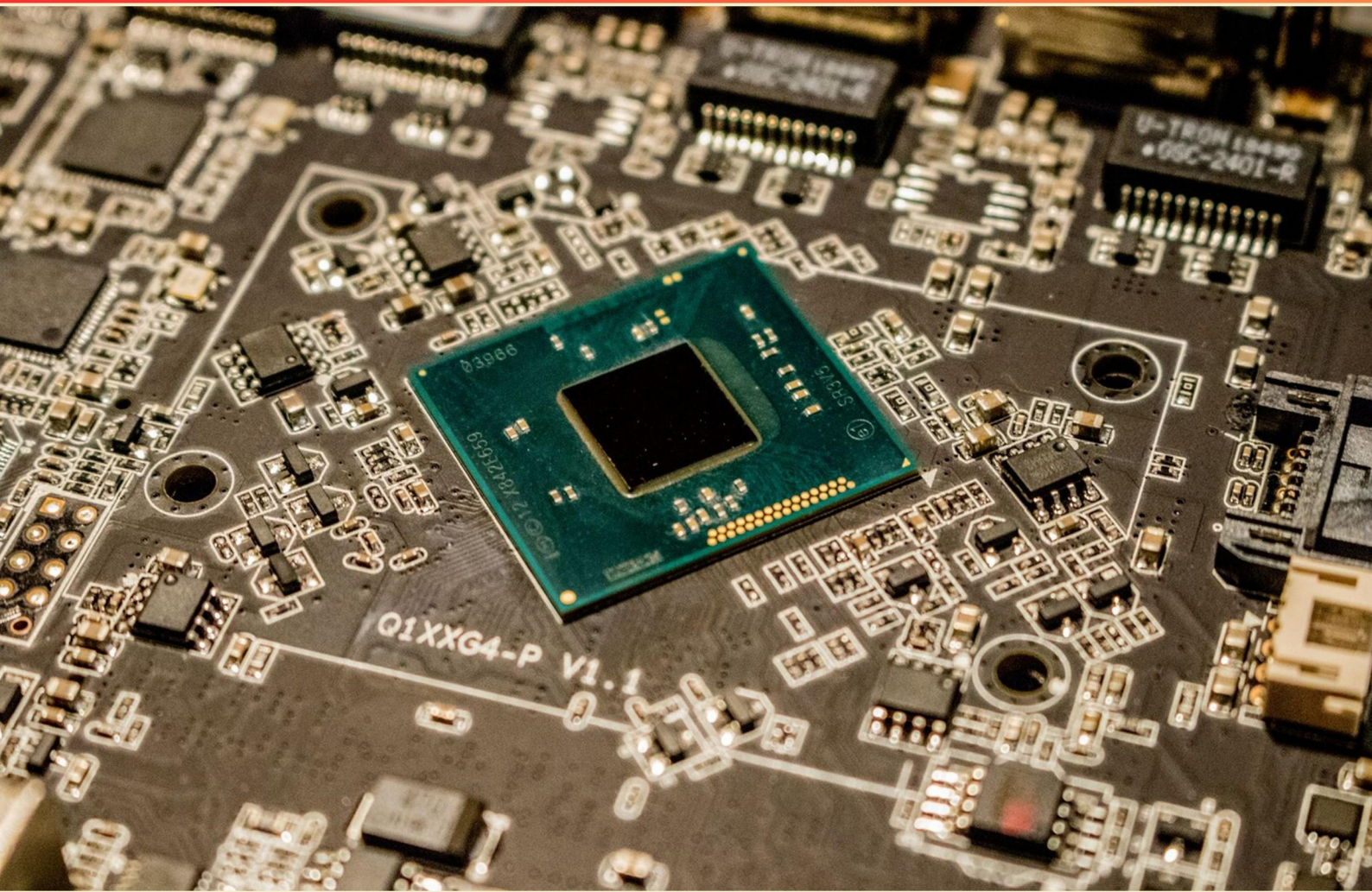


# FE ELECTRICAL AND COMPUTER PRACTICE EXAM (SAMPLE)

## STUDY GUIDE



## SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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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 SI base quantity corresponds to the unit 'second'?**
  - A. Length
  - B. Mass
  - C. Time
  - D. Temperature
- 2. What is the effect of a 180-degree phase shift in electrical signals?**
  - A. It causes signals to double in frequency
  - B. It inverts the waveform of the signal
  - C. It reduces the amplitude of the signal
  - D. It removes all harmonic distortions
- 3. What does Joule's law of energy state?**
  - A. Energy cannot be converted between forms
  - B. One energy form can be converted into another without loss
  - C. Energy is always conserved in electrical systems
  - D. Energy conversion always results in heat loss
- 4. What are the units of magnetic flux density?**
  - A. Volt (V)
  - B. Newton (N)
  - C. Tesla (T) or webers per meter squared ( $\text{Wb/m}^2$ )
  - D. Coulomb (C)
- 5. What type of communication is characterized as full duplex?**
  - A. Communication in one direction only
  - B. Communication without time delays
  - C. Communication that happens simultaneously in both directions
  - D. Communication that transmits data asynchronously
- 6. What is the significance of understanding inverse mappings in functions?**
  - A. They illustrate the point where functions are undefined
  - B. They provide a way to reverse operations of original functions
  - C. They determine the number of dimensions in the mapping
  - D. They show how functions correlate to linear equations

- 7. What type of three-phase connection exists if the line current equals the phase current?**
- A. Wye connection
  - B. Delta connection
  - C. Series connection
  - D. Parallel connection
- 8. What is required to determine the point of inflection of a function?**
- A. Find the first derivative and set it to zero
  - B. Calculate the limits of the function
  - C. Find the second derivative and solve for  $x$
  - D. Identify the roots of the function
- 9. What term describes a circuit that has the same current throughout all its elements?**
- A. Series circuit
  - B. Parallel circuit
  - C. Open circuit
