

# FCC Element 6 - Radiotelegraph Operator License (T) 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

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- 1. Which of the following is a common effect of using too high a filament voltage?**
  - A. Reduced emission and adverse circuit operation**
  - B. Lengthened filament life**
  - C. Increased power output**
  - D. None of the above**
  
- 2. What does a higher input grid resistance indicate about an amplifier's operation?**
  - A. High sensitivity to modulation**
  - B. Reduced distortion in output**
  - C. Increased power output**
  - D. Efficient rectification**
  
- 3. In the context of vacuum tubes, what is commonly referred to as "load"?**
  - A. The impedance through which plate current flows**
  - B. The increase in load impedance with respect to internal plate impedance**
  - C. Both A and B**
  - D. None of the above**
  
- 4. While the vessel is in port, how frequently should the emergency equipment be tested?**
  - A. Once a day**
  - B. Once a week**
  - C. Once a month**
  - D. Only when the vessel is ready to leave port**
  
- 5. If a 500 Hz transformer is connected to a 60 Hz source of the same voltage, what consequence might occur?**
  - A. The primary would draw excessive current**
  - B. The transformer would overheat**
  - C. The primary might burn out**
  - D. All of the above**

- 6. When connecting electrolytic capacitors in series, what must be observed?**
- A. The polarity marked on the component**
  - B. There is no polarity to observe**
  - C. Connect anode to anode**
  - D. Connect cathode to cathode**
- 7. How can you determine the condition of a dry "B" battery?**
- A. By measuring the voltage under normal load**
  - B. By measuring the voltage under no load**
  - C. By observing physical damage**
  - D. All of the above**
- 8. What type of plates do Edison type batteries typically have?**
- A. Plates of zinc**
  - B. Plates of iron**
  - C. Plates of compounds of nickel and iron**
  - D. Plates of aluminum**
- 9. What is the impact of insufficient filter capacity in a power supply?**
- A. It improves regulation**
  - B. It leads to unstable voltage**
  - C. It reduces overall performance**
  - D. None of the above**
- 10. If a class B linear final R-F amplifier were in saturation and no modulation, what would happen when modulated?**
- A. The carrier frequency would override the grid-plate current and result in positive shift resulting in amplification**
  - B. The Class B linear amplifier only modulates below cut-off**
  - C. A condition of negative carrier shift would be the result**
  - D. Both A and B**

## Answers

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

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## **Explanations**

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**1. Which of the following is a common effect of using too high a filament voltage?**

- A. Reduced emission and adverse circuit operation**
- B. Lengthened filament life**
- C. Increased power output**
- D. None of the above**

Using too high a filament voltage can lead to reduced emission and adverse circuit operation. When the filament voltage exceeds the manufacturer's recommended level, it causes the filament to operate at higher temperatures than intended. This excess heat can lead to a phenomenon known as "overheating," which can damage the filament and degrade its ability to emit electrons effectively. As a result, the overall emission of electrons decreases, leading to diminished performance in the circuit. Proper emission is critical for the functionality of devices like vacuum tubes or certain types of amplifiers; decreased emissions can result in a failure to maintain the necessary gain or signal integrity, causing distortion or loss of signal clarity. Additionally, the excessive strain on the filament may lead to premature failure, necessitating more frequent replacements, which is not ideal for operational efficiency.

**2. What does a higher input grid resistance indicate about an amplifier's operation?**

- A. High sensitivity to modulation**
- B. Reduced distortion in output**
- C. Increased power output**
- D. Efficient rectification**

A higher input grid resistance in an amplifier typically indicates high sensitivity to modulation. This is because a component with higher input resistance draws less current from the previous stage of the circuit, allowing for greater signal input without significantly loading it down. Consequently, this contributes to the amplifier's ability to respond more effectively to small changes in the input signal, enhancing its sensitivity. This sensitivity is particularly important in applications where fine variations in input need to be accurately amplified, such as in radiotelegraphy and other communication systems. The design of amplifiers often strategically utilizes input grid resistance to optimize performance in these settings, making this characteristic a key aspect of their operational effectiveness. The other options may not be as inherently linked to input grid resistance. For instance, reduced distortion in output and increased power output are related to different aspects of amplifier design and operation, such as the linearity of the amplification process or overall circuit efficiency rather than input grid resistance alone. Similarly, efficient rectification involves converting AC to DC and does not directly correlate with the input characteristics of an amplifier.

