

PHASES OF MITOSIS PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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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 phase begins the process of mitosis with chromosome condensation?**
 - A. Prophase
 - B. Metaphase
 - C. Anaphase
 - D. Telophase
- 2. Why must chromosomes be fully condensed before microtubule attachment to chromosomes?**
 - A. Condensation reduces DNA entanglement and enables accurate separation.
 - B. Condensation has no effect on separation.
 - C. Condensation increases entanglement, hindering separation.
 - D. Condensation only occurs after spindle attachment.
- 3. Which term describes the two identical copies of a chromosome that are joined at the centromere?**
 - A. Centromere
 - B. Sister Chromatid
 - C. Chromosome
 - D. Chromatids
- 4. Name and describe the three classes of spindle microtubules.**
 - A. Kinetochore microtubules attach to chromosomes.
 - B. Polar microtubules interact to push poles apart.
 - C. Astral microtubules anchor to the cortex and position the spindle.
 - D. Kinetochore microtubules attach to chromosomes; polar microtubules interact to push poles apart; astral microtubules anchor to the cortex and position the spindle.
- 5. Which mechanism ensures proper attachment of chromosomes to opposite spindle poles?**
 - A. Kinetochore microtubule capture and tension from bi-orientation.
 - B. Random attachment to any pole.
 - C. Nuclear envelope remains intact to guide attachments.
 - D. Cohesion at centromeres prevents spindle attachment.

- 6. Which stage is the first stage of mitosis, during which the cell's chromatin condenses into chromosomes?**
- A. Prophase
 - B. Anaphase
 - C. Metaphase
 - D. Telophase
- 7. Which statement best describes the role of condensin during mitosis?**
- A. It helps condense chromosomes to prevent entanglement and enables proper segregation.
 - B. Condensin breaks down the nuclear envelope.
 - C. It forms the nucleolus.
 - D. It triggers cytokinesis.
- 8. What event marks the onset of anaphase?**
- A. Cleavage of cohesin.
 - B. Formation of a cell plate.
 - C. Nuclear envelope re-forms.
 - D. Chromosome replication.
- 9. During mitosis, at which stage do sister chromatids separate to become individual chromosomes?**
- A. Prophase
 - B. Metaphase
 - C. Anaphase
 - D. Telophase
- 10. Which phase is characterized by nuclear membrane reforming and chromosomes de-condensing?**
- A. Anaphase
 - B. Metaphase
 - C. Telophase
 - D. Prophase

Answers

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

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Explanations

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1. Which phase begins the process of mitosis with chromosome condensation?

- A. Prophase**
- B. Metaphase
- C. Anaphase
- D. Telophase

Chromosome condensation is the process that makes chromatin coil into visible chromosomes, and this starts in the first stage of mitosis, prophase. In prophase, chromosomes condense from loosely packed chromatin into distinct structures, the nuclear envelope begins to break down, and the spindle apparatus begins to form. This condensation prepares the chromosomes for orderly segregation later on. By metaphase, the chromosomes are fully condensed and aligned, and the later stages involve separation and reformation of nuclei rather than condensation. So the phase that begins mitosis with chromosome condensation is prophase.

2. Why must chromosomes be fully condensed before microtubule attachment to chromosomes?

- A. Condensation reduces DNA entanglement and enables accurate separation.**
- B. Condensation has no effect on separation.
- C. Condensation increases entanglement, hindering separation.
- D. Condensation only occurs after spindle attachment.

Chromosome condensation before spindle attachment is essential because condensing DNA into compact, discrete chromosomes reduces entanglement and makes attachment by spindle microtubules possible and accurate. When chromosomes are condensed, kinetochores at the centromeres can be reached by microtubules and pulled toward opposite poles without the tangled mess of long, uncondensed DNA. This compact form ensures chromosomes align properly at the metaphase plate and segregate cleanly during anaphase. If chromosomes stayed loose and entangled, spindle fibers would struggle to attach correctly, increasing the risk of mis-segregation or chromosome breakage. Condensation begins in prophase, before spindle attachment, so the idea that it occurs after attachment or has no effect, or that it increases entanglement, isn't correct.

3. Which term describes the two identical copies of a chromosome that are joined at the centromere?

- A. Centromere
- B. Sister Chromatid**
- C. Chromosome
- D. Chromatids

Two identical copies of a chromosome that are attached at the centromere are called sister chromatids. They form after DNA replication in S phase, so each chromosome has been duplicated and the two copies stay linked at the centromere. The centromere is the region where the chromatids are held together until mitosis progresses to anaphase, when they are pulled apart into separate chromosomes for distribution to the daughter cells. The term centromere describes the constricted region itself, while a chromosome can refer to the entire structure, and chromatids without the qualifier don't specify that they are the paired copies from the same chromosome. So, the precise name for the two identical copies joined at the centromere is sister chromatids.

4. Name and describe the three classes of spindle microtubules.

- A. Kinetochore microtubules attach to chromosomes.
- B. Polar microtubules interact to push poles apart.
- C. Astral microtubules anchor to the cortex and position the spindle.
- D. Kinetochore microtubules attach to chromosomes; polar microtubules interact to push poles apart; astral microtubules anchor to the cortex and position the spindle.**

The three classes are kinetochore microtubules, polar microtubules, and astral microtubules. Kinetochore microtubules attach to chromosomes at the kinetochores, and their dynamics help move chromosomes toward the metaphase plate and then pull sister chromatids apart during anaphase. Polar microtubules extend from each pole toward the center and interact with microtubules from the opposite pole; their overlap at the spindle midzone, coordinated by motor proteins, helps push the poles apart and elongate the spindle. Astral microtubules radiate toward the cell cortex, anchor to the cortex, and help position and orient the spindle within the cell by pulling on the cortex. Together, these three classes organize spindle assembly and drive accurate chromosome segregation.

