OPERATIONAL AMPLIFIER PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Table of Contents

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. **If the input voltages of an op-amp are identical and the output voltage is 0Vdc. The op-amp is**
   - A. Saturated
   - B. Linear
   - C. Balanced
   - D. Unbalanced

2. **If the circuit load resistor is varied within design limits, the circuit voltage gain remains the same.**
   - A. increases
   - B. remains the same
   - C. decreases
   - D. becomes unpredictable

3. **Voltage comparators perform as**
   - A. Oscillators
   - B. Amplifiers
   - C. Level Detectors
   - D. Integrators

4. **To adjust the output offset voltage of an op-amp, connect circuit inputs to**
   - A. Ground directly
   - B. Power supply
   - C. Circuit common
   - D. Output node

5. **For a Multiple-Feedback (MFB) active filter, what do component values primarily determine?**
   - A. Only center frequency.
   - B. Quality factor (Q) and center frequency.
   - C. Only gain.
   - D. Noise performance.

6. If the feedback resistor is doubled from its original value while the input resistor remains the same and the initial gain is 75, what is the new gain?

A. 75

B. 37.5

C. 150

D. 225

7. A non-inverting summing amplifier cannot scale or weight input signals. Which of the following statements is false?

A. They can scale or weight input signals.

B. They cannot scale or weight input signals.

C. They preserve the input polarity.

D. They provide high input impedance.

8. Which statement is false? an inverting summing amplifier does not alter the polarity of the summed voltages

A. An inverting summing amplifier sums multiple inputs.

B. An inverting summing amplifier does not alter the polarity of the summed voltages.

C. An inverting summing amplifier's output is inverted relative to inputs.

D. The circuit uses negative feedback.

9. In a noninverting amplifier, the closed-loop gain is

A. 1 + (Rf/Rin)

B. Rf/Rin

C. Rin/Rf

D. 1

10. In a typical inverting op-amp configuration, increasing the feedback resistor value tends to

A. No change

B. Decrease bandwidth

C. Increase bandwidth

D. Undefined

Answers

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

Explanations

1. If the input voltages of an op-amp are identical and the output voltage is 0Vdc. The op-amp is

A. Saturated

B. Linear

C. Balanced

D. Unbalanced

When the input voltages of an op-amp are identical, the differential input voltage is zero. In an ideal op-amp, the output is proportional to this difference, so zero difference means the output sits at zero volts, provided the device is not driven into saturation by offset errors. This situation is described as the op-amp being balanced: the two inputs are at the same potential, so there is no differential drive pushing the output away from a harmless, linear operating point. The given scenario—inputs equal and output at 0 V—fits perfectly with a balanced, linear condition. If the output were at a supply rail, that would indicate saturation, and if the inputs differed, the device wouldn't be balanced.

2. If the circuit load resistor is varied within design limits, the circuit voltage gain remains the same.

A. increases

B. remains the same

C. decreases

D. becomes unpredictable

In a negative-feedback op-amp circuit, the voltage gain is set by the feedback network—the ratio of the resistors in the feedback path—rather than by what the load does at the output. The op-amp adjusts its output so that the voltage at the inverting input matches the input voltage, enforcing a fixed relationship between input and output determined by that resistor ratio. The load simply draws current from the output; as long as the load is within the amplifier's ability to drive (no excessive current, no saturation or output impedance effects beyond design limits), the feedback keeps the same output voltage ratio, so the gain stays constant. If the load were to demand more current than the device can supply, you'd see a change due to output limitations, but within design limits the gain remains the same.

3. Voltage comparators perform as

A. Oscillators

B. Amplifiers

C. Level Detectors

D. Integrators

Voltage comparators are designed to decide which of two voltages is higher and to produce an output that reflects that decision. This makes them act as level detectors: they monitor a signal against a fixed reference and flip their output when the signal crosses that threshold. When the input surpasses the reference, the output switches to a high level; when it falls short, the output goes low. This threshold-crossing behavior is what you use to sense that a particular voltage level has been reached or exceeded. They're not meant to amplify signals like amplifiers, not meant to generate repeating waveforms like oscillators, and not meant to accumulate input over time like integrators.

4. To adjust the output offset voltage of an op-amp, connect circuit inputs to

A. Ground directly

B. Power supply

C. Circuit common

D. Output node

To null or adjust the output offset, you want the two input terminals to sit at the same potential so any remaining output is due only to the offset voltage inside the amplifier. Tying both inputs to the circuit common provides that common reference point, making the input differential effectively zero. With both inputs at the same level, you can use offset-trim provisions (if present) to dial the output back to zero. If you connect an input to the power supply, the inputs aren't forced to be equal and the amplifier may drive to a rail or behave unpredictably. Connecting to the output node would disturb the feedback behavior and won't set the inputs equal. Grounding both inputs works if ground is the same as the circuit's common reference, but the intended and reliable practice is to use the circuit common, which is the designated reference for offset adjustment.

