

EM4 Digital Electronics 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. In what year was ENIAC completed?**
 - A. 1938**
 - B. 1939**
 - C. 1940**
 - D. 1948**

- 2. The number of _____ determines the number of pulses to cycle a counter from 0 count to 0 count.**
 - A. Bits**
 - B. Stages**
 - C. Gates**
 - D. Pins**

- 3. Which component of a computer microprocessor performs simple logic functions such as AND, OR, and XOR?**
 - A. Central Processing Unit (CPU)**
 - B. Control Unit**
 - C. Arithmetic Logic Unit (ALU)**
 - D. Register File**

- 4. In ESD control, where should the resistance in the benchtop ground cable be located?**
 - A. Top**
 - B. Bottom**
 - C. Side**
 - D. Behind**

- 5. What is hexadecimal referred to**
 - A. 8**
 - B. 10**
 - C. 2**
 - D. 16**

- 6. In base-2 notation, when the exponent increases by 1, what happens to the value?**
- A. The weight of the number doubles**
 - B. The weight halves**
 - C. The value increases by one**
 - D. The value remains the same**
- 7. An accumulator stores data currently being used by the ALU**
- A. RAM**
 - B. ROM**
 - C. Accumulator**
 - D. Program Counter**
- 8. Which statement about ENIAC is true?**
- A. It is a mechanical calculator**
 - B. It used integrated circuits**
 - C. It was completed in 1950**
 - D. It is one of the earliest electronic computers**
- 9. What is another name for a serial in/ serial out register?**
- A. Shift register**
 - B. Counter**
 - C. Decoder**
 - D. Multiplexer**
- 10. Which work surface presents an opportunity for electrostatic discharge (ESD) damage?**
- A. Waxed**
 - B. Painted**
 - C. Vinyl**
 - D. All of the above**

Answers

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

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Explanations

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1. In what year was ENIAC completed?

- A. 1938
- B. 1939
- C. 1940
- D. 1948**

ENIAC's place in computer history is about how quickly a big machine moved from plan to working hardware during WWII. Construction started in 1943 and the hardware was completed in 1945. It then began running calculations that year, with a formal dedication to follow in 1946. Because of that timeline, the commonly cited completion year is 1945 (some sources emphasize 1946 as the point at which it was fully ready for regular use). The years listed in the question don't match that completion point: they're either before ENIAC existed or after it had already been completed. The upshot is that ENIAC was completed in the mid-1940s, with 1945 being the typical completion year and 1946 often noted for its readiness and dedication.

2. The number of _____ determines the number of pulses to cycle a counter from 0 count to 0 count.

- A. Bits
- B. Stages**
- C. Gates
- D. Pins

The number of stages sets how many distinct states the counter can go through before it wraps back to zero. Each stage is a flip-flop storage element, adding one binary digit to the count. With N stages you have 2^N possible states, so it takes 2^N input pulses to cycle from 0 back to 0. For example, a two-stage counter has four states (00, 01, 10, 11) and completes a full cycle in four pulses; a three-stage counter has eight states and requires eight pulses. Since the cycle length is determined by how many storage stages the counter has, that count controls the number of pulses in a full 0-to-0 cycle. Pins and gates don't set this length, and while you could describe the size in terms of bits, the term stages specifically refers to the storage elements that define the count.

3. Which component of a computer microprocessor performs simple logic functions such as AND, OR, and XOR?

- A. Central Processing Unit (CPU)
- B. Control Unit
- C. Arithmetic Logic Unit (ALU)**
- D. Register File

The capability to perform simple logic operations like AND, OR, and XOR is found in the Arithmetic Logic Unit. The ALU is the part of the processor that carries out basic operations on binary data, taking inputs from registers, applying the requested operation, and producing a result. The rest of the CPU—the Control Unit—manages the sequence of operations but doesn't execute the logic itself, and the Register File simply stores operands and results. So for executing these basic logic functions, the ALU is the correct component.

4. In ESD control, where should the resistance in the benchtop ground cable be located?

- A. Top**
- B. Bottom**
- C. Side**
- D. Behind**

In ESD control, you want a grounding path that safely limits the current that could pass through the operator during a discharge. Placing the resistance in the benchtop ground cable near the operator—right at the top of the bench—puts the current-limiting element in the exact path from the person (via the wrist strap or mat contact) to earth. This positioning ensures that any discharge flowing through the worker is slowed by the resistor before it can reach the body, reducing risk and helping maintain a controlled, predictable potential at the user's touch points. If the resistance were located lower down, to the side, or behind, it wouldn't be in the same part of the path the operator's body takes, making the current limiting less effective and harder to guarantee during use.

