Satellite Communications (SATCOM) Practice Test (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

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 **17**

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. **Which forward error correction code employs a shift-register based encoder and produces a continuous stream of encoded bits?**
   - A. Hamming code
   - B. Reed-Solomon code
   - C. Convolutional code
   - D. Shannon limit

2. **In a bistatic radar system, the transmitter and receiver are located...**
   - A. Different locations
   - B. Same location
   - C. The transmitter on a satellite and the receiver on the ground
   - D. The system does not require line-of-sight

3. **Impedance is the measure of opposition to current when a voltage is applied, and it is significant for matching transmission lines and antennas. What is impedance primarily used for in RF systems?**
   - A. The opposition to current when voltage is applied
   - B. The physical size of components
   - C. The color of insulation
   - D. The operating frequency of the circuit

4. **What is the significance of impedance matching in RF systems?**
   - A. Increases reflections and reduces power transfer
   - B. Minimizes reflection and maximizes power transfer
   - C. Has no effect on reflections
   - D. Only affects DC behavior

5. How do monostatic and bistatic radar configurations differ?
   A. Monostatic transmits and receives at the same location; bistatic uses different locations
   B. Monostatic uses separate transmitter and receiver; bistatic shares a common location
   C. Monostatic is space-based; bistatic is ground-based
   D. Monostatic uses phased array; bistatic uses dish

6. Telemetry data on a satellite typically conveys which type of information?
   A. The reason the satellite was designed
   B. Payload data results
   C. Ground command sequences
   D. State of health

7. Which of the following are design considerations for antennas?
   A. Size, shape, losses and operational environment
   B. Color and weight
   C. Frequency hopping and encryption
   D. Mechanical mounting only

8. Which parameter is defined as the ratio of the maximum radiation intensity to the average radiation intensity?
   A. HPBW
   B. Directivity
   C. BWFN
   D. Reciprocity

9. Which of the following is a capability of phased array antennas?
   A. Beam Forming, tracking, multiple beams, high reliability, high EIRP, nulling
   B. Low complexity and low cost
   C. No need for feed distribution
   D. Single fixed beam unable to track

10. Which sequence of RSA key lengths is correct?

- **A. 2048, 3072, 4096**
- **B. 512, 1024, 2048**
- **C. 128, 256, 512**
- **D. 1024, 2048, 4096**

Answers

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

Explanations

1. **Which forward error correction code employs a shift-register based encoder and produces a continuous stream of encoded bits?**

   A. Hamming code

   B. Reed-Solomon code

   C. Convolutional code

   D. Shannon limit

Convolutional codes are defined by a shift-register based encoder that treats the input as a continuous stream and produces encoded output bits on the fly. In a convolutional encoder, each output bit is formed by combining the current input bit with several past input bits stored in memory elements arranged as shift registers. The pattern of which bits are combined is set by generator polynomials (the taps), so the encoder's output depends on the current bit plus a window of previous bits. Because the encoder keeps accumulating past bits, encoding happens continuously as long as data is flowing, yielding a steady stream of encoded bits rather than fixed-size blocks. This real-time, memory-based structure is exactly what makes convolutional codes suitable for streaming data in SATCOM links and other channels, with decoding often performed by the Viterbi algorithm. Hamming codes are block-based; they encode fixed-size data blocks with parity bits, not as a continuous stream tied to past bits. Reed-Solomon codes are also block-based and operate on symbols rather than bit streams. The Shannon limit is a theoretical bound on error performance and capacity, not a type of code or encoder.

