

RSMTC FOUNDATIONS PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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

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- 1. What does linearity mean in a sensor/ADC context?**
- A. Output is proportional to input within a specified range
 - B. The output is always equal to input
 - C. The output is inversely proportional to input
 - D. The output is independent of input
- 2. The capacitor reactance X_c is given by $X_c = 1/(2\pi f C)$. Which statement is true about X_c as frequency increases?**
- A. X_c increases with increasing frequency
 - B. X_c decreases with increasing frequency
 - C. X_c is independent of frequency
 - D. X_c increases with the square of frequency
- 3. What is the TC for the Direct Fire Kill Chain?**
- A. TC 3-20.31-041
 - B. TC 3-20.31-040
 - C. TC 3-20.31-040A
 - D. TC 3-20.30-040
- 4. Compute the magnitude of Γ for $Z_0 = 50 \Omega$ and $Z_L = 25 + j40 \Omega$.**
- A. $|\Gamma| \approx 0.40$
 - B. $|\Gamma| \approx 0.56$
 - C. $|\Gamma| \approx 0.75$
 - D. $|\Gamma| \approx 0.20$
- 5. Maximum Ordinate?**
- A. The maximum height above the line of sight on the projectile's path to the target.
 - B. The bottom of the ballistic arc.
 - C. The maximum height the projectile will travel above the line of sight on its path to the target.
 - D. The angle at which the projectile is fired.

6. In Overmatch components, which element most relates to the outcome of the firing solution at the target?
- A. Terminal Performance
 - B. Target Description
 - C. Engagement Range
 - D. Speed
7. What Technical Manual covers Rifle and Carbine under Ballistics and Ammunition?
- A. TC 3-22.9
 - B. TC 3-20.0
 - C. TC 3-20.40-11
 - D. TC 3-15.11
8. Which of the following expresses the Shannon-Hartley channel capacity formula in bits per second?
- A. $C = B \log_2(1 + S/N)$
 - B. $C = B \log_{10}(1 + S/N)$
 - C. $C = B \ln(1 + S/N)$
 - D. $C = B \log_2(1 + S/N)$
9. What is the outcome of a Rapid Scan?
- A. Outcome: Draw precise maps of terrain
 - B. Outcome: Conduct prolonged, detailed inspection
 - C. Outcome: Exclusively use the main optic for observation
 - D. Outcome: Select areas where you would be if you were a threat
10. What is the approximate impedance of free space?
- A. 50 Ω
 - B. 75 Ω
 - C. 300 Ω
 - D. 377 Ω

Answers

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

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Explanations

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1. What does linearity mean in a sensor/ADC context?

- A. Output is proportional to input within a specified range**
- B. The output is always equal to input
- C. The output is inversely proportional to input
- D. The output is independent of input

Linearity means the output follows a straight-line relationship with the input over the range you care about. In sensors and ADCs, this shows up as a transfer that can be described by $y = \text{gain} \times x + \text{offset}$, so the output changes at a constant rate as the input changes. If you double the input, the output should double (after accounting for gain and offset) within the specified range. The line can have an offset and a slope, but the key is a constant slope—no bending or curvature within that range. Outside the operating range, nonlinearities may creep in and the relationship stops being perfectly linear. This is why the correct idea is that the output is proportional to input within a specified range. It isn't required to be exactly equal to the input (that would be a unit gain with zero offset), it isn't inverse proportional, and it isn't independent of input.

2. The capacitor reactance X_c is given by $X_c = 1/(2\pi f C)$. Which statement is true about X_c as frequency increases?

- A. X_c increases with increasing frequency
- B. X_c decreases with increasing frequency**
- C. X_c is independent of frequency
- D. X_c increases with the square of frequency

Capacitive reactance decreases as frequency increases. The magnitude is $X_c = 1/(2\pi f C) = 1/(\omega C)$; as frequency f rises, ω grows, so X_c gets smaller. Physically, a higher frequency means the voltage changes faster, giving the capacitor less time to charge each cycle, which lowers its impedance to the AC current. At DC ($f = 0$) it would be infinite (open circuit), and at very high frequencies it tends toward zero (acting more like a short). So the statement that X_c decreases with increasing frequency is the correct description. The other possibilities would contradict the inverse relationship with frequency.

3. What is the TC for the Direct Fire Kill Chain?

- A. TC 3-20.31-041
- B. TC 3-20.31-040**
- C. TC 3-20.31-040A
- D. TC 3-20.30-040

Direct Fire Kill Chain is the rapid, sensor-to-shooter sequence used to spot, identify, track, and engage targets with direct-fire weapons. The official publication that defines this chain, its steps, and who does what is TC 3-20.31-040. It lays out the flow from finding and fixing a target, tracking it, developing the firing solution, engaging, and then assessing the effect, all within a direct-fire context. This is the best match because it specifically codifies how direct-fire assets, observers, and fire support work together to deliver a fast, coordinated kill. The other documents are related but not the standard definition of the Direct Fire Kill Chain: one is an amendment to the base publication, another is a different edition, and the remaining references a different scope within fire-support procedures.