  - D. Short circuit
- 10. What is a potential effect of the skin effect in conductors?**
- A. Increased resistance
  - B. Decreased capacitance
  - C. Lower temperature
  - D. Increased current flow

## **Answers**

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

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## **Explanations**

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## 1. Which SI base quantity corresponds to the unit 'second'?

- A. Length
- B. Mass
- C. Time**
- D. Temperature

The unit 'second' is defined as the SI base unit for measuring time. In the International System of Units (SI), time is one of the fundamental quantities, and the second is the standard unit used to quantify its measurement. Each SI base quantity is associated with a specific unit, and time is uniquely linked to the second due to its precise definition, which is based on the vibrations of cesium atoms in atomic clocks. Understanding the concept of time as a base quantity is essential in various fields of physics and engineering because time plays a critical role in equations of motion, electrical circuits, and many other applications where changes over time are analyzed.

## 2. What is the effect of a 180-degree phase shift in electrical signals?

- A. It causes signals to double in frequency
- B. It inverts the waveform of the signal**
- C. It reduces the amplitude of the signal
- D. It removes all harmonic distortions

A 180-degree phase shift results in the inversion of the waveform of the signal. When a signal is subjected to this phase shift, its peaks and troughs are effectively flipped; for example, where there was a peak in the original waveform, there will now be a trough in the inverted waveform. This behavior is fundamentally related to how phase shifts affect sinusoidal signals, and it can be applied to any periodic waveform. In practical applications, an inverter is often used in signal processing where the phase shift helps in signal manipulation, synchronization, or in creating certain types of circuit behaviors such as subtractive mixing in audio processing. Understanding phase shifts is crucial in the design of circuits that rely on timing and synchronization, like those used in communication systems, oscillators, and feedback loops.

