

AMATEUR TECHNICIAN LICENSE PRACTICE TEST (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 is a beam antenna?**
 - A. An antenna built from aluminum I-beams
 - B. An omnidirectional antenna invented by Clarence Beam
 - C. An antenna that concentrates signals in one direction
 - D. An antenna that reverses the phase of received signals
- 2. Which of the following is good practice when installing ground wires on a tower for lightning protection?**
 - A. Put a drip loop in the ground connection to prevent water damage to the ground system
 - B. Make sure all ground wire bends are right angles
 - C. Ensure that connections are short and direct
 - D. All these choices are correct
- 3. When using a directional antenna, how might your station be able to communicate with a distant repeater if buildings or obstructions are blocking the direct line of sight path?**
 - A. Change from vertical to horizontal polarization
 - B. Try to find a path that reflects signals to the repeater
 - C. Try the long path
 - D. Increase the antenna SWR
- 4. What factor primarily affects antenna performance at higher frequencies?**
 - A. Length of the antenna
 - B. Ground conditions
 - C. Height above ground
 - D. Frequency of operation
- 5. How is a voltmeter connected to a component to measure applied voltage?**
 - A. In series
 - B. In parallel
 - C. In quadrature
 - D. In phase

- 6. Which of the following are inputs to a satellite tracking program?**
- A. The satellite transmitted power
 - B. The Keplerian elements
 - C. The last observed time of zero Doppler shift
 - D. All these choices are correct
- 7. What are the two components of a radio wave?**
- A. A. Impedance and reactance
 - B. B. Voltage and current
 - C. C. Electric and magnetic fields
 - D. D. Ionizing and non-ionizing radiation
- 8. In which type of circuit is voltage the same across all components?**
- A. Series
 - B. Parallel
 - C. Resonant
 - D. Branch
- 9. What happens to power lost in a feed line?**
- A. It increases the SWR
 - B. It is radiated as harmonics
 - C. It is converted into heat
 - D. It distorts the signal
- 10. What is a band plan, beyond the privileges established by the FCC?**
- A. A voluntary guideline for using different modes or activities within an amateur band
 - B. A list of operating schedules
 - C. A list of available net frequencies
 - D. A plan devised by a club to indicate frequency band usage

Answers

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

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Explanations

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1. What is a beam antenna?

- A. An antenna built from aluminum I-beams
- B. An omnidirectional antenna invented by Clarence Beam
- C. An antenna that concentrates signals in one direction**
- D. An antenna that reverses the phase of received signals

A beam antenna is an antenna designed to concentrate radio frequency signals in a specific direction, significantly enhancing its directional gain. This characteristic is particularly advantageous for long-distance communication, as it allows for stronger signal transmission and reception along its main lobe, reducing interference from signals coming from other directions. This type of antenna can take various forms, including Yagi, log-periodic, and parabolic designs, which are fundamentally constructed to focus energy into a more narrow beam rather than dispersing it evenly in all directions, as omnidirectional antennas do. The increased directionality not only improves communication range but also makes the antenna more efficient by maximizing the power delivered to a specific target area while minimizing noise and interference from unwanted signals. The other options represent misunderstandings or mischaracterizations of what a beam antenna is. An antenna built from aluminum I-beams refers to materials and construction methods but does not define how the antenna functions in terms of signal directionality. The mention of Clarence Beam introduces an incorrect historical reference, as the term "beam antenna" is not linked to any individual. Lastly, the idea of reversing the phase of received signals does not pertain to the fundamental operation of a beam antenna but relates to other types of antennas utilized for different purposes,

2. Which of the following is good practice when installing ground wires on a tower for lightning protection?

- A. Put a drip loop in the ground connection to prevent water damage to the ground system
- B. Make sure all ground wire bends are right angles
- C. Ensure that connections are short and direct**
- D. All these choices are correct

