

ASCP MOLECULAR BIOLOGY (MB) TECHNOLOGIST PRACTICE EXAM (SAMPLE) STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE

<https://ascpmolecularbiology.examzify.com>



Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

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	16

SAMPLE

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

SAMPLE

- 1. Which two viruses can be detected using hybrid capture alongside HPV?**
 - A. HIV and HCV
 - B. Hepatitis B virus and CMV
 - C. Influenza and RSV
 - D. Norovirus and Adenovirus
- 2. What is the primary function of eukaryotic DNA Polymerase ϵ ?**
 - A. Replication of the lagging strand
 - B. Base excision repair
 - C. DNA replication and repair, mainly for the leading strand
 - D. Primase activity for initiating replication
- 3. Which gene mutation is closely associated with Fragile X syndrome?**
 - A. CFTR
 - B. F5
 - C. H63D
 - D. FMR1
- 4. What is the main application of Strand Displacement Amplification (SDA)?**
 - A. High-throughput RNA sequencing
 - B. Detection of *M. tuberculosis*
 - C. Identification of protein structures
 - D. Analysis of mammalian genetics
- 5. Which chromosome contains the HLA genes?**
 - A. Chromosome 1
 - B. Chromosome 6
 - C. Chromosome 12
 - D. Chromosome 15
- 6. If the environment is too stringent, what will happen to the probe and target?**
 - A. They will bind successfully
 - B. They will not bind
 - C. They will form a stable hybrid
 - D. They will denature

- 7. Which oncogene is involved in chronic myeloid leukemia?**
- A. HER2
 - B. BCR-Abl
 - C. KRAS
 - D. EGFR
- 8. Which cancers are primarily associated with the Philadelphia chromosome (t(9;22))?**
- A. Pediatric ALL, Adult ALL, CML
 - B. CML, Adult ALL, Pediatric ALL
 - C. CML, Pediatric ALL, Adult ALL
 - D. Adult ALL, CML, Pediatric ALL
- 9. Which MHC class is primarily involved in signaling and communication rather than antigen binding?**
- A. MHC-I
 - B. MHC-II
 - C. MHC-III
 - D. None of the above
- 10. Which type of amplification technique does the Ligase Chain Reaction belong to?**
- A. Signal Amplification
 - B. Probe Amplification
 - C. Target Amplification
 - D. Polymerase Amplification

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Which two viruses can be detected using hybrid capture alongside HPV?

- A. HIV and HCV
- B. Hepatitis B virus and CMV**
- C. Influenza and RSV
- D. Norovirus and Adenovirus

The selection of Hepatitis B virus (HBV) and Cytomegalovirus (CMV) as viruses detectable alongside HPV using hybrid capture technology is based on the capabilities of hybrid capture assays. This method is particularly useful for identifying specific nucleic acid sequences within a mixture, which is essential for the diagnosis of various viral infections. Hybrid capture assays utilize the principle of hybridization, where DNA or RNA from the target virus is captured with a labeled probe and then detected. Both HBV and CMV have well-characterized nucleic acids that can be efficiently targeted through this technique. HBV, being a major cause of liver disease, and CMV, which can lead to significant morbidity, especially in immunocompromised individuals, are important pathogens that benefit from this detection method. In contrast, the other options include viruses that are generally not detected together with HPV using hybrid capture. HIV and HCV, while also significant viruses, are typically tested through different molecular methods, mainly due to their different clinical contexts and infection pathways. Influenza and RSV are respiratory viruses that are not usually associated with HPV infections, and detection methods used for them focus on respiratory samples and different viral particle characteristics. Norovirus and Adenovirus also employ different detection techniques and would not

2. What is the primary function of eukaryotic DNA Polymerase ϵ ?

- A. Replication of the lagging strand
- B. Base excision repair
- C. DNA replication and repair, mainly for the leading strand**
- D. Primase activity for initiating replication

Eukaryotic DNA Polymerase ϵ plays a critical role in the replication of DNA, primarily focusing on the leading strand. During DNA replication, the leading strand is synthesized in a continuous manner, as opposed to the lagging strand, which is synthesized in discontinuous fragments known as Okazaki fragments. DNA Polymerase ϵ is specifically responsible for this continuous synthesis as it has a high processivity and is essential for accurately and efficiently elongating the leading strand. In addition to its primary role in leading strand replication, DNA Polymerase ϵ is also involved in the repair mechanisms of DNA, contributing to the overall integrity of the genetic material. This dual functionality emphasizes its importance in maintaining both the replication process and the response to DNA damage. Understanding the specific activities of different polymerases, including DNA Polymerase ϵ , allows for a more profound insight into eukaryotic cellular processes related to DNA replication and repair mechanisms.

