

American Society for Clinical Pathology (ASCP) Technologist in Cytogenetics certification (ASCP CG) Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

This is a sample study guide. To access the full version with hundreds of questions,

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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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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!

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Questions

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- 1. What is the best type of objective lens to use when photographing a specimen?**
 - A. PlanApo 100/1.4 Oil 160/0.17**
 - B. Standard 40x objective lens**
 - C. Simple 10x objective lens**
 - D. Wide field 60x objective lens**
- 2. If GTG banded chromosomes appear ghost-like with little visible banding, what should be altered during the preparation?**
 - A. Increase trypsin time**
 - B. Decrease trypsin time**
 - C. Increase staining time**
 - D. Decrease staining temperature**
- 3. What outcome can be expected from chromosomal collapse during banding procedures?**
 - A. Visible centromeres**
 - B. Loss of genetic information**
 - C. Clearer banding patterns**
 - D. Increased chromosome visibility**
- 4. What technique should be used to analyze chromosomes when satellites are suspected?**
 - A. G-banding**
 - B. NOR banding**
 - C. FISH**
 - D. Q-banding**
- 5. What factor significantly impacts the quality of chromosomes viewed under a phase contrast microscope?**
 - A. Type of phase scope used**
 - B. Slide drying after cells have been dropped**
 - C. Time elapsed since sample preparation**
 - D. Sample storage temperature**

6. Which component of a brightfield microscope is used to manipulate contrast?

- A. Stage clips**
- B. Condenser aperture diaphragm**
- C. Objective lenses**
- D. Focusing knobs**

7. What region of the chromosome does quinacrine and acridine orange dyes typically stain?

- A. GC rich DNA**
- B. AT rich DNA**
- C. Centromeric DNA**
- D. Telomeric DNA**

8. What procedure is LEAST likely to be informative for a patient with questionable leukemia and a low white cell count?

- A. Bone marrow aspiration**
- B. PHA-stimulated blood culture**
- C. FISH analysis**
- D. Cytogenetic panel**

9. Which nomenclature is correct for a patient with Down syndrome with only trisomy 21 found?

- A. 46,XY,+21**
- B. 47,XX,+21**
- C. 47,XY,+21c[20]**
- D. 48,XY,+21**

10. What advantage does culturing living cells provide over direct harvest for chromosome analysis?

- A. Lower cost of materials**
- B. More accurate results**
- C. Better morphology of chromosomes**
- D. Faster processing time**

Answers

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

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Explanations

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1. What is the best type of objective lens to use when photographing a specimen?

- A. PlanApo 100/1.4 Oil 160/0.17**
- B. Standard 40x objective lens**
- C. Simple 10x objective lens**
- D. Wide field 60x objective lens**

The PlanApo 100/1.4 Oil 160/0.17 objective lens is the most suitable choice for photographing a specimen due to its high numerical aperture (NA) of 1.4 and its specific design that allows for excellent resolution and contrast. The "Plan" designation indicates that this lens is corrected for field curvature, providing a flat field of view across the entire image. The "Apo" stands for apochromatic, meaning that it has been specifically designed to minimize chromatic aberration, allowing for multiple wavelengths of light to converge on the same plane. The use of oil immersion enhances the lens's light-gathering ability, resulting in a brighter and clearer image, which is crucial for detailed photography of microscopic specimens. This lens's combination of high magnification, superior resolution, and excellent optical corrections makes it ideal for capturing the fine details that can be critical when documenting cytogenetic specimens. In contrast, the other lenses may not offer the same level of performance in terms of resolution, lighting, and image quality, making them less suitable for photography purposes.

2. If GTG banded chromosomes appear ghost-like with little visible banding, what should be altered during the preparation?

- A. Increase trypsin time**
- B. Decrease trypsin time**
- C. Increase staining time**
- D. Decrease staining temperature**

When GTG banding results in chromosomes that appear ghost-like with minimal visible banding, it indicates that there may have been excessive digestion of the chromosome spreads, leading to the loss of banding pattern detail. Since trypsin is the enzyme used during the GTG banding process, decreasing the trypsin time is a key adjustment to improve the visibility of chromosome bands. Reducing the time the chromosomes are exposed to trypsin ensures that the enzyme does not digest the chromatin too thoroughly, allowing for the preservation of the banding patterns that are critical for analysis. Adequate banding is essential for identifying chromosomal abnormalities, and a balance must be achieved in enzyme exposure time to prevent excessive digestion. Changes to staining time or temperature may alter the coloration or contrast of the bands but would not directly address the loss of structure that characterizes the ghost-like appearance. Therefore, decreasing trypsin time is the most effective approach to restoring the visibility of the chromosomal bands during preparation.