- 3. In the context of vacuum tubes, what is commonly referred to as "load"?**
- A. The impedance through which plate current flows**
  - B. The increase in load impedance with respect to internal plate impedance**
  - C. Both A and B**
  - D. None of the above**

In the context of vacuum tubes, "load" refers to the impedance through which the plate current flows, as well as the relationship between the load impedance and the internal plate impedance of the tube. When discussing a vacuum tube's operation, it is crucial to understand how the plate current interacts with both the circuit elements and the tube's internal characteristics. The term "load" typically represents the external impedance that the tube drives. This impedance is essential because it affects the voltage and current that the tube can deliver to a connected circuit, ultimately influencing its performance and efficiency. The increase in load impedance with respect to internal plate impedance is also relevant. This relationship helps in optimizing the tube's operation, allowing for maximum power transfer and minimizing distortion. A higher load impedance can affect the plate current and the overall amplification capabilities of the tube. Thus, considering both the direct definition of "load" and its interplay with internal characteristics makes the answer comprehensive and correct.

- 4. While the vessel is in port, how frequently should the emergency equipment be tested?**
- A. Once a day**
  - B. Once a week**
  - C. Once a month**
  - D. Only when the vessel is ready to leave port**

Testing emergency equipment is crucial for ensuring that it is functional and ready to be deployed when needed. The correct approach is to conduct tests of the emergency equipment only when the vessel is ready to leave port. This timing is essential because it ensures that the equipment is operational and properly maintained just before it enters a potentially hazardous environment at sea, where emergencies can arise. Conducting tests at this frequency means that the equipment's operational state is confirmed right before it might be needed, aligning with safety regulations and operational standards. Regular exams and maintenance checks while in port could lead to overlooking essential checks before departure, making option D the most logical and safe choice. Other intervals, such as daily, weekly, or monthly, may imply that regular checks are less focused on the specific need for readiness at the moment of departure, potentially compromising safety during critical operations. Therefore, the tested method of checking emergency equipment right before leaving port is adequate and appropriate for maritime safety compliance.

5. If a 500 Hz transformer is connected to a 60 Hz source of the same voltage, what consequence might occur?
- A. The primary would draw excessive current
  - B. The transformer would overheat
  - C. The primary might burn out
  - D. All of the above**

When a transformer designed for a specific frequency, such as 500 Hz, is connected to a source operating at a much lower frequency of 60 Hz, several significant consequences can occur. First, due to the frequency difference, the transformer may not operate efficiently, leading to an improper magnetic flux in the core. As a result, the primary winding would draw excessive current in an attempt to compensate for the increased saturation of the core. This excessive current draw can cause the windings to heat up significantly. As the current increases, the transformer's components—especially the windings—are subjected to higher temperatures, which can lead to overheating. Continuous overheating may break down insulation materials within the transformer, compromising its integrity. Additionally, if the situation persists without any remedial action, the thermal stress could lead to a complete failure of the primary winding structure, even burning out the coil itself. This potentially catastrophic failure can result in a need for replacement or extensive repairs. Considering these points, each outcome—excessive current draw, overheating, and burnout—is interconnected. Therefore, the appropriate conclusion is that all the stated consequences could occur when a 500 Hz transformer is connected to a 60 Hz power source.

6. When connecting electrolytic capacitors in series, what must be observed?
- A. The polarity marked on the component**
  - B. There is no polarity to observe
  - C. Connect anode to anode
  - D. Connect cathode to cathode

When connecting electrolytic capacitors in series, it is crucial to observe the polarity marked on the component. Electrolytic capacitors are designed with a specific positive (anode) and negative (cathode) terminal, and connecting them in reverse polarity can result in failure of the capacitor, which may include leakage, venting, or even explosion in some cases. In series connections, while the voltages across each capacitor can add up, each capacitor must be connected in a way that the positive terminal of one is connected to the negative terminal of the next for the series to function correctly, but the individual capacitor's polarity still needs to be respected. Therefore, failing to observe the correct polarity can lead to significant issues. In summary, the requirement to maintain the correct polarity is essential to ensure the reliability and safety of the circuit when using electrolytic capacitors in series, making it a fundamental consideration during assembly.

