

Amgen Biotech Experience (ABE) Lab 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. Hydrophobic interaction chromatography relies on which protein property?**
 - A. Net charge at physiological pH**
 - B. Overall molecular weight**
 - C. Hydrophobicity of amino acid side chains**
 - D. Specific ligand affinity**

- 2. Why are the colonies red on the LB/amp/ara plate but not on the LB/amp plate?**
 - A. Arabinose enables expression of red fluorescent protein via araC and Pbad.**
 - B. Ampicillin is required for red pigment synthesis.**
 - C. Red pigment is produced only when lactose is present.**
 - D. Red color is inherent to transformed colonies regardless of media.**

- 3. How can a human gene be expressed in bacteria?**
 - A. By exposing to high temperature**
 - B. By mutating the gene**
 - C. By placing the gene under a bacterial promoter on a plasmid**
 - D. By removing introns from the gene**

- 4. The para-R plasmid replicated in a bacterial cell may exist before digestion in which configurations?**
 - A. Supercoiled**
 - B. Nicked circle**
 - C. Multimer**
 - D. All three configurations**

- 5. In the R+ lane, where is the 807 bp rfp fragment relative to ladder marks?**
 - A. Between 1,000 bp and 500 bp**
 - B. Between 4,000 bp and 5,000 bp**
 - C. At the top of the ladder**
 - D. At the bottom of the ladder**

- 6. In what circumstances might it be important to use gel electrophoresis to separate and identify plasmids and short linear pieces of DNA?**
- A. If you want to photograph the gel for a lab display**
 - B. If you want to measure protein concentration**
 - C. If you are making a recombinant plasmid and have to verify that you have been successful**
 - D. If you want to sequence the whole genome**
- 7. Why is a protein's conformation important for carrying out its function?**
- A. The color of the protein.**
 - B. It creates binding sites on the surface that allow attachment to other molecules.**
 - C. It has no impact on interactions with other molecules.**
 - D. It only affects the rate of protein synthesis.**
- 8. Why did E. coli grow on both the P- and P+ sides of the LB plate?**
- A. The LB plate provided nutrients for all cells regardless of plasmid.**
 - B. Only P+ cells could grow due to plasmid.**
 - C. P- side had no nutrients.**
 - D. The plate had a selective color indicator.**
- 9. Why is ampicillin added to the agar plate in plasmid experiments?**
- A. To promote growth of all bacteria on the plate**
 - B. To select for cells that have integrated the plasmid into the chromosome**
 - C. To select for bacterial cells that contain the plasmid due to antibiotic resistance**
 - D. To measure transformation efficiency by colony color**
- 10. Why was ampicillin included in the overnight culture?**
- A. To allow transformed E. coli cells to grow and divide.**
 - B. To kill non-transformants.**
 - C. To provide carbon source.**
 - D. To inhibit growth of all cells.**

Answers

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

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Explanations

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1. Hydrophobic interaction chromatography relies on which protein property?

- A. Net charge at physiological pH
- B. Overall molecular weight
- C. Hydrophobicity of amino acid side chains**
- D. Specific ligand affinity

The key idea is that hydrophobic interaction chromatography separates proteins based on how hydrophobic their surface regions are. The column has a hydrophobic stationary phase, and under high salt conditions, water is structured in a way that strengthens hydrophobic interactions. Proteins with more exposed hydrophobic amino acid side chains bind more strongly to the column and thus elute later as the salt concentration is lowered. So the property being exploited is the hydrophobicity of the protein's surface. Net charge at physiological pH would drive binding in ion-exchange chromatography, not HIC; overall molecular weight affects separation by size in size-exclusion chromatography; and specific ligand affinity governs affinity chromatography.

2. Why are the colonies red on the LB/amp/ara plate but not on the LB/amp plate?

- A. Arabinose enables expression of red fluorescent protein via araC and Pbad.**
- B. Ampicillin is required for red pigment synthesis.
- C. Red pigment is produced only when lactose is present.
- D. Red color is inherent to transformed colonies regardless of media.