3. What outcome can be expected from chromosomal collapse during banding procedures?

- A. Visible centromeres**
- B. Loss of genetic information**
- C. Clearer banding patterns**
- D. Increased chromosome visibility**

The expected outcome of chromosomal collapse during banding procedures is clearer banding patterns. Chromosomal collapse refers to the process where chromosomes, typically in a condensed state during cell division, become more organized during the banding technique. This organization allows for distinct bands to become visible, which represent variations in chromatin density and help in the identification of specific chromosomal regions and abnormalities. A clearer banding pattern is crucial for cytogenetic analysis, as it enhances the ability to distinguish individual chromosomes and elucidate their structures. This increased clarity is particularly important during karyotyping and in identifying translocations, deletions, or other chromosomal anomalies. While the presence of distinct banding patterns enhances visibility, the other potential outcomes, such as the visibility of centromeres or loss of genetic information, pertain to different aspects of the chromosomal structure and stability rather than the direct result of chromosomal collapse during the banding technique.

4. What technique should be used to analyze chromosomes when satellites are suspected?

- A. G-banding**
- B. NOR banding**
- C. FISH**
- D. Q-banding**

When analyzing chromosomes where satellites are suspected, NOR banding is the most appropriate technique to use. NOR banding specifically targets the nucleolar organizer regions (NORs) on chromosomes, which are areas involved in ribosomal RNA synthesis. These NORs are associated with the presence of satellites, which are repetitive DNA sequences located on the acrocentric chromosomes. By employing NOR banding, one can visualize the nucleolar organizer regions and identify the presence and structure of satellite DNA, making it ideal for cases where there are suspicions of abnormal satellite arrangements or numbers. In contrast, G-banding is commonly used for general chromosome analysis and karyotyping, but it does not specifically highlight the nucleolar organizer regions. FISH (Fluorescence In Situ Hybridization) can provide more targeted information and is useful for detecting specific DNA sequences, but it does not inherently focus on the assessment of satellites associated with nucleolar organizers. Q-banding, while useful for visualizing certain chromosome features, does not specifically address the presence of satellite DNA and NORs as effectively as NOR banding.

5. What factor significantly impacts the quality of chromosomes viewed under a phase contrast microscope?

- A. Type of phase scope used**
- B. Slide drying after cells have been dropped**
- C. Time elapsed since sample preparation**
- D. Sample storage temperature**

The quality of chromosomes viewed under a phase contrast microscope is significantly impacted by slide drying after cells have been dropped. Proper slide preparation, specifically the drying time, is crucial for maintaining the structural integrity of the chromosomes. If cells are allowed to dry too quickly or become overly dehydrated, it can lead to distortion or loss of clarity, making it difficult to accurately assess the chromosomal morphology. Furthermore, adequate drying helps in achieving a suitable level of contrast, which is essential when utilizing a phase contrast microscope. When the sample is properly dried, it ensures that the chromosomes are better visualized against the background. This clarity is key for further analysis, such as identifying specific chromosomal abnormalities or structural features. In contrast, factors such as the type of phase scope used, the time elapsed since sample preparation, and sample storage temperature might influence visualization but are not as critical to the immediate quality of the chromosome assessment as the drying process is. While these other factors can impact overall preparation and analysis, it is the slide drying that has the most direct and immediate effect on the visibility of chromosomal characteristics under the microscope.

6. Which component of a brightfield microscope is used to manipulate contrast?

- A. Stage clips**
- B. Condenser aperture diaphragm**
- C. Objective lenses**
- D. Focusing knobs**

The component of a brightfield microscope used to manipulate contrast is the condenser aperture diaphragm. This diaphragm helps control the amount of light that passes through the specimen by varying the diameter of the light beam coming from the condenser. By adjusting this diaphragm, the microscopist can optimize the contrast of the image being viewed. When the diaphragm is closed slightly, it increases contrast by reducing the amount of light and enhancing the differences in optical density between the specimen and the background. This is particularly useful when examining transparent specimens that may otherwise appear faint. Other components mentioned have different functions: stage clips secure the slides in place, objective lenses magnify the specimen, and focusing knobs adjust the focal length to bring the specimen into sharp focus. These components do not actively manipulate the light intensity in a way that enhances contrast in the images produced by the microscope.