7. How can you determine the condition of a dry "B" battery?

- A. By measuring the voltage under normal load**
- B. By measuring the voltage under no load**
- C. By observing physical damage**
- D. All of the above**

Determining the condition of a dry "B" battery is best accomplished by measuring the voltage under normal load. When a battery is under load, it provides a more accurate representation of its performance since it mimics the actual conditions in which the battery is used. If the voltage drops significantly when under load compared to its nominal voltage, this indicates that the battery may be weak or failing. Measuring the voltage under no load can show a good voltage reading, but this does not account for the internal resistance of the battery, which can provide a false impression of battery health. Observing physical damage can give some insights into the battery's condition, but it does not provide a definitive measure of its ability to perform under operational conditions. Therefore, assessing a battery under normal load reflects not only its voltage output but also its capacity to power a device effectively, making it the most reliable method for evaluating the battery's condition.

8. What type of plates do Edison type batteries typically have?

- A. Plates of zinc**
- B. Plates of iron**
- C. Plates of compounds of nickel and iron**
- D. Plates of aluminum**

Edison type batteries, also known as nickel-iron batteries, are distinguished by their use of plates made from compounds of nickel and iron. This design is notable for its durability and ability to withstand overcharging and deep discharging, which makes these batteries particularly suitable for applications that require reliable performance over a long lifespan. The use of nickel and iron in the plates allows for a chemical reaction that is highly efficient, providing a steady output of energy over time. Additionally, this combination is less prone to corrosion compared to other materials, which contributes to the longevity and robustness of the battery. While other types of batteries may use zinc, aluminum, or iron alone, the unique structure of nickel and iron plates in Edison type batteries provides specific advantages in terms of performance and durability. This specific chemistry is what makes option C the correct choice.

**9. What is the impact of insufficient filter capacity in a power supply?**

- A. It improves regulation**
- B. It leads to unstable voltage**
- C. It reduces overall performance**
- D. None of the above**

Insufficient filter capacity in a power supply can lead to unstable voltage because the filter's primary role is to smooth out the fluctuations in the voltage output. When the capacity is inadequate, it cannot effectively store and release charge to maintain a steady voltage level during periods of load changes or ripple from the rectification process. This instability can manifest as voltage spikes or dips, which can adversely affect the performance of connected devices. In the context of power supplies, stable voltage is crucial for the reliable operation of electronic circuits. If the voltage fluctuates too much, it can lead to erratic behavior, damage components, or cause systems to fail. Therefore, having proper filter capacity is essential to ensure that the power supply delivers a consistent and reliable output.

**10. If a class B linear final R-F amplifier were in saturation and no modulation, what would happen when modulated?**

- A. The carrier frequency would override the grid-plate current and result in positive shift resulting in amplification**
- B. The Class B linear amplifier only modulates below cut-off**
- C. A condition of negative carrier shift would be the result**
- D. Both A and B**

When a Class B linear final RF amplifier is in saturation and is then modulated, the expected outcome is a condition of negative carrier shift. In this scenario, saturation means that the amplifier has reached its maximum output level, and it cannot respond effectively to increases in the input signal. When modulation occurs in a saturated amplifier, it will attempt to amplify the signal variations (the modulating information) superimposed on the carrier, but since it's already at maximum output, the amplifier cannot increase output power correspondingly for the peaks of the modulating waveform. Instead, the result can lead to the compression of the amplitude of the modulated signal around the carrier frequency, which manifests as a negative shift. This means that the peaks of the modulated signal are effectively clipped, leading to distortion and a potential drop or "shift" in the average power level of the carrier signal. The other choices do not accurately describe the behavior of a Class B linear amplifier in saturation. The first option incorrectly suggests that the amplifier would enhance the output, which is not feasible in saturation. The second option misstates the operating behavior of Class B amplifiers; they can modulate above cut-off despite their linearity restrictions in saturation. Thus, the correct answer focuses on the

## 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](mailto:hello@examzify.com).**

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

**<https://fcelelement6radiotechop.examzify.com>**

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

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