2. **In a bistatic radar system, the transmitter and receiver are located...**

   A. Different locations

   B. Same location

   C. The transmitter on a satellite and the receiver on the ground

   D. The system does not require line-of-sight

In a bistatic radar, the transmitter and receiver are in separate locations. This separation is what distinguishes bistatic setups from monostatic ones, where the same location (often the same antenna) handles both transmitting and receiving. Because the signal goes from the transmitter to the target and then from the target to the receiver, you get two distinct legs of travel and a geometry defined by the transmitter, target, and receiver positions. This arrangement is common in scenarios like a satellite transmitting to a ground-based receiver, or an aircraft-based transmitter with a separate ground receiver. The other statements don't define bistatic operation. Having the transmitter and receiver at the same place would be monostatic. The idea that a transmitter on a satellite and a receiver on the ground is impossible isn't accurate—it's a valid bistatic configuration, but the core description is simply that the two nodes are at different locations. The line-of-sight requirement is a practical concern for radar performance, not what makes a system bistatic.

3. Impedance is the measure of opposition to current when a voltage is applied, and it is significant for matching transmission lines and antennas. What is impedance primarily used for in RF systems?

A. The opposition to current when voltage is applied

B. The physical size of components

C. The color of insulation

D. The operating frequency of the circuit

Impedance is the opposition to current flow when voltage is applied, combining resistance and reactance and changing with frequency. In RF systems, this concept is used to ensure impedance matching between the source, transmission line, and antenna so that maximum power is transferred and reflections are minimized. By designing for a specific impedance (often 50 ohms), you keep energy flowing efficiently through the line and into the load. The physical size of components, insulation color, or just the operating frequency aren't what impedance measures.

4. What is the significance of impedance matching in RF systems?

A. Increases reflections and reduces power transfer

B. Minimizes reflection and maximizes power transfer

C. Has no effect on reflections

D. Only affects DC behavior

Impedance matching means making the impedance seen by the RF source equal to its own internal impedance so energy can flow smoothly from source to load. When the impedances are matched, the reflection coefficient is minimized (ideally zero), so almost no power is reflected back toward the source. That means the transmission line carries the signal efficiently and the load receives most of the available power, which also keeps the voltage and current at appropriate levels along the line. In contrast, any mismatch causes reflections, reduces power delivered to the load, and can create standing waves that degrade performance or harm the transmitter. Impedance matching, therefore, is about minimizing reflections and maximizing power transfer; it does not affect DC behavior.

5. How do monostatic and bistatic radar configurations differ?

A. Monostatic transmits and receives at the same location; bistatic uses different locations

B. Monostatic uses separate transmitter and receiver; bistatic shares a common location

C. Monostatic is space-based; bistatic is ground-based

D. Monostatic uses phased array; bistatic uses dish

The main distinction is where the transmitter and receiver are located relative to each other. In a monostatic radar, the transmitter and receiver are at the same location, often sharing the same antenna or being tightly co-located. The radar sends a pulse and listens for echoes at the same point, so the round-trip path is essentially from one point back to that same point. In a bistatic radar, the transmitter and receiver are at different locations. The signal goes from the transmitter to the target and then from the target to a separate receiver. This creates two distinct spatial points and changes the geometry: the measured time corresponds to the sum of the distances from transmitter to target and from target to receiver, not a simple back-and-forth path. It also alters Doppler and angle estimation because the viewing geometry involves two fixed points rather than one. Monostatic setups are typically simpler to design and operate, while bistatic configurations offer different capabilities and trade-offs, especially regarding placement of the transmitter and receiver and the resulting imaging and tracking requirements.

6. Telemetry data on a satellite typically conveys which type of information?

A. The reason the satellite was designed

B. Payload data results

C. Ground command sequences

D. State of health

Telemetry data is the information sent from the satellite to the ground that reports the spacecraft's current condition and operating status. It includes health indicators such as temperatures, voltages, currents, battery state, power subsystem status, attitude and orbit information, and fault flags. This data lets operators monitor performance, detect anomalies, and decide when to intervene. In contrast, payload data results are the science measurements from instruments, ground command sequences are uplink instructions sent to the satellite, and the reason the satellite was designed is design rationale—not telemetry content. So, the typical role of telemetry is to convey the state of health.