Arabinose acts as an inducer for the araC-Pbad system. When arabinose is present, AraC changes shape and activates transcription from the Pbad promoter, turning on the expression of the red pigment gene. That makes the colonies appear red on the LB/amp/ara plate. In contrast, without arabinose, this promoter stays off (AraC represses it), so the pigment isn't produced and the colonies aren't red. Ampicillin is only there to select for transformed cells in both plates; it doesn't drive pigment production.

3. How can a human gene be expressed in bacteria?

- A. By exposing to high temperature
- B. By mutating the gene
- C. By placing the gene under a bacterial promoter on a plasmid**
- D. By removing introns from the gene

Expressing a human gene in bacteria requires a DNA construct that bacteria can read and maintain. Bacteria use promoters that are recognized by their RNA polymerase to start transcription, and a plasmid serves as the vehicle to carry the gene into the bacterial cell and to replicate. Placing the human gene downstream of a bacterial promoter on a plasmid provides both the transcriptional signal and the means to produce the mRNA and, ultimately, protein inside the bacteria. In practice, the gene is often used in a form without introns (cDNA) because bacteria lack the machinery to splice introns, but the essential step for expression is supplying a bacterial promoter on a plasmid. Exposing cells to high temperature does not create the necessary transcriptional control, mutating the gene does not enable expression, and removing introns alone does not provide the promoter and vector required for expression.

4. The para-R plasmid replicated in a bacterial cell may exist before digestion in which configurations?

- A. Supercoiled**
- B. Nicked circle**
- C. Multimer**
- D. All three configurations**

Plasmid DNA in a bacterial cell can adopt multiple topological forms at the same time, because DNA topology changes during replication, repair, and maintenance. One common state is supercoiled DNA, where negative supercoils tighten the circle and make the molecule compact. A nicked circle can also occur when one strand is broken, relaxing the circle so it is no longer supercoiled and behaves differently in experiments. Additionally, plasmids can form multimers, such as dimers or higher-order concatenates, through recombination or certain replication processes, yielding larger circular molecules than a single unit. Since these processes can all be active in the same cell, plasmid DNA may be found in all three configurations before any digestion. Each form has distinct properties and will migrate differently during analysis, which is why all three configurations are possible.

5. In the R+ lane, where is the 807 bp rfp fragment relative to ladder marks?

- A. Between 1,000 bp and 500 bp**
- B. Between 4,000 bp and 5,000 bp**
- C. At the top of the ladder**
- D. At the bottom of the ladder**

In gel electrophoresis, DNA fragments separate by size: smaller fragments migrate farther toward the bottom, and a ladder provides reference bands at known base-pair lengths. An 807 bp fragment is smaller than 1,000 bp but larger than 500 bp, so its band will appear between the 1,000 bp and 500 bp marks on the ladder. It wouldn't sit at the top (largest) or bottom (smallest) of the ladder. Therefore, the 807 bp fragment is found between 1,000 bp and 500 bp.

6. In what circumstances might it be important to use gel electrophoresis to separate and identify plasmids and short linear pieces of DNA?

- A. If you want to photograph the gel for a lab display**
- B. If you want to measure protein concentration**
- C. If you are making a recombinant plasmid and have to verify that you have been successful**
- D. If you want to sequence the whole genome**

Gel electrophoresis is used here because it lets you separate DNA by size and by form, so you can tell whether a plasmid and any inserted DNA are present in the expected amounts and lengths. When you create a recombinant plasmid, the plasmid backbone plus the inserted fragment should produce a DNA pattern with bands at specific sizes. Running a gel after cloning (or after a digest you use to check the construct) shows whether the recombinant plasmid is present and whether the insert is correctly incorporated, since the fragments will appear at predictable sizes. You can also distinguish different forms of plasmid DNA (like supercoiled versus linear) because they migrate differently, which helps confirm you've got the right construct overall. This verification step is crucial before moving on to sequencing or expression. Other options don't fit as well because measuring protein concentration is about proteins, not DNA constructs; sequencing a whole genome isn't about checking a specific recombinant plasmid; and photographing a gel is a display step rather than a method to verify that the cloning worked. The answer that best fits is using gel electrophoresis to confirm you've successfully created the recombinant plasmid.