The best practice for installing ground wires on a tower for lightning protection is to ensure that connections are short and direct. This approach minimizes the resistance of the grounding system, allowing it to effectively dissipate the immense electrical energy from a lightning strike. A shorter, more direct connection reduces the inductive and resistive losses that can occur with longer or more convoluted paths, thereby enhancing the overall effectiveness of the lightning protection system. In grounding systems, the goal is to create a low-resistance path to the earth. When connections are kept short and direct, the impedance of the ground system is lowered, allowing it to work more effectively during a lightning event. This is crucial for protecting both the structure and any associated equipment from damage. Other practices mentioned, while beneficial in specific contexts, do not prioritize efficiency in the same way. For example, creating a drip loop may help in certain scenarios related to water management but does not directly improve the grounding efficiency. Opting for right-angle bends in wires can sometimes increase the resistance of the installation and complicate the current's path. Therefore, while each of these individual practices can have their merits, the most essential factor for effective lightning protection is the directness and shortness of connections.

3. When using a directional antenna, how might your station be able to communicate with a distant repeater if buildings or obstructions are blocking the direct line of sight path?

- A. Change from vertical to horizontal polarization
- B. Try to find a path that reflects signals to the repeater**
- C. Try the long path
- D. Increase the antenna SWR

When communicating using a directional antenna, overcoming obstacles such as buildings or other obstructions that block a direct line of sight to a distant repeater can often be achieved through signal reflection. Reflected signals can reach your antenna even if the direct path is not accessible due to physical barriers. By positioning the antenna or adjusting the angle of transmission, the signal may bounce off adjacent structures or natural features, allowing it to make its way to the repeater. This technique is particularly valuable in urban environments where direct communication paths are frequently obstructed. The effectiveness of this approach can depend on the specific characteristics of the surroundings; certain surfaces reflect signals better than others, which means experimentation may be necessary to find the best reflectors in your area. Considering the other options, changing the polarization may not significantly aid in establishing communication in this situation, as the physical barrier remains. Trying the long path could be a feasible strategy, but it may not guarantee a successful connection due to distance and other factors. Increasing the antenna's standing wave ratio (SWR) does not enhance communication capability and could negatively impact performance, as it's an indicator of mismatched impedance and could lead to signal loss rather than improved transmission.

4. What factor primarily affects antenna performance at higher frequencies?

- A. Length of the antenna
- B. Ground conditions
- C. Height above ground
- D. Frequency of operation**

The factor that primarily affects antenna performance at higher frequencies is the frequency of operation. As the frequency increases, the current distribution along the antenna elements changes significantly, which in turn impacts the antenna's impedance, radiation patterns, and overall efficiency. At higher frequencies, antennas generally need to be designed and constructed with precise dimensions that match the wavelength of the signal being transmitted or received. This is because antennas operate most effectively when they are tuned to specific frequencies, which are often related to the antenna's physical length. Additionally, the performance characteristics of antennas—such as gain, directivity, and bandwidth—are heavily influenced by the frequency of operation. While factors such as antenna length, ground conditions, and height above ground play roles in how an antenna performs, their influence is often secondary to how well the antenna is matched to the desired frequency of operation. At higher frequencies, even small changes in antenna design or location can yield more pronounced effects on performance compared to lower frequencies, reinforcing the central importance of frequency in antenna effectiveness.

5. How is a voltmeter connected to a component to measure applied voltage?

- A. In series
- B. In parallel**
- C. In quadrature
- D. In phase

A voltmeter is designed to measure the electrical potential difference, or voltage, across a component in a circuit. To achieve this accurately, the voltmeter must be connected in parallel with the component whose voltage is to be measured. By connecting it in parallel, the voltmeter can accurately capture the voltage across the component without significantly affecting the behavior of the circuit. When connected in this manner, the voltmeter provides a high resistance path to minimize the current flowing through it, thereby preventing a significant load from being placed on the circuit. This ensures that the voltage reading reflects the actual potential difference across the component without altering the circuit conditions. Connecting a voltmeter in series, for instance, would lead to incorrect readings since it would create a voltage divider effect, and other options, such as "in quadrature" or "in phase," are not applicable in this context. Thus, measuring voltage correctly requires the voltmeter to be connected in parallel to the component of interest.