5. What is hexadecimal referred to

- A. 8**
- B. 10**
- C. 2**
- D. 16**

Hexadecimal refers to a base-16 numeral system. It uses sixteen symbols: 0 through 9 for values zero to nine, and A through F for ten to fifteen. The name itself highlights the base: sixteen. This base is especially handy in computing because each hex digit maps neatly to four binary bits, so two hex digits represent a full byte. For example, the binary byte 11111111 is FF in hexadecimal, which equals 255 in decimal. So the concept being tested is that hexadecimal is a base-16 system, unlike the bases 8 (octal), 10 (decimal), or 2 (binary).

6. In base-2 notation, when the exponent increases by 1, what happens to the value?

- A. The weight of the number doubles**
- B. The weight halves**
- C. The value increases by one**
- D. The value remains the same**

In binary, each position represents a power of two. When the exponent increases by one, you move to the next higher power, so that part of the value becomes twice as large. In other words, increasing the exponent multiplies that contribution by 2, and shifting a binary number left by one bit doubles its value. For example, 1011_2 is 11 in decimal, and shifting left to 10110_2 gives 22, exactly twice as much. The other ideas don't fit: halving would happen if you moved to a lower exponent, adding one to the value is arithmetic, not exponent-based, and the value wouldn't stay the same when you hop to a higher power.

7. An accumulator stores data currently being used by the ALU

A. RAM

B. ROM

C. Accumulator

D. Program Counter

The accumulator is a register that holds the value the arithmetic logic unit is currently working with. When the ALU performs an operation, it uses the value in the accumulator as one operand (often the other operand is also taken from a register or memory), and the result is typically written back into the accumulator. This arrangement keeps the active data in a fast, small storage area so calculations can proceed quickly without repeatedly fetching from main memory. RAM is the main memory used to store data and instructions over time, not the immediate workspace of the ALU. ROM stores firmware or program code and is read-only during operation, not the temporary data the ALU manipulates. The program counter tracks which instruction to fetch next, not the data being processed by the ALU.

8. Which statement about ENIAC is true?

A. It is a mechanical calculator

B. It used integrated circuits

C. It was completed in 1950

D. It is one of the earliest electronic computers

ENIAC represents an early leap from mechanical and relay-based calculation to electronic computation. It used vacuum tubes to perform operations directly as electrical signals, which was a groundbreaking shift at the time. Because it was completed in 1945, not 1950, any statement tying it to a 1950 completion is incorrect. Integrated circuits hadn't been used yet—ICs came later—so ENIAC didn't rely on them. This combination of electronic design and its early completion makes it one of the first true electronic computers, which is why that statement is the correct one.

9. What is another name for a serial in/ serial out register?

A. Shift register

B. Counter

C. Decoder

D. Multiplexer

A serial in/serial out register is fundamentally a shift register. In a shift register, data is fed in one bit at a time and, with each clock edge, all bits shift one position along the storage elements. The bit that was in the input ends up moving through the chain and exits at the serial output after being shifted through the register. This bit-by-bit movement is exactly what "serial in/serial out" describes. This differs from the other devices: a counter increments a binary value on each clock, not a chain of bits moving through storage; a decoder selects one output line based on the input code; a multiplexer routes one of several inputs to the output. None of those inherently store and move a data stream through a sequence of storage elements the way a shift register does.

10. Which work surface presents an opportunity for electrostatic discharge (ESD) damage?

A. Waxed

B. Painted

C. Vinyl

D. All of the above

Static charges tend to build up on insulating surfaces, and a discharge can damage sensitive electronics. Waxed, painted, and vinyl work surfaces are all nonconductive or only weakly conductive, so they can trap and hold charge created by movement, friction with clothing or tools, or separation of surfaces. Because the charge lingers on these materials, a discharge can jump to or from a device placed on the surface or touched by a person, risking ESD damage. Therefore, any of these surfaces can pose an ESD risk, making all of the above the correct description. To mitigate this, use dissipative or conductive work surfaces, grounding, humidity control, and antistatic measures on the entire workspace.

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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://em4digitalelec.examzify.com>

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

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