NWCG Introduction to Wildland Fire Behavior Calculations (S-390) 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. **Unstable Lapse Rate is defined as a lapse rate greater than how many degrees?**

   A. Greater than 5.5 degrees

   B. Less than 5.5 degrees

   C. Exactly 5.5 degrees

   D. Depends on humidity

2. **Rothermel's model states that extreme fire behavior is not predicted.**

   A. True

   B. False

   C. Indeterminable

   D. Irrelevant

3. **Which statement best describes an unstable atmosphere?**

   A. Vertical motion is enhanced

   B. Vertical motion is restricted

   C. Humidity is high only

   D. Wind is calm

4. **Rank the time lag classes from fastest to slowest to reach equilibrium moisture content.**

   A. 1 hr fuels < 10 hr fuels < 100 hr fuels < 1000 hr fuels

   B. 10 hr fuels < 1 hr fuels < 1000 hr fuels < 100 hr

   C. 1000 hr fuels < 100 hr fuels < 10 hr fuels < 1 hr

   D. 1 hr fuels < 1000 hr fuels < 10 hr fuels < 100 hr

5. **Which visual indicator is used to update the forecast when high winds are aloft?**

   A. Lenticular

   B. Cumulus

   C. Cirrus

   D. Altocumulus

6. How many feet are in one mile?

- **A. 5,280 ft**
- **B. 4,840 ft**
- **C. 5,000 ft**
- **D. 6,000 ft**

7. Wind measures what in an atmosphere?

- **A. Lateral movement within an atmosphere**
- **B. Vertical movement**
- **C. Humidity changes**
- **D. Temperature changes**

8. Which of the following is a visual indicator of unstable conditions?

- **A. Taller smoke column**
- **B. Steady winds**
- **C. Stratus type clouds**
- **D. Poor visibility**

9. Which of the following is NOT an input for a fuel model?

- **A. Fuel loading**
- **B. Fuel moisture content**
- **C. Wind speed**
- **D. Bulk density**

10. Which statement about herbaceous moisture is correct?

- **A. It refers to the live portions of a plant**
- **B. It refers to dead plant matter**
- **C. It refers to soil moisture**
- **D. It is not related to moisture stress**

Answers

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

Explanations

1. Unstable Lapse Rate is defined as a lapse rate greater than how many degrees?

A. Greater than 5.5 degrees

B. Less than 5.5 degrees

C. Exactly 5.5 degrees

D. Depends on humidity

Understanding atmospheric stability starts with how temperature changes with height—the lapse rate. If the air cools with height more rapidly than the surrounding air, rising parcels stay warmer than their surroundings and keep rising, creating instability. The threshold used here is about the dry adiabatic lapse rate, which is roughly 5.5°F per 1,000 feet. So, an unstable lapse rate is defined as a lapse rate greater than 5.5°F per 1,000 ft. That's why the correct choice is the one indicating "greater than 5.5 degrees." The other options don't fit because stability is not described by being less than, exactly equal to, or dependent on humidity in this context; exceeding the 5.5°F per 1,000 ft threshold signals instability that affects convection and fire behavior.

2. Rothermel's model states that extreme fire behavior is not predicted.

A. True

B. False

C. Indeterminable

D. Irrelevant

Rothermel's model is a steady-state, semi-empirical approach for predicting surface-fire spread in uniform fuels. It calculates the rate of spread and related fire characteristics based on fuel properties, wind, slope, and moisture under constant conditions. Because it's built to describe typical surface-fire behavior and does not incorporate dynamic feedbacks or processes that cause extreme events (such as rapid accelerations, crown-fire transitions, spotting, or wind-driven blowups), it does not predict those extreme behaviors. So the statement is true: extreme fire behavior is not predicted by Rothermel's model.

3. Which statement best describes an unstable atmosphere?

A. Vertical motion is enhanced

B. Vertical motion is restricted

C. Humidity is high only

D. Wind is calm

In an unstable atmosphere, vertical motion is enhanced because a rising air parcel stays buoyant and continues to rise. When a parcel is displaced upward, if it remains warmer (less dense) than its surroundings, it will keep accelerating upward rather than stopping or sinking back. This leads to stronger convection and more vigorous vertical mixing, which is exactly what "unstable" describes. That's why the best statement is that vertical motion is enhanced. The other ideas don't capture stability: high humidity alone doesn't determine whether air is unstable, and calm winds don't define stability. Vertical motion being restricted describes a stable atmosphere, where air tends to resist upward movement.