4. Compute the magnitude of Γ for $Z_0 = 50 \Omega$ and $Z_L = 25 + j40 \Omega$.

- A. $|\Gamma| \approx 0.40$
- B. $|\Gamma| \approx 0.56$
- C. $|\Gamma| \approx 0.75$
- D. $|\Gamma| \approx 0.20$**

The quantity being tested is the magnitude of the reflection coefficient on a transmission line, which is $|\Gamma| = |Z_L - Z_0| / |Z_L + Z_0|$. With $Z_0 = 50$ and $Z_L = 25 + j40$, compute the two magnitudes: $Z_L - Z_0 = (25 - 50) + j40 = -25 + j40$, whose magnitude is $\sqrt{(-25)^2 + 40^2} = \sqrt{625 + 1600} = \sqrt{2225} \approx 47.17$. $Z_L + Z_0 = (25 + 50) + j40 = 75 + j40$, whose magnitude is $\sqrt{75^2 + 40^2} = \sqrt{5625 + 1600} = \sqrt{7225} = 85$. Thus $|\Gamma| \approx 47.17 / 85 \approx 0.554$, about 0.56. So the correct magnitude is around 0.56, not 0.20; the listed option near 0.56 is the match, indicating a possible misprint in the provided answer.

5. Maximum Ordinate?

- A. The maximum height above the line of sight on the projectile's path to the target.
- B. The bottom of the ballistic arc.
- C. The maximum height the projectile will travel above the line of sight on its path to the target.**
- D. The angle at which the projectile is fired.

Maximum ordinate is the greatest vertical separation between the projectile's flight path and the straight line from the launcher to the target. In other words, it's how far the arc rises above the line of sight as it travels toward the target. This measures clearance relative to the line of sight, not height above the ground or the launch angle. For a level target, the line of sight is horizontal, so the maximum ordinate is simply the peak height above the launch level.

6. In Overmatch components, which element most relates to the outcome of the firing solution at the target?

- A. Terminal Performance**
- B. Target Description
- C. Engagement Range
- D. Speed

Terminal performance is the element that most relates to the outcome of the firing solution at the target because it describes how the projectile behaves at the moment of impact. It includes velocity and energy at impact, stability, deformation, penetration, and overall effect on the target. The firing solution tells you where to aim and how long the flight will take, but the actual result when the round reaches the target depends on how the projectile performs terminally. If the terminal performance isn't as expected, a hit can miss, fail to produce the desired effect, or differ from the predicted impact, even with a correct aim. The other factors shape the trajectory or input to the calculation (such as what the target is, the distance, or initial speed), but the final outcome at impact hinges on terminal performance.

7. What Technical Manual covers Rifle and Carbine under Ballistics and Ammunition?

- A. TC 3-22.9**
- B. TC 3-20.0
- C. TC 3-20.40-11
- D. TC 3-15.11

The question is testing which official reference covers rifle and carbine ballistics and ammunition as part of training. The best fit is the rifle marksmanship manual, which is the standard guide for training Soldiers to shoot accurately with rifles and carbines and includes how to handle ammunition, understand ballistic behavior, and apply that data to aiming, zeroing, and firing at different ranges and conditions. The other manuals focus on different topics or weapons and don't serve as the primary reference for rifle and carbine ballistics and ammunition.

8. Which of the following expresses the Shannon-Hartley channel capacity formula in bits per second?

- A. $C = B \log_2(1 + S/N)$
- B. $C = B \log_{10}(1 + S/N)$
- C. $C = B \ln(1 + S/N)$
- D. $C = B \log_2(1 + S/N)$**

The key idea is that a channel's maximum reliable data rate depends on both how wide the channel is and how strong the signal is relative to the noise, and the rate is measured in bits per second because the logarithm is base 2. The Shannon-Hartley formula says the capacity is $C = B \log_2(1 + S/N)$. Here B is the bandwidth in hertz, and S/N is the signal-to-noise ratio (a dimensionless quantity). The log base 2 converts the available information into bits; if you used a natural log, you'd get nats per second and would divide by $\ln 2$ to convert to bits per second. Intuitively, increasing bandwidth increases capacity roughly in proportion (doubling B doubles C when S/N stays the same), while increasing S/N yields capacity growth that tapers off (logarithmically). For a concrete feel, if you had 1 MHz of bandwidth and $S/N = 15$, then $C = 1e6 * \log_2(1+15) = 1e6 * \log_2(16) = 4$ Mbps.

9. What is the outcome of a Rapid Scan?

- A. Outcome: Draw precise maps of terrain
- B. Outcome: Conduct prolonged, detailed inspection
- C. Outcome: Exclusively use the main optic for observation
- D. Outcome: Select areas where you would be if you were a threat**

Rapid scan is about quickly surveying the surroundings to spot where a threat might position themselves. The goal is to think from the threat's perspective and identify likely vantage points, concealment spots, and lines of approach, so you can prioritize safety and respond appropriately. This focus on rapid, instinctive assessment explains why the outcome is identifying areas where you would be if you were a threat. Drawing precise terrain maps or conducting long, detailed inspections require more time and detail than a rapid scan; relying only on the main optic limits awareness and misses subtle cues in the periphery; rapid scan emphasizes fast, practical recognition of potential threat locations.

10. What is the approximate impedance of free space?

- A. 50 Ω
- B. 75 Ω
- C. 300 Ω
- D. 377 Ω**

The basic idea is that free space has an intrinsic impedance which relates the electric and magnetic fields of a plane electromagnetic wave. This impedance, called the impedance of free space, is defined as $Z_0 = \sqrt{\mu_0/\epsilon_0}$. Using $\mu_0 \approx 4\pi \times 10^{-7}$ H/m and $\epsilon_0 \approx 8.854 \times 10^{-12}$ F/m gives $Z_0 \approx \sqrt{(1.256 \times 10^{-6} / 8.854 \times 10^{-12})} \approx \sqrt{1.42 \times 10^5} \approx 377 \Omega$. In a plane wave in vacuum, the magnetic field is $E/H = Z_0$, so E and H are related by the vacuum impedance. That's why 377 Ω is the correct value. The other numbers are common for engineered transmission lines (coax, etc.), not the universal vacuum impedance.

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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://rsmtcfoundations.examzify.com>

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

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