many modern cup anemometers, this cut-in or minimum usable wind speed is around 0.5 m/s (about 1.6 ft/s). Below this, the rotor tends to stall or produce readings overwhelmed by noise, so reliable, usable measurements aren't obtained. While some highly sensitive setups can operate a bit lower, 0.5 m/s is a common practical lower limit for typical devices, making the statement true.

4. What is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing irreversible or serious health effects?

A. ERPG-1

B. ERPG-2

C. ERPG-3

D. IDLH

This question tests the ERPG concept, which sets exposure thresholds for a chemical release over one hour. ERPG-1 is the level where almost everyone could be exposed without any symptoms. ERPG-2 is the level below which most people could be exposed for up to an hour without experiencing irreversible or serious health effects or symptoms that could impair their ability to take protective actions. ERPG-3 denotes conditions that could cause life-threatening effects, and IDLH means Immediately Dangerous to Life or Health. The scenario specifically asks for the concentration below which almost everyone could be exposed for one hour without irreversible or serious health effects, which corresponds to ERPG-2.

5. **Which action would improve the accuracy of puff predictions?**

   A. **Using a fixed stability class regardless of conditions**

   B. **Specifying an appropriate stability class**

   C. **Ignoring stability altogether**

   D. **Increasing release height only**

The key factor here is how atmospheric stability controls turbulence and mixing, which governs how a puff spreads and dilutes as it travels downwind. The dispersion of a puff in models depends on stability-class-dependent dispersion parameters that set how quickly the puff grows in the horizontal and vertical directions. When you specify an appropriate stability class that matches the actual atmospheric conditions, you accurately represent the level of turbulence and mixing, leading to more reliable predictions of puff size, shape, and concentrations. If you use a fixed stability class no matter what conditions are present, you'll misrepresent the real turbulence—sometimes predicting too much mixing and other times too little. Ignoring stability altogether is even more unreliable, effectively assuming a constant, often incorrect, turbulence level. Simply increasing the release height changes dilution somewhat, but it doesn't fix errors from mischaracterizing how the atmosphere is mixing the puff. So choosing the correct stability class that reflects current conditions directly improves the accuracy of puff predictions.

6. **The predicted values of sigma_y and sigma_z for puff models are sensitive to the specification of atmospheric stability class.**

   A. **True**

   B. **False**

   C. **Depends on wind speed**

   D. **Only for high wind speeds**

In puff models, how a plume spreads sideways and vertically is governed by turbulence in the atmosphere, which is quantified by sigma_y and sigma_z. The atmospheric stability class tells you how intense that turbulence is: stable conditions suppress mixing and lead to smaller sigma values, while unstable conditions enhance mixing and produce larger sigma values. Since sigma_y and sigma_z are essentially measures of how far the puff widens in the horizontal and vertical directions over time, their growth depends on the diffusivity governed by the stability of the air. If you change the stability specification, you change the diffusivity and thus the predicted sigma values for the same source, wind, and time. Wind speed does affect how far the plume travels, but the question focuses on the spread parameters themselves. The need to specify stability arises at any wind speed, not only at high speeds, so the statement isn't conditional on wind speed.

7. The ALOHA hazard modeling program can accommodate which hazardous gas cloud sources?

A. A single gas cloud source

B. A gas cloud source with multiple releases

C. A complex gas cloud with variable release rates

D. All of the above

ALOHA is built to evaluate hazards from accidental gas releases and can handle a range of source configurations. It can model a single release from one source, but it also accommodates more complex scenarios by allowing multiple releases from different sources and by letting the release rate vary over time. This means you can simulate a gas cloud that starts from a single source, scenarios with several releases occurring (or occurring in sequence), and clouds formed from time-varying or irregular release rates, which create more realistic, dynamic hazard footprints. Because it supports all these cases, the program can accommodate a single source, multiple releases, and a complex cloud with variable release rates.

8. The Pasquill-Gifford model is used for which type of atmospheric scenarios?

A. Passive COTAs

B. Dense gas releases

C. Turbulent jet emissions

D. Fire smoke plumes

The main idea is a Gaussian plume approach to atmospheric dispersion for a steady, continuous release of a non-buoyant, passive tracer. This model treats the released substance as something carried by the wind and diffused by atmospheric turbulence, with the concentration field downwind described by a symmetric Gaussian in both the horizontal and vertical directions. It relies on stability categories to set how quickly the plume spreads (the horizontal and vertical dispersion parameters) and assumes no significant buoyancy, no density-driven effects, and a relatively flat, unobstructed terrain. In this sense it's best suited for passive tracers that don't alter the flow and aren't strongly influenced by gravity differences. That's why the appropriate scenario is a passive tracer release. Dense gas releases, fire smoke plumes, and jet emissions all involve buoyancy, density contrasts, or momentum effects that the Pasquill-Gifford model doesn't capture, so those cases require different modeling approaches.

9. **In the atmosphere, if the mean wind direction is constant, the wind direction must be zero.**

   A. True

   B. False

   C. Not necessarily

   D. Depends on stability

The key idea is that the mean wind direction is about where the air is coming from on average, not about forcing the wind to be zero. If the mean direction stays constant, the flow has a preferred origin, but that origin could be any compass direction, not necessarily north (zero degrees). The wind can still vary from moment to moment due to turbulence, gusts, and local effects, so the instantaneous direction is rarely fixed exactly at zero even when the average direction is constant. So the statement is not correct. (Note: stability or other factors don't force the mean direction to be zero; the situation is simply that a constant mean direction does not imply a zero wind direction.)

10. **ERPG-2 is defined as the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms.**

   A. ERPG-1

   B. ERPG-2

   C. ERPG-3

   D. IDLH

The question tests understanding of ERPG-2, one of the three ERPG levels used in hazard assessments. ERPG-2 is defined as the maximum airborne concentration for which nearly all individuals could be exposed for up to one hour without experiencing irreversible or other serious health effects or symptoms. In other words, it marks the exposure level where severe, but not immediate life-threatening, health effects could be avoided for the majority of people over that 1-hour period. That's why this option fits exactly: it captures the second tier's emphasis on potential irreversible or serious health effects within a 1-hour exposure window. ERPG-1 corresponds to mild or reversible effects, ERPG-3 to life-threatening health effects, and IDLH stands for Immediately Dangerous to Life or Health, indicating a level so dangerous that escape without life-threatening harm is not reliably possible.

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://sacheela967module2.examzify.com

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