4. Rank the time lag classes from fastest to slowest to reach equilibrium moisture content.

A. 1 hr fuels < 10 hr fuels < 100 hr fuels < 1000 hr fuels

B. 10 hr fuels < 1 hr fuels < 1000 hr fuels < 100 hr

C. 1000 hr fuels < 100 hr fuels < 10 hr fuels < 1 hr

D. 1 hr fuels < 1000 hr fuels < 10 hr fuels < 100 hr

The idea being tested is how quickly different fuel sizes respond to changes in ambient moisture, reaching equilibrium moisture content (EMC). Smaller fuels reach EMC much faster because they have a high surface-area-to-volume ratio and less mass, so moisture moves in and out quickly. 1-hour fuels, like grasses and other fine fuels, respond fastest to moisture changes. Next are 10-hour fuels (small twigs), which take longer to equilibrate. Then come 100-hour fuels (larger twigs and small branches), which take even longer. The largest, 1000-hour fuels (large logs), are slowest to reach EMC due to their greater mass and slower internal moisture diffusion. So the ranking from fastest to slowest to reach EMC is 1-hour fuels, then 10-hour fuels, then 100-hour fuels, and finally 1000-hour fuels.

5. Which visual indicator is used to update the forecast when high winds are aloft?

A. Lenticular

B. Cumulus

C. Cirrus

D. Altocumulus

Lenticular clouds are the visual cue that signals high winds aloft. They form when moist air is forced to rise over mountains and then settles into smooth, lens-shaped waves on the leeward side. Their well-defined, stacked appearance indicates strong, gusty winds at upper levels and possible rotor winds near ridges, so spotting them prompts updating the forecast to reflect those higher winds aloft. Cumulus clouds point to surface heating and convection rather than a direct aloft wind signal; cirrus clouds show high-altitude moisture and approaching weather but don't specifically indicate wind strength aloft; altocumulus suggests mid-level cloudiness and potential instability, not a definitive wind cue.

6. How many feet are in one mile?

A. 5,280 ft

B. 4,840 ft

C. 5,000 ft

D. 6,000 ft

Think of the conversion from miles to feet in two steps: there are 1,760 yards in a mile, and each yard has 3 feet. Multiplying 1,760 by 3 gives 5,280 feet in a mile. That makes 5,280 ft the exact distance. The other options are just rounded or too small/large to represent a mile precisely.

7. Wind measures what in an atmosphere?

A. Lateral movement within an atmosphere

B. Vertical movement

C. Humidity changes

D. Temperature changes

Wind is the horizontal movement of air across the surface. It describes how air travels sideways from one area to another, which is why measuring wind tells you about lateral transport that affects things like fire spread and ember transport. Vertical movement—updrafts and downdrafts—drives convection and cloud formation, but that's not what wind itself is. Humidity changes and temperature changes describe the air's state, not its motion, though they can influence wind patterns.

8. Which of the following is a visual indicator of unstable conditions?

A. Taller smoke column

B. Steady winds

C. Stratus type clouds

D. Poor visibility

Unstable atmospheric conditions create strong convection, with hot air rising rapidly and carrying smoke high into the air. That vigorous vertical motion shows up visually as a tall, towering smoke column, making it the clearest visual cue of instability. The other indicators don't specifically reflect vertical convection: steady winds indicate horizontal transport rather than buoyant updrafts; stratus-type clouds form in more stable, layered conditions; and poor visibility can result from many factors and doesn't alone signal instability. So a taller smoke column directly demonstrates the enhanced vertical mixing and updrafts characteristic of instability.

9. Which of the following is NOT an input for a fuel model?

A. Fuel loading

B. Fuel moisture content

C. Wind speed

D. Bulk density

Fuel models are built from properties that describe the fuel itself, not the surrounding weather. They rely on how much fuel is present and how it behaves when heat is applied. The key inputs are fuel loading (how much fuel there is per area), fuel moisture content (how wet or dry the fuel is, which affects ignition and burn rate), and bulk density (how densely packed the fuel bed is, influencing heat transfer and consumption). Wind speed, while crucial for overall fire behavior, is an environmental condition used in the broader fire behavior calculations rather than a property of the fuel model. It affects how quickly a fire spreads and how intense it becomes, but it isn't a characteristic used to define the fuel model itself.

10. Which statement about herbaceous moisture is correct?

A. It refers to the live portions of a plant

B. It refers to dead plant matter

C. It refers to soil moisture

D. It is not related to moisture stress

Herbaceous moisture refers to the water content in living, non-woody plant tissues—the live portions of grasses and other herbaceous plants. This moisture status directly affects how easily these live fuels ignite and sustain combustion; when they're wet, they resist ignition, and when they're dry, they contribute to faster spread and more intense flame. It's a live-fuel property, distinct from dead plant matter (dead fuel moisture) and from soil moisture, which is water in the soil rather than in living tissue. Because living herbaceous tissues respond quickly to weather, their moisture status can change rapidly, making this measure essential for assessing moisture stress and potential fire behavior.

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://nwcgs390.examzify.com

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