7. Why is a protein's conformation important for carrying out its function?

- A. The color of the protein.**
- B. It creates binding sites on the surface that allow attachment to other molecules.**
- C. It has no impact on interactions with other molecules.**
- D. It only affects the rate of protein synthesis.**

Protein function hinges on its three-dimensional shape, which forms specific surfaces and binding pockets. That precise conformation creates binding sites with the right size, shape, and chemical properties to recognize and attach to other molecules such as substrates, ligands, or partner proteins. When the protein folds into the correct shape, these sites can form the necessary interactions (like complementary shape and charge), enabling the biological activity to occur. If the conformation changes or is disrupted, the binding site may no longer fit its partner, and the function can be lost or altered. This is why the best answer emphasizes that the surface binding sites allow attachment to other molecules, enabling the protein to carry out its role. The other options are not accurate: color has no effect on function, conformation does impact interactions, and function is not limited to changing the rate of protein synthesis.

8. Why did E. coli grow on both the P- and P+ sides of the LB plate?

A. The LB plate provided nutrients for all cells regardless of plasmid.

B. Only P+ cells could grow due to plasmid.

C. P- side had no nutrients.

D. The plate had a selective color indicator.

On a nutrient-rich LB plate, bacteria can grow regardless of whether they carry a plasmid. The plasmid isn't providing nutrients, so without any selection pressure (like an antibiotic), both plasmid-containing and plasmid-free cells have access to the same nutrients in the medium and can form colonies. The presence or absence of the plasmid only matters when a selective agent or specific marker is used. Since the plate is just LB, it supports growth of both P- and P+ cells.

9. Why is ampicillin added to the agar plate in plasmid experiments?

A. To promote growth of all bacteria on the plate

B. To select for cells that have integrated the plasmid into the chromosome

C. To select for bacterial cells that contain the plasmid due to antibiotic resistance

D. To measure transformation efficiency by colony color

Ampicillin selection relies on antibiotic resistance encoded on the plasmid. After you introduce the plasmid into bacterial cells, you plate them on medium containing ampicillin. Only the cells that have taken up the plasmid and express the resistance gene can survive the antibiotic, while non-transformed cells are inhibited or killed. This makes the growing colonies a direct readout of which cells acquired the plasmid. This approach doesn't promote growth of all bacteria, since the antibiotic blocks growth of those without resistance. It isn't about the plasmid integrating into the chromosome—selection is tied to the presence of the resistance gene, which is carried by the plasmid in standard experiments. And it isn't a method to measure transformation efficiency by colony color; color screening uses a reporter gene (like lacZ or GFP) for visual signals, whereas ampicillin selection simply indicates which cells carry the plasmid.

10. Why was ampicillin included in the overnight culture?

A. To allow transformed E. coli cells to grow and divide.

B. To kill non-transformants.

C. To provide carbon source.

D. To inhibit growth of all cells.

Ampicillin acts as a selective pressure in transformation experiments. The plasmid you introduce into E. coli carries an ampicillin resistance gene, so only cells that took up the plasmid can survive and keep growing in the presence of the antibiotic.

Non-transformants, which lack the resistance, are killed or unable to divide. This selective environment enriches for cells that carry the plasmid, making it easier to identify and study the transformed population. Ampicillin isn't a carbon source, and it doesn't suppress growth of all cells—only the ones without resistance are affected.

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://amgenabelab.examzify.com>

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

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