## 3. What does Joule's law of energy state?

- A. Energy cannot be converted between forms
- B. One energy form can be converted into another without loss**
- C. Energy is always conserved in electrical systems
- D. Energy conversion always results in heat loss

Joule's law primarily deals with the relationship between electric current, resistance, and the heat generated in electrical circuits. It states that the heat produced by a current flowing through a resistor is proportional to the square of the current ( $I^2$ ), the resistance ( $R$ ), and the time ( $t$ ) that the current flows, represented mathematically as  $Q = I^2 R t$ . The correct choice reflects the fundamental idea that in many scenarios, energy can be effectively transformed from one form to another. Specifically, Joule's law highlights how electrical energy converts to thermal energy through heat dissipation in resistive materials, conveying that energy remains conserved in the process. While there might be thermal losses, the principle indicates that energy is transformed rather than lost entirely, aligning with the concept that energy conversion occurs without complete loss in ideal conditions. The other options suggest various misconceptions about energy, such as claiming it cannot be converted or that conversion always results in heat loss. Joule's law emphasizes energy's behavior in electric circuits, making the correct choice a clear representation of its principles and implications.

#### 4. What are the units of magnetic flux density?

- A. Volt (V)
- B. Newton (N)
- C. Tesla (T) or webers per meter squared (Wb/m<sup>2</sup>)**
- D. Coulomb (C)

Magnetic flux density is a measure of the strength and direction of a magnetic field in a specific area. The unit of measurement for magnetic flux density is the Tesla, which is equivalent to webers per square meter. This relationship comes from the definition of the Tesla: one Tesla is defined as one weber of magnetic flux through a perpendicular area of one square meter. In practical terms, when you encounter a magnetic field strength expressed in Tesla, it provides a clear indication of how strong the magnetic field is and how it can interact with electric charges and currents. This concept is pivotal in applications such as electric motors, generators, and magnetic resonance imaging (MRI), where understanding the properties of magnetic fields is essential. The other units listed do not pertain to magnetic flux density. Volt (V) pertains to electric potential, Newton (N) is a unit of force, and Coulomb (C) represents electric charge. Each of these measurements belongs to different domains of physics and does not describe the characteristics of a magnetic field in the way that Tesla does. Thus, the correct option accurately represents the units associated with magnetic flux density.

#### 5. What type of communication is characterized as full duplex?

- A. Communication in one direction only
- B. Communication without time delays
- C. Communication that happens simultaneously in both directions**
- D. Communication that transmits data asynchronously

Full duplex communication refers to the ability to send and receive data simultaneously in both directions. This means that while one device is transmitting information, the other device can also transmit information at the same time without any interference or waiting period. This type of communication allows for more effective and efficient interaction, similar to a two-way street where traffic can flow in both directions simultaneously. In contrast, options describing one-way communication or asynchronous methods do not embody the characteristics of full duplex. For instance, communication that occurs in one direction only can only transmit data from a sender to a receiver without allowing a return signal at the same time. Additionally, communication that is asynchronous does not necessarily occur simultaneously; it involves the data being sent at different times, which does not align with the simultaneous nature inherent in full duplex systems. Therefore, the correct answer highlights the defining feature of full duplex communication, emphasizing its capability for simultaneous data transmission in both directions.

## 6. What is the significance of understanding inverse mappings in functions?

- A. They illustrate the point where functions are undefined
- B. They provide a way to reverse operations of original functions**
- C. They determine the number of dimensions in the mapping
- D. They show how functions correlate to linear equations

Understanding inverse mappings in functions is significant because they provide a way to reverse the operations of the original functions. This means that if you have a function that takes an input and produces an output, the inverse function takes that output and returns it to the original input. This concept is vital in various fields, including mathematics, engineering, and computer science, as it allows for the solving of equations and the restoration of information that may have been manipulated or transformed. For example, if a function  $f(x)$  transforms an input  $x$  into  $y$  ( $f(x) = y$ ), the inverse function  $f^{-1}(y)$  will bring  $y$  back to  $x$  ( $f^{-1}(y) = x$ ). This relationship helps in understanding how to efficiently retrieve original data after applying a function, which is essential in areas like coding, cryptography, and various systems where operations need to be reversed or undone. By grasping the significance of inverse mappings, one can develop a deeper understanding of functional relationships and their applications, such as solving equations, performing transformations, or even designing algorithms in computation.

