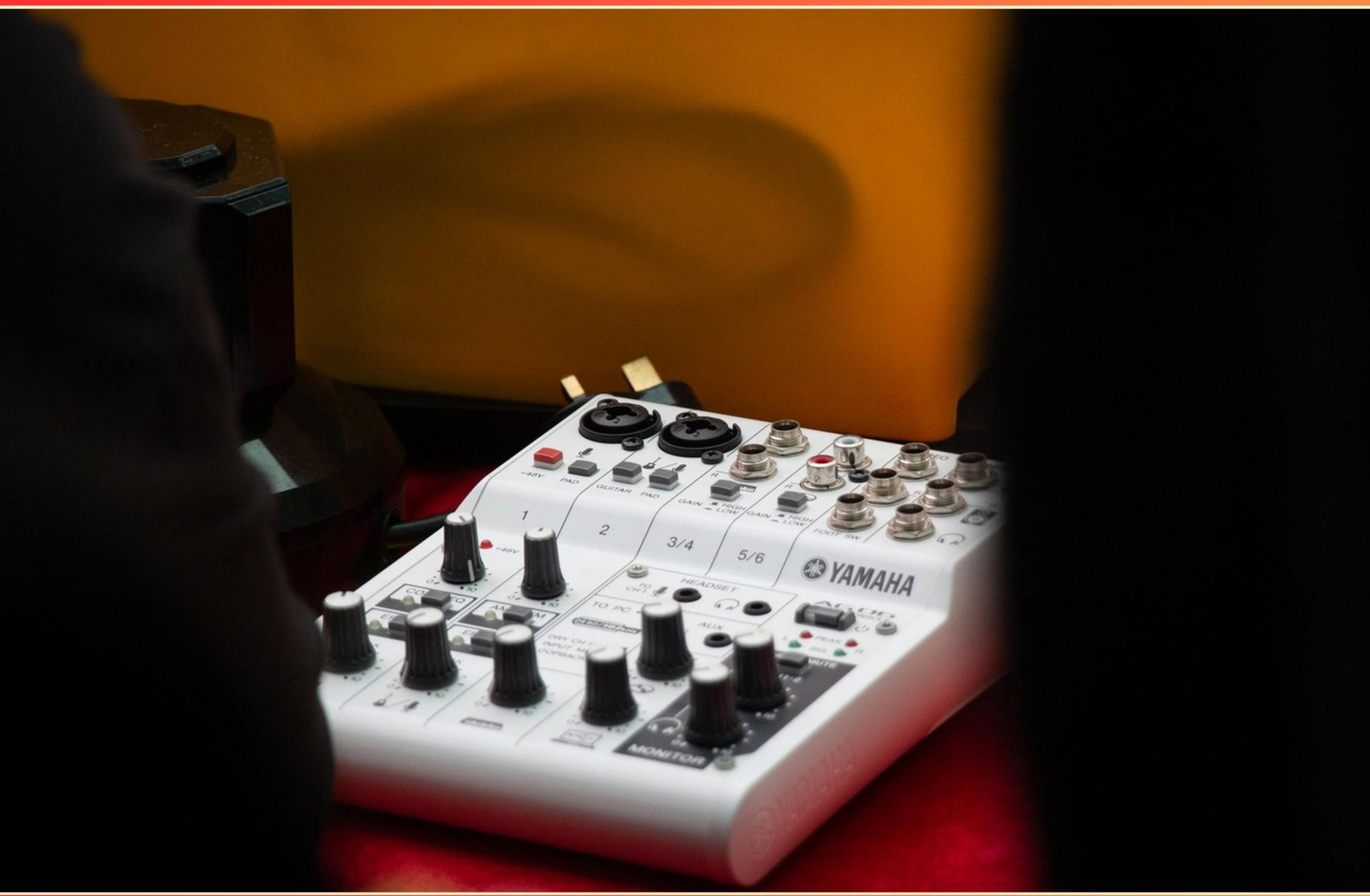
FCC GENERAL RADIOTELEPHONE OPERATOR LICENSE (GROL) ELEMENT 3 PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://fccgrolelement3.examzify.com

Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

Table of Contents

Copyright 1

Table of Contents 2

Introduction 3

How to Use This Guide 4

Questions 5

Answers 9

Explanations 11

Next Steps 16

SAMPLE

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.

SAMPLE

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!

SAMPLE

Questions

SAMPLE

1. If a carrier frequency has a second harmonic, what frequency is it?

A. 4100 kHz

B. 12300 kHz

C. 8200 kHz

D. 16400 kHz

2. What is the frequency range of the localizer beam system used by aircraft to find the centerline of a runway during an Instrument Landing System (ILS) approach to an airport?