3. Which gene mutation is closely associated with Fragile X syndrome?

- A. CFTR
- B. F5
- C. H63D
- D. FMR1**

Fragile X syndrome is most closely associated with mutations in the FMR1 gene. This gene is located on the X chromosome and is responsible for producing the FMRP (Fragile X Mental Retardation Protein), which plays a crucial role in neuronal development and function. In individuals with Fragile X syndrome, there is typically a CGG trinucleotide repeat expansion within the FMR1 gene. When the number of repeats exceeds a certain threshold (usually over 200), it leads to methylation of the gene and subsequent silencing, resulting in the absence of functional FMRP. The lack of this protein affects synaptic function and is linked to the cognitive and behavioral features associated with Fragile X syndrome, including intellectual disability and autism spectrum disorders. The other gene mutations listed do not have a direct connection to Fragile X syndrome. For instance, CFTR is associated with cystic fibrosis, F5 is related to clotting disorders, and H63D is a variant of the HFE gene linked to hereditary hemochromatosis. Therefore, the FMR1 gene is specifically implicated in Fragile X syndrome due to its vital role and the mechanism involved in the disorder.

4. What is the main application of Strand Displacement Amplification (SDA)?

- A. High-throughput RNA sequencing
- B. Detection of *M. tuberculosis***
- C. Identification of protein structures
- D. Analysis of mammalian genetics

*Strand Displacement Amplification (SDA) is primarily utilized for the detection of specific nucleic acid sequences, making it particularly effective for identifying pathogens such as *Mycobacterium tuberculosis* (*M. tuberculosis*). The technique harnesses the properties of DNA polymerase, which can displace downstream DNA strands during replication, allowing for a rapid and efficient amplification of target sequences even in the presence of contaminating nucleic acids. SDA's sensitivity and specificity are key advantages when diagnosing infectious diseases, including tuberculosis, which is crucial due to the need for timely identification and treatment. The amplification process used in SDA results in a significant increase in the amount of target DNA, enabling detection methods that can confirm the presence of pathogens in clinical samples. Other options, such as high-throughput RNA sequencing, identification of protein structures, and analysis of mammalian genetics, do not align with the core function of SDA. High-throughput RNA sequencing involves techniques that process and sequence a large number of RNA molecules rather than amplifying specific DNA sequences. Identifying protein structures pertains more to techniques in biochemistry and structural biology, while mammalian genetics analysis generally employs different molecular techniques such as PCR or sequencing approaches tailored for genetic composition rather than amplification strategies like SDA.*

5. Which chromosome contains the HLA genes?

- A. Chromosome 1
- B. Chromosome 6**
- C. Chromosome 12
- D. Chromosome 15

The HLA (human leukocyte antigen) genes are located on chromosome 6. This chromosome houses a critical region known as the Major Histocompatibility Complex (MHC), which plays a vital role in the immune system by helping the body distinguish between self and non-self entities. The HLA genes are particularly important for the regulation of the immune response and are involved in the presentation of antigens to T cells. The MHC is divided into several classes, with class I molecules (such as HLA-A, HLA-B, and HLA-C) presenting antigens to CD8+ cytotoxic T cells, whereas class II molecules (such as HLA-DP, HLA-DQ, and HLA-DR) present antigens to CD4+ helper T cells. The diversity of HLA genes is crucial for the immune system's ability to recognize different pathogens, and variations in these genes can influence individual susceptibility to various diseases. The incorrect choices pertain to chromosomes that do not contain the HLA gene cluster. Chromosome 1, 12, and 15 have different sets of genes and genetic markers that do not directly pertain to the HLA complex. Thus, identifying chromosome 6 as the location for H

6. If the environment is too stringent, what will happen to the probe and target?

- A. They will bind successfully
- B. They will not bind**
- C. They will form a stable hybrid
- D. They will denature

In a stringent environment, conditions such as high temperatures or high salt concentrations can disrupt non-specific interactions between the probe and target nucleic acids. This results in a significant reduction in the likelihood of annealing or hybridization. When the environment is overly stringent, the probe is unable to form stable base pairs with the target DNA or RNA, leading to a failure in binding. The binding of nucleic acids relies on specific hydrogen bonding between complementary bases, and if the conditions are too harsh, these interactions can be disrupted. An effective hybridization requires optimal temperature and ionic conditions to facilitate this process. Therefore, under stringent conditions, the probe and target will not bind, supporting the answer that they will not bind. Understanding this principle is essential when designing experiments involving probes in molecular biology, as it emphasizes the importance of optimizing environmental conditions for successful hybridization.