7. What region of the chromosome does quinacrine and acridine orange dyes typically stain?

- A. GC rich DNA**
- B. AT rich DNA**
- C. Centromeric DNA**
- D. Telomeric DNA**

Quinacrine and acridine orange dyes are primarily known for their ability to stain AT-rich regions of DNA. These dyes intercalate into the DNA double helix, and their fluorescence intensity is affected by the base composition; specifically, they exhibit a higher affinity for adenine-thymine (A-T) base pairs compared to guanine-cytosine (G-C) base pairs. This property makes them particularly useful for identifying specific chromosomal structures and regions during cytogenetic analyses. The staining pattern created by these dyes is utilized in various applications, including identifying certain chromosomal abnormalities and the overall structural organization of chromosomes. Understanding how these dyes target AT-rich DNA is crucial for interpreting cytogenetic results and further applying this knowledge in clinical settings.

8. What procedure is LEAST likely to be informative for a patient with questionable leukemia and a low white cell count?

- A. Bone marrow aspiration**
- B. PHA-stimulated blood culture**
- C. FISH analysis**
- D. Cytogenetic panel**

The procedure that is least likely to be informative for a patient with questionable leukemia and a low white cell count is a PHA-stimulated blood culture. PHA (phytohemagglutinin) is a mitogen that stimulates lymphocyte proliferation. In the context of evaluating leukemia, high white blood cell counts are often anticipated, as leukemia is characterized by the overproduction of immature or abnormal blood cells. A low white cell count may indicate that the peripheral blood is not providing sufficient cellularity to demonstrate the abnormalities associated with leukemia. In cases where leukemic cells are scarce, the PHA-stimulated blood culture might not yield informative results, as the low baseline cell count can limit cell division and proliferation needed for effective analysis. On the other hand, bone marrow aspiration is more likely to provide valuable diagnostic information. It directly samples the bone marrow where leukemic cells may be more abundant. FISH analysis and cytogenetic panels are also vital because they can detect specific chromosomal abnormalities associated with various leukemias, which can be present even when the peripheral blood count is low.

9. Which nomenclature is correct for a patient with Down syndrome with only trisomy 21 found?

- A. 46,XY,+21**
- B. 47,XX,+21**
- C. 47,XY,+21c[20]**
- D. 48,XY,+21**

In the context of cytogenetics, the correct nomenclature for a patient with Down syndrome due to trisomy 21, specifically when referring to a male patient, would typically start with the total number of chromosomes followed by the sex chromosome composition and the aneuploidy notation for the affected chromosome. The notation 47,XY,+21 indicates that there are 47 chromosomes, the individual is male (XY), and there is an additional copy of chromosome 21, which is consistent with Down syndrome. The "c" in the option that includes it signifies that there is a cytogenetic notation following it, often used to indicate a specific variant or structural anomaly, and the brackets may further specify details about the chromosomes. However, in many contexts, when simply describing trisomy 21, the inclusion of such specific details is not necessary unless it pertains to a certain classification or additional findings. Given that Down syndrome is characterized specifically by the presence of three copies of chromosome 21, the correct nomenclature would likely only need to indicate the presence of the third copy, without the additional details provided in option C. Therefore, while option C might provide extra information, the simpler and more universally recognized nomenclature would be seen in options like A

10. What advantage does culturing living cells provide over direct harvest for chromosome analysis?

- A. Lower cost of materials**
- B. More accurate results**
- C. Better morphology of chromosomes**
- D. Faster processing time**

Culturing living cells before conducting chromosome analysis offers the advantage of better morphology of chromosomes. When cells are cultured, they can progress through the cell cycle, particularly to the metaphase stage, where chromosomes are most condensed and well-defined. This enhanced condensation improves the visibility and distinctness of chromosome structure, making it easier to analyze for genetic abnormalities or karyotyping. The morphology of chromosomes is crucial for accurate analysis because well-defined chromosomes can help identify structural abnormalities, such as translocations, deletions, and duplications. Adequate chromosome morphology is essential for a thorough examination, ensuring that any potential anomalies can be detected reliably. Without culture, direct harvest may result in chromosomes that are less distinct, potentially leading to misinterpretation or failure to identify problematic areas of the genome. Other options, such as lower cost of materials, more accurate results, and faster processing time, do not specifically stem from the advantage offered by cell culturing. While these factors might be important, they do not directly relate to the enhancement in chromosome morphology that comes from culturing cells before analysis.

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://ascp-technologistincytogenicscertification.examzify.com>

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

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