6. Which of the following are inputs to a satellite tracking program?

- A. The satellite transmitted power
- B. The Keplerian elements**
- C. The last observed time of zero Doppler shift
- D. All these choices are correct

The correct answer focuses on the Keplerian elements because they are a set of orbital parameters that define the orbit of a satellite and are essential for tracking its position in space. Keplerian elements include the semi-major axis, eccentricity, inclination, longitude of the ascending node, argument of periapsis, and true anomaly. These parameters allow tracking systems to predict where a satellite will be at a given time, making them a crucial component of satellite tracking programs. In the context of the choices provided, while the transmitted power and last observed time of zero Doppler shift might be relevant in certain contexts (like determining signal strength or analyzing the satellite's orbital path), they don't specifically provide the necessary orbital information that a satellite tracking program requires to determine the satellite's position over time, which is primarily derived from Keplerian elements. Therefore, the focus on Keplerian elements as the correct input reflects the fundamental principles of orbital mechanics central to satellite tracking.

7. What are the two components of a radio wave?

- A. A. Impedance and reactance
- B. B. Voltage and current
- C. C. Electric and magnetic fields**
- D. D. Ionizing and non-ionizing radiation

Radio waves consist of two fundamental components: electric fields and magnetic fields. These components oscillate at right angles to each other and to the direction of the wave's propagation. Essentially, a radio wave can be described as a fluctuating electromagnetic field that transmits energy through space. The electric field component represents the force that charged particles would feel due to electric forces, while the magnetic field component arises from the movement of these charges. Together, they create a transverse wave that can travel through the vacuum of space as well as through certain media, allowing for the transmission of information in various communication systems, such as radio broadcasting and wireless networking. Understanding these two components is crucial when exploring how radio waves propagate and interact with the environment, which is fundamental knowledge for amateur radio operators.

8. In which type of circuit is voltage the same across all components?

- A. Series
- B. Parallel**
- C. Resonant
- D. Branch

In a parallel circuit, voltage remains the same across all components connected in parallel. This characteristic arises because each component shares the same two nodes of voltage supply, allowing them to experience the same electrical potential difference. For example, if you connect multiple light bulbs in parallel to a power source, each bulb receives the full voltage from the power supply, leading to consistent brightness across all bulbs as long as they are functioning properly. This is in contrast to series circuits, where the voltage is divided among the components, resulting in different voltage levels across each one based on their resistance values. Understanding this principle is crucial for designing circuits and predicting how they will behave under different conditions, which directly applies to many practical scenarios in electronics.

9. What happens to power lost in a feed line?

- A. It increases the SWR
- B. It is radiated as harmonics
- C. It is converted into heat**
- D. It distorts the signal

Power lost in a feed line is primarily converted into heat. This loss occurs due to the resistive elements of the cable, which dissipate energy as heat when current flows through them. As RF signals travel down the feed line, various factors such as cable resistance, dielectric losses, and skin effect contribute to this energy loss. When this energy is dissipated in the form of heat, it results in a reduction of the power available at the antenna. It's important for operators to consider this loss when designing and setting up antenna systems, as excessive power loss in the feed line can significantly impact performance. Focusing on using high-quality feed lines with low resistance and losses can help minimize these effects, ensuring that more of the transmitted power reaches the antenna for effective radiation.

10. What is a band plan, beyond the privileges established by the FCC?

- A. A voluntary guideline for using different modes or activities within an amateur band**
- B. A list of operating schedules
- C. A list of available net frequencies
- D. A plan devised by a club to indicate frequency band usage

A band plan serves as a voluntary guideline for amateur radio operators, helping to organize the use of different modes or activities within a specific amateur band. These guidelines are developed by the amateur radio community and are designed to minimize interference and enhance communication efficiency among operators. Band plans establish recommended frequencies for different modes of operation, such as voice, digital, or CW (continuous wave) transmissions, and may suggest specific frequencies for particular events or types of communication. This collective approach allows for more effective use of the available spectrum and promotes cooperation among operators who share the same frequency band. Other options focus on various aspects of operating on amateur bands but do not encapsulate the concept of a band plan as effectively. For instance, operating schedules and net frequencies are more specific and do not inherently encompass the broader objectives of coordination and voluntary best practices that a band plan represents. A plan devised by a club addresses local usage but doesn't reflect the wider collaborative nature of band plans that apply across the amateur radio community.

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://amateurtechnician.examzify.com>

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

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