7. Which of the following are design considerations for antennas?

A. Size, shape, losses and operational environment

B. Color and weight

C. Frequency hopping and encryption

D. Mechanical mounting only

Antennas are designed by balancing physical size, geometry, and material losses against the operating environment to meet the required RF performance. The size sets how much effective aperture you have, which directly influences potential gain and beamwidth; a larger aperture can focus energy more tightly, giving higher gain, but it also has to fit the platform. The shape determines the radiation pattern and polarization you'll get; different shapes (parabolic dishes, patches, dipoles) are chosen to meet the desired coverage and interference characteristics. Losses matter because any resistive or dielectric losses reduce efficiency, so less power is radiated and the link budget suffers. The operational environment matters because temperature changes, moisture, wind, and the presence of a radome or mounting structure can affect impedance, mechanical integrity, and long-term reliability; the design must maintain performance under real-world conditions, including environmental stress and weatherproofing. Color is largely unrelated to RF performance, and while weight can influence the mechanical aspects of the installation, it does not define the antenna's RF behavior by itself. Frequency hopping and encryption belong to the signal and security layers, not the antenna design. Mechanical mounting is important, but describing the design as only about mounting misses the essential electrical and environmental factors that determine how well the antenna will perform.

8. Which parameter is defined as the ratio of the maximum radiation intensity to the average radiation intensity?

A. HPBW

B. Directivity

C. BWFN

D. Reciprocity

Directivity captures how strongly an antenna concentrates energy in its strongest direction compared with the average over all directions. It is defined as the ratio of the radiation intensity in the direction of maximum radiation to the average radiation intensity across the entire sphere. In formula terms, $D = I_{max} / I_{avg}$, and since the average intensity is the total radiated power divided by 4π, this can also be written as $D = 4\pi I_{max} / P_{rad}$. A highly directional antenna has a large directivity, while an isotropic radiator has directivity of 1 (no concentration). The other terms describe different aspects: HPBW is the angular width of the main lobe at half its maximum, BWFN is the beamwidth between the first null, and reciprocity relates to the transmitter and receiver patterns being identical.

9. Which of the following is a capability of phased array antennas?

A. Beam Forming, tracking, multiple beams, high reliability, high EIRP, nulling

B. Low complexity and low cost

C. No need for feed distribution

D. Single fixed beam unable to track

Phased array antennas control the direction and shape of the radio beam by adjusting the phase and amplitude across many radiating elements. This lets you form and steer beams electronically, so you can point the main beam toward a target without any mechanical movement. Because steering is electronic, the array can track a moving satellite quickly and smoothly. You can also form multiple beams at once, covering different directions or supporting multiple channels, which is a natural capability of the array when you apply different weightings to the elements. The absence of moving parts contributes to higher reliability, and coherently combining the signals from all elements concentrates power in the chosen direction, giving high EIRP. Additionally, adaptive weighting allows placing nulls in directions of interference, reducing jamming or unwanted signals while keeping the desired beam strong. Things that claim low complexity or no feed distribution ignore the need for a distributed feed network, and a single fixed beam that cannot track contradicts the fundamental advantage of electronic beam steering.

10. Which sequence of RSA key lengths is correct?

A. 2048, 3072, 4096

B. 512, 1024, 2048

C. 128, 256, 512

D. 1024, 2048, 4096

RSA key length determines how hard it is to factor the modulus, so security improves as the number of bits increases. Today, 2048 bits is the minimum recommended for new keys, with 3072 and 4096 bits offering progressively stronger protection for data that must stay confidential longer. The sequence 2048, 3072, 4096 matches a common, practical upgrade path: start at 2048, increase to 3072 for better long-term security without excessive performance impact, and use 4096 when the highest level of protection is needed over many years. Other options include sizes that are considered insecure or obsolete: very small sizes like 512 or 128/256/512 are easily broken with modern hardware, and starting with 1024 is discouraged in current guidelines. A sequence that begins with 1024 (like 1024, 2048, 4096) isn’t the standard recommended progression today.

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://satcom.examzify.com

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