## 7. What type of three-phase connection exists if the line current equals the phase current?

- A. Wye connection**
- B. Delta connection
- C. Series connection
- D. Parallel connection

In a wye connection (also known as a star connection), the line current is equal to the phase current. This is a fundamental characteristic of the wye configuration, where each phase is connected to a common neutral point. In this setup, each of the three phases can be seen as separate branches, and the current that flows through each phase is the same as the current that leaves the supply lines, resulting in line current and phase current being equal. In contrast, in a delta connection, the phase current is different from the line current. Specifically, the line current is  $\sqrt{3}$  times greater than the phase current in a balanced system. This occurs because each phase is connected in a loop, and the line currents contribute differently to the total current flowing in the phases. The series and parallel connections are not applicable to three-phase systems in the same context. Series connections would involve components where the same current flows through all elements, leading to a different configuration of the circuit. In parallel connections, the current divides among multiple paths, and again, this does not represent the equal relationship between line and phase currents found in a wye configuration. Thus, a wye connection accurately describes the scenario where the line current is equal to the phase current.

## 8. What is required to determine the point of inflection of a function?

- A. Find the first derivative and set it to zero
- B. Calculate the limits of the function
- C. Find the second derivative and solve for  $x$**
- D. Identify the roots of the function

To determine the point of inflection of a function, one needs to find the second derivative of that function and solve for the variable. A point of inflection occurs where the curvature of the graph changes, which is identified by changes in the sign of the second derivative. When the second derivative is zero or undefined at some point  $(x = c)$ , it indicates that there may be a change in concavity at that point. However, to confirm that it is indeed a point of inflection, one should also check whether the second derivative changes signs before and after  $(x = c)$ . Therefore, finding the second derivative is essential in determining both potential points of inflection and confirming their nature. In contrast, setting the first derivative to zero typically identifies critical points, which could indicate local maxima or minima but do not directly address changes in concavity. Calculating limits of the function is important for understanding its behavior at certain values but does not directly pertain to identifying points of inflection. Identifying the roots of the function focuses on where the function intersects the  $x$ -axis, which is not relevant for determining points of inflection.

## 9. What term describes a circuit that has the same current throughout all its elements?

- A. Series circuit**
- B. Parallel circuit
- C. Open circuit
- D. Short circuit

The term that describes a circuit with the same current flowing through all its elements is a series circuit. In a series circuit, components are connected end-to-end in a single path for the current to flow. Because there's only one path for the current, it remains constant throughout the entire circuit. This characteristic is fundamental to understanding how series circuits operate; the total current that flows through the circuit is the same at every point. If any component in a series circuit were to fail or be disconnected (creating an open circuit), the entire flow of current would stop. Thus, the defining trait of series circuits is this uniformity of current, which contrasts with parallel circuits, where current can vary among different branches.

## 10. What is a potential effect of the skin effect in conductors?

- A. Increased resistance**
- B. Decreased capacitance
- C. Lower temperature
- D. Increased current flow

The skin effect is an electromagnetic phenomenon that occurs in conductors when they carry alternating current (AC). As the frequency of the current increases, the current density becomes concentrated near the surface of the conductor rather than being evenly distributed throughout its cross-sectional area. This results in a decrease in the effective cross-sectional area through which the current can flow. Due to the reduced area, the resistance of the conductor effectively increases with higher frequencies. This is because resistance is inversely related to the cross-sectional area: as the area decreases, resistance increases. Therefore, the skin effect leads to an increase in the effective resistance of the conductor at higher AC frequencies. In contrast, other options such as decreased capacitance, lower temperature, or increased current flow do not accurately represent the effects of the skin effect on conductors. The skin effect specifically relates to how current distribution changes with frequency and predominantly increases resistance in a conductor as frequency rises.

## 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:

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

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