7. Which oncogene is involved in chronic myeloid leukemia?

- A. HER2
- B. BCR-Abl**
- C. KRAS
- D. EGFR

Chronic myeloid leukemia (CML) is primarily characterized by the presence of a specific genetic abnormality known as the Philadelphia chromosome. This chromosome results from a translocation between chromosome 9 and chromosome 22, leading to the fusion of two genes: BCR (Breakpoint Cluster Region) and ABL (Abelson Murine Leukemia Viral Oncogene Homolog). The resultant fusion protein, BCR-Abl, acts as a tyrosine kinase that promotes cell proliferation and inhibits apoptosis, contributing to the development of leukemia. Understanding the role of BCR-Abl in CML is crucial because it serves as both a diagnostic marker and a therapeutic target. Treatments such as tyrosine kinase inhibitors (e.g., imatinib) have been developed specifically to inhibit the activity of the BCR-Abl protein, significantly improving outcomes for patients with CML. Other options listed represent oncogenes associated with different cancers or pathways but are not specifically linked to CML. HER2 is predominantly related to breast cancer, KRAS is involved in various solid tumors, and EGFR is associated with lung and head and neck cancers. None of these contribute to the pathogenesis of chronic myeloid leukemia in the way that BCR-A

8. Which cancers are primarily associated with the Philadelphia chromosome (t(9;22))?

- A. Pediatric ALL, Adult ALL, CML
- B. CML, Adult ALL, Pediatric ALL
- C. CML, Pediatric ALL, Adult ALL**
- D. Adult ALL, CML, Pediatric ALL

The Philadelphia chromosome, resulting from a translocation between chromosomes 9 and 22 (t(9;22)), is primarily linked to specific blood cancers. Its presence is most notably associated with Chronic Myeloid Leukemia (CML) and certain forms of Acute Lymphoblastic Leukemia (ALL). CML is most frequently characterized by the Philadelphia chromosome, which leads to the production of the BCR-ABL fusion protein, driving the uncontrolled proliferation of myeloid cells. This genetic alteration is a crucial diagnostic marker for CML and is fundamental in the development of targeted therapies, such as tyrosine kinase inhibitors. In the context of Acute Lymphoblastic Leukemia, both adult and pediatric cases may exhibit the presence of the Philadelphia chromosome, although it is more common and carries a poorer prognosis in adults. The BCR-ABL fusion gene within ALL also contributes to the pathogenesis of this disease. Thus, selecting the response associating CML, Pediatric ALL, and Adult ALL accurately reflects the established link of the Philadelphia chromosome and its clinical significance across these hematological malignancies.

9. Which MHC class is primarily involved in signaling and communication rather than antigen binding?

- A. MHC-I
- B. MHC-II
- C. MHC-III**
- D. None of the above

MHC class III is primarily involved in signaling and communication rather than directly participating in antigen presentation. While MHC class I and MHC class II molecules are typically recognized for their roles in binding and presenting peptides to T cells, MHC class III molecules contribute to the immune response through the production of various cytokines and complement proteins, which are essential for cell signaling and communication between immune cells. This functional distinction highlights the importance of MHC class III in modulating immune reactions, even though it does not bind antigens in the manner that MHC class I and MHC class II molecules do. Understanding this division helps clarify the roles of different molecules in the immune response and their mechanisms of action, illustrating that MHC class III is more about facilitating communication within the immune system rather than presenting specific antigens to T cells.

10. Which type of amplification technique does the Ligase Chain Reaction belong to?

- A. Signal Amplification
- B. Probe Amplification**
- C. Target Amplification
- D. Polymerase Amplification

The Ligase Chain Reaction (LCR) is classified under probe amplification techniques. In this method, specific DNA probes are used that are complementary to adjacent sections of the target sequence. The key feature of LCR is the use of DNA ligase to join the two probes that have hybridized to the target sequence. This ligation step effectively amplifies the signal of the target DNA without needing to replicate the entire target sequence itself, which is a hallmark of probe amplification methods. This type of amplification is particularly valuable for detecting specific sequences, as it allows the incorporation of multiple rounds of ligation to increase sensitivity and specificity. Probe amplification methods like LCR are often advantageous when trying to identify low-abundance targets, as they can selectively enrich for sequences of interest based on the designed probes.

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://ascpmolecularbiology.examzify.com>

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

SAMPLE