A. 108.10 kHz to 111.95 kHz.

B. 329.15 MHz to 335.00 MHz.

C. 108.10 MHz to 111.95 MHz.

D. 329.15 kHz to 335.00 kHz.

3. Before ground testing an aircraft RADAR, the operator should:

A. Ensure that the area in front of the antenna is clear of other maintenance personnel to avoid radiation hazards.

B. Be sure the receiver has been properly shielded and grounded.

C. First test the transmitter connected to a matched load.

D. Measure power supply voltages to prevent circuit damage.

4. What is the purpose of a synchro transmitter and receiver?

A. Synchronizes the transmitted and received pulse trains

B. Prevents the receiver from operating during the period of the transmitted pulse

C. Transmits the angular position of the antenna to the indicator unit

D. Keeps the speed of the motor generator constant

5. Which term best describes the amount of work done or energy transferred when a force causes displacement?

A. Joule

B. Newton

C. Pascal

D. Coulomb

SAMPLE

6. Which statement about SITOR communications is true?

A. In the ARQ mode each character is transmitted twice.

B. Two-way communication with the coast radio station using FEC is not necessary to be able to receive the broadcasts.

C. Weather broadcasts cannot be made in FEC because sending each character twice would be prohibitively long.

D. Communication is established on the working channel and answerbacks are exchanged before FEC broadcasts can be received.

7. What is one way that voice is transmitted in a pulse-width modulation system?

A. A standard pulse is varied in amplitude by an amount depending on the voice waveform at that instant.

B. The position of a standard pulse is varied by an amount depending on the voice waveform at that instant.

C. A standard pulse is varied in duration by an amount depending on the voice waveform at that instant.

D. The number of standard pulses per second varies depending on the voice waveform at that instant.

8. In AC circuits, which statement correctly describes RMS value?

A. The square root of the average of the instantaneous values

B. The average value of the absolute value

C. The peak value

D. The average value

9. In mixer operation, which term describes the response where an unwanted signal at the image frequency also produces the same IF?

A. Local oscillator leakage

B. Intermodulation

C. Image response

D. Carrier suppression

SAMPLE

10. A string of 12 NiCd cells connected in series produces approximately how many volts?

A. 12 volts.

B. 12.6 volts.

C. 15 volts.

D. 72 volts.

SAMPLE

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. If a carrier frequency has a second harmonic, what frequency is it?

A. 4100 kHz

B. 12300 kHz

C. 8200 kHz

D. 16400 kHz

Harmonics are integer multiples of a carrier frequency, and the second harmonic is twice the fundamental frequency. If the carrier is 4100 kHz, its second harmonic is 2 × 4100 = 8200 kHz. The other options represent the fundamental (4100 kHz), the third harmonic (3 × 4100 = 12300 kHz), and the fourth harmonic (4 × 4100 = 16400 kHz). So 8200 kHz is the second harmonic.

2. What is the frequency range of the localizer beam system used by aircraft to find the centerline of a runway during an Instrument Landing System (ILS) approach to an airport?

A. 108.10 kHz to 111.95 kHz.

B. 329.15 MHz to 335.00 MHz.

C. 108.10 MHz to 111.95 MHz.

D. 329.15 kHz to 335.00 kHz.

The localizer, which provides horizontal guidance to align with the runway centerline, operates in the VHF aviation band from 108.10 to 111.95 MHz. This range is allocated specifically for the ILS localizer signals. The glide slope, which gives vertical guidance, uses a separate band around 329.15 to 335.00 MHz, so that range is not for the localizer. Also, the localizer frequencies are in MHz, not kHz, so the 108.10 to 111.95 MHz range is the correct one.

3. Before ground testing an aircraft RADAR, the operator should:

A. Ensure that the area in front of the antenna is clear of other maintenance personnel to avoid radiation hazards.

B. Be sure the receiver has been properly shielded and grounded.

C. First test the transmitter connected to a matched load.

D. Measure power supply voltages to prevent circuit damage.

High-power radar beams can cause serious radiation exposure, so the very first safety step before ground testing is to ensure that the area in front of the antenna is clear of any personnel. Keeping the path of the main beam unobstructed and away from people prevents accidental exposure if the transmitter is energized or if the antenna sweeps or moves during tests. This is the priority because it directly mitigates a potentially dangerous RF hazard. While shielding and grounding the receiver, testing the transmitter with a matched load, and checking power supply voltages are important parts of safe operation and reliable testing, they do not address the immediate safety risk of radiant exposure to people in the antenna's front path.

SAMPLE

4. What is the purpose of a synchro transmitter and receiver?

A. Synchronizes the transmitted and received pulse trains

B. Prevents the receiver from operating during the period of the transmitted pulse

C. Transmits the angular position of the antenna to the indicator unit

D. Keeps the speed of the motor generator constant

Synchro systems are used to send angular position as an electrical signal. The transmitter is connected to the part whose angle you want to know (such as an antenna). As the shaft turns, it creates three-phase voltages whose relative phases encode the angle. The receiver picks up those voltages and drives an indicator so you see the antenna's position remotely. This is why the purpose is to transmit the angular position of the antenna to the indicator unit. It's not about timing pulses, preventing operation, or controlling motor speed.