5. For a Multiple-Feedback (MFB) active filter, what do component values primarily determine?

A. Only center frequency.

B. Quality factor (Q) and center frequency.

C. Only gain.

D. Noise performance.

In a multiple-feedback active filter, the passive network around the op-amp sets the locations of the poles of the transfer function. Those pole locations determine the center frequency and how sharply the filter responds, i.e., the Q factor. So choosing the resistor and capacitor values primarily tunes where the center frequency lies and how selective the filter is. The overall gain at the center frequency comes mainly from the amplifier configuration and feedback resistor ratios, not from the pole positions themselves. Noise performance, while influenced by resistor values and the op-amp, is not what these component choices primarily establish.

6. If the feedback resistor is doubled from its original value while the input resistor remains the same and the initial gain is 75, what is the new gain?

A. 75

B. 37.5

C. 150

D. 225

In an inverting op-amp, the closed-loop gain magnitude is set by the ratio Rf/Rin. If the input resistor stays the same and the feedback resistor is doubled, that ratio doubles. Starting from a gain magnitude of 75, doubling Rf yields a magnitude of 150. If you track the sign for an inverting configuration, the gain would be -150, but the numerical gain value asked here is 150.

7. A non-inverting summing amplifier cannot scale or weight input signals. Which of the following statements is false?

A. They can scale or weight input signals.

B. They cannot scale or weight input signals.

C. They preserve the input polarity.

D. They provide high input impedance.

The main idea here is that a non-inverting summing amplifier can combine and weight multiple input signals before applying gain. This is done by using a resistor network at the non-inverting input that creates a weighted average of the inputs. The op-amp's feedback then provides a non-inverting gain, so the final output is a scaled version of that weighted sum. Because the input sees a high-impedance node, the sources aren't loaded, and each input's influence can be adjusted by choosing appropriate resistor values. The non-inverting configuration also preserves the polarity of the inputs since there is no phase reversal in this path. So the statement claiming it cannot scale or weight input signals is false, because the resistor network at the non-inverting input enables weighting, and the overall gain scales that weighted sum. The other properties—preserving input polarity and providing high input impedance—are consistent with a non-inverting arrangement.

8. Which statement is false? an inverting summing amplifier does not alter the polarity of the summed voltages

A. An inverting summing amplifier sums multiple inputs.

B. An inverting summing amplifier does not alter the polarity of the summed voltages.

C. An inverting summing amplifier's output is inverted relative to inputs.

D. The circuit uses negative feedback.

Inverting summing amplifiers produce an inverted sum of their inputs because the signals are applied to the inverting input and negative feedback forces that node to a virtual ground. Each input resistor feeds current into the summing junction, and the feedback resistor converts the total current into an output voltage that has the opposite sign to the inputs. For an ideal op-amp, the output relationship is Vout = -Rf Σ(Vi/Ri), so any positive input voltages yield negative outputs, and the polarity is flipped. This is why the statement claiming the polarity is not altered is false. The other facts are correct: it can sum multiple inputs through separate resistors, the output is inverted relative to the inputs, and the circuit relies on negative feedback to set the gain and keep the operation linear.

9. In a noninverting amplifier, the closed-loop gain is

A. 1 + (Rf/Rin)

B. Rf/Rin

C. Rin/Rf

D. 1

In a noninverting amplifier, the feedback network of Rf from output to the inverting input and Rin from the inverting input to ground sets the gain. The op-amp drives the output so that the inverting input voltage matches the noninverting input, so V- ≈ Vin. The current through Rin is Vin/Rin, and that same current flows through Rf, giving (Vout − Vin)/Rf = Vin/Rin. Solving for Vout yields Vout = Vin(1 + Rf/Rin), so the closed-loop gain is Vin-to-Vout equal to 1 + Rf/Rin. This matches the expression 1 + (Rf/Rin). The other forms would correspond to different configurations: Rf/Rin alone is the gain of an inverting amplifier, Rin/Rf is its reciprocal, and a gain of 1 would be just a unity-gain buffer with no amplification.

10. In a typical inverting op-amp configuration, increasing the feedback resistor value tends to

A. No change

B. Decrease bandwidth

C. Increase bandwidth

D. Undefined

Gain-bandwidth tradeoff in an op-amp governs how bandwidth changes when you change closed-loop gain. In an inverting configuration, the closed-loop gain magnitude is set by the ratio Rf/Rin. If you increase the feedback resistor while Rin stays fixed, that ratio grows, so the closed-loop gain becomes larger in magnitude. Real op-amps have a finite gain-bandwidth product, so the product of the closed-loop gain and the closed-loop bandwidth remains approximately constant. Therefore boosting Rf lowers the bandwidth to keep that product roughly the same. For example, with a gain-bandwidth product of about 1 MHz, moving from a gain of -1 to -10 reduces the bandwidth from ~1 MHz to ~100 kHz. So the bandwidth decreases.

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://operationalamplifier.examzify.com

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