5. Which mechanism ensures proper attachment of chromosomes to opposite spindle poles?

- A. Kinetochore microtubule capture and tension from bi-orientation.**
- B. Random attachment to any pole.
- C. Nuclear envelope remains intact to guide attachments.
- D. Cohesion at centromeres prevents spindle attachment.

Bi-orientation with tension is the key mechanism that makes chromosome attachment to opposite spindle poles reliable. Each chromosome has kinetochores that grab onto microtubules from opposite poles. When both kinetochores are attached to microtubules from opposite sides, pulling forces exert tension across the sister chromatids. This tension stabilizes the correct attachments and helps the cell detect and correct misattachments, so the chromosomes align so that sister chromatids are anchored to opposite poles. If attachments are random or lack this tension, they're unstable and prone to errors, and the nuclear envelope's intact state would block spindle access while cohesion at centromeres mainly holds sisters together rather than directing pole-to-pole attachment.

6. Which stage is the first stage of mitosis, during which the cell's chromatin condenses into chromosomes?

- A. Prophase**
- B. Anaphase
- C. Metaphase
- D. Telophase

During mitosis, the chromatin condenses into visible chromosomes in prophase, the first stage. This condensation makes long DNA fibers compact enough to be physically separated later. Each chromosome already consists of two sister chromatids held together at the centromere, and as prophase unfolds, the nucleolus disappears, the nuclear envelope begins to break down, and the spindle apparatus begins to form with centrosomes moving toward opposite poles. These changes set up the machinery needed to separate the chromatids in later stages. In subsequent phases, chromatid separation occurs in a, alignment at the cell's center happens in metaphase, and the nucleus re-forms with chromatin de-condensing in telophase.

7. Which statement best describes the role of condensin during mitosis?

- A. It helps condense chromosomes to prevent entanglement and enables proper segregation.
- B. Condensin breaks down the nuclear envelope.**
- C. It forms the nucleolus.
- D. It triggers cytokinesis.

The main concept here is how condensin helps chromosomes become compact during mitosis so they can be segregated cleanly. Condensin forms a ring around DNA and promotes the formation of DNA loops, which shortens and thickens the chromosomes. This condensation prevents tangling and ensures the sister chromatids can be pulled apart accurately by the spindle during anaphase. Nuclear envelope breakdown is driven by other mitotic changes and kinases that modify nuclear envelope components, not by condensin. The nucleolus disassembles during mitosis and is not formed by condensin. Cytokinesis—the final separation of the cytoplasm—depends on the contractile actomyosin ring and signaling pathways, not on condensin.

8. What event marks the onset of anaphase?

- A. Cleavage of cohesin.**
- B. Formation of a cell plate.
- C. Nuclear envelope re-forms.
- D. Chromosome replication.

Onset of anaphase happens when the cohesin proteins holding sister chromatids together are cleaved, allowing the chromatids to separate and be pulled toward opposite poles. This cleavage—driven by the enzyme separase after APC/C activation—unleashes the sister chromatids so they can move apart as microtubules shorten and the poles move farther apart. The other events occur at different stages: forming a cell plate happens during plant cytokinesis, not anaphase; the nuclear envelope re-forms in telophase; chromosome replication occurs earlier in S phase before mitosis begins.

9. During mitosis, at which stage do sister chromatids separate to become individual chromosomes?

- A. Prophase
- B. Metaphase
- C. Anaphase**
- D. Telophase

Sister chromatids separate into individual chromosomes when the cell retrieves the sister-chromatid glue and uses motor forces to pull them apart toward opposite ends. This happens after the chromatids have lined up, but before the final repartition of genetic material; the cohesin proteins holding the sisters together are cleaved, and the shortening of kinetochore microtubules drags each chromatid to a pole. That moment marks the transition from a duplicated chromosome still connected at the centromere to separate chromosomes being moved to opposite sides of the cell. So the stage where this separation occurs is anaphase. Before this stage, in prophase the chromosomes condense and the spindle forms but stay attached; in metaphase they align at the center still joined; after anaphase, in telophase, the chromosomes arrive at the poles and begin to de-condense as the nuclear envelope re-forms.

10. Which phase is characterized by nuclear membrane reforming and chromosomes de-condensing?

- A. Anaphase
- B. Metaphase
- C. Telophase**
- D. Prophase

Telophase is the stage in mitosis where the chromosomes arrive at the poles and begin to de-condense back into less visible chromatin, and the nuclear membrane reforms around each new set of chromosomes to form two distinct nuclei. This reformation signals the near completion of nuclear division, setting the stage for cytokinesis to separate the cytoplasm and complete cell division. Earlier phases show opposite processes: prophase has chromosomes condensing and the nuclear envelope breaking down, metaphase aligns condensed chromosomes at the center with no nucleus visible, and anaphase pulls sister chromatids to opposite poles without reforming the nucleus yet.

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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://phasesofmitosis.examzify.com>

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

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