5. Which term best describes the amount of work done or energy transferred when a force causes displacement?

A. Joule

B. Newton

C. Pascal

D. Coulomb

Work is the amount of energy transferred when a force moves an object through a distance. The unit for this energy transfer is the joule, defined as the work done by a one-newton force acting over one meter of displacement (1 J = 1 N·m). In other words, when a force causes displacement in the direction of the force, the energy transferred is measured in joules. The other units represent different quantities: a newton measures force, a pascal measures pressure, and a coulomb measures electric charge. If the force isn't aligned with the displacement, you use W = F d cos(theta), but when the force is along the path, it simplifies to W = F d.

6. Which statement about SITOR communications is true?

A. In the ARQ mode each character is transmitted twice.

B. Two-way communication with the coast radio station using FEC is not necessary to be able to receive the broadcasts.

C. Weather broadcasts cannot be made in FEC because sending each character twice would be prohibitively long.

D. Communication is established on the working channel and answerbacks are exchanged before FEC broadcasts can be received.

SITOR uses two modes: ARQ, which is two-way with possible retransmission, and FEC, which is a one-way broadcast with error correction built in. In FEC, the transmitter adds redundancy that lets the receiver correct many errors without asking for data to be resent. Because of that redundancy, you don't need a return link or any answerbacks to receive the broadcasts. Two-way communication is not required for FEC broadcasts to be received. The other statements mix up how the modes work: ARQ isn't defined by duplicating every character, weather broadcasts can be sent with FEC, and you don't have to establish a working channel or exchange answerbacks before receiving FEC transmissions.

SAMPLE

7. What is one way that voice is transmitted in a pulse-width modulation system?

A. A standard pulse is varied in amplitude by an amount depending on the voice waveform at that instant.

B. The position of a standard pulse is varied by an amount depending on the voice waveform at that instant.

C. A standard pulse is varied in duration by an amount depending on the voice waveform at that instant.

D. The number of standard pulses per second varies depending on the voice waveform at that instant.

In pulse-width modulation, the information is carried by how long each pulse stays high within a fixed cycle, not by changing the pulse height. The amplitude of every pulse stays the same, but its width varies in direct proportion to the voice signal at that instant. When the voice signal is higher, the pulse remains high longer; when the voice is lower, the pulse is shorter. This changing duty cycle encodes the instantaneous amplitude of the audio you want to reproduce. The carrier frequency (the rate of pulses) is usually kept constant, and filtering the PWM signal can recover the original analog voice waveform. The other ideas describe different modulation schemes (varying pulse height, shifting pulse position, or changing how many pulses occur per second) and aren't how PWM conveys the voice.

8. In AC circuits, which statement correctly describes RMS value?

A. The square root of the average of the instantaneous values

B. The average value of the absolute value

C. The peak value

D. The average value

RMS measures the effective value of an AC signal in terms of heating effect. It is calculated as the square root of the average of the squares of the instantaneous values over time: Vrms = sqrt((1/T) ∫ v(t)^2 dt). For a sinusoidal voltage, Vrms equals the peak value divided by sqrt(2). This is the quantity used to compute power in a resistor since P = Vrms^2 / R. The statement describing RMS as the square root of the average of the instantaneous values is missing the crucial squaring step, so the precise description is the square root of the average of the squares of the instantaneous values. Other options refer to different waveform properties: the average value of the absolute value is the average rectified value, the peak value is the maximum amplitude, and the plain average value is the DC average (which is zero for a balanced AC waveform).

SAMPLE

9. In mixer operation, which term describes the response where an unwanted signal at the image frequency also produces the same IF?

A. Local oscillator leakage

B. Intermodulation

C. Image response

D. Carrier suppression

In a mixer, the frequencies combine so the output includes the sum and difference of the LO and RF signals. The intermediate frequency is the absolute difference: IF = |RF − LO|. Because of this, any unwanted RF frequency that sits at the image distance from the LO will also land at the same IF when mixed. The image frequency is defined by the condition that it produces the same IF as the desired signal, so the mixer responds to that unwanted signal as well. This specific phenomenon is called image response. Local oscillator leakage is a separate issue where the LO signal itself leaks into the RF or IF path, not about an extra input at the image frequency causing the same IF. Intermodulation refers to spurious frequencies created by nonlinear mixing of two or more signals, not the single-image concept. Carrier suppression is about reducing the carrier level and isn't describing this image-frequency effect.

10. A string of 12 NiCd cells connected in series produces approximately how many volts?

A. 12 volts.

B. 12.6 volts.

C. 15 volts.

D. 72 volts.

NiCd cells provide about 1.2 volts each. When cells are connected in series, their voltages add, so the total is the sum of all cells. With a string of twelve in series, the total ends up in the mid-teens, commonly rounded to about fifteen volts. If the pack is fully charged, each cell can be a bit higher, so the total is a little higher; if discharged, it's a bit lower. The other numbers would require different numbers of cells or a different chemistry, so they don't match the way series voltages add.

SAMPLE

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://fccgrolelement3.examzify.com

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

SAMPLE