DNA REPLICATION PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://dnareplication.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 15

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.

SAMPLE

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!

SAMPLE

Questions

SAMPLE

1. Thymine dimers are covalent links between adjacent thymine bases caused by UV exposure. They are an example of which type of lesion?

A. Nucleotide excision lesion

B. Interstrand crosslinks

C. Pyrimidine dimers

D. Single-base substitutions

2. What is the term for the particular sequence in the genome where DNA replication begins?

A. Replication bubble

B. Origin of replication

C. Template strand

D. Replication fork

3. Depurination due to thermal energy results in what?

A. Depurination

B. Deamination

C. Methylation

D. Ubiquitination

4. What is the function of replication protein A (RPA) in eukaryotic replication?

A. Binds and stabilizes single-stranded DNA, preventing secondary structures

B. Unwinds double-stranded DNA

C. Priming RNA synthesis

D. Ligation of breaks

5. What are replication factories?

A. Nuclear pores

B. Nuclear subdomains where several replication forks are active

C. Centrosomes

D. Mitochondrial nucleoid sites

SAMPLE

6. Which enzyme catalyzes the formation of the phosphodiester bond to seal the BER gap?

A. DNA Polymerase

B. RNA Ligase

C. DNA Ligase

D. AP Endonuclease

7. What is the function of the clamp at the replication fork?

A. It seals nicks between fragments

B. It holds DNA polymerase to the lagging strand

C. It unwinds the DNA ahead of the fork

D. It primes RNA synthesis on the lagging strand

8. Which enzyme introduces a double-stranded break ahead of the replication fork to relieve torsional stress?

A. Gyrase (topoisomerase II)

B. Helicase

C. Primase

D. Ligase

9. Which model suggested random interspersion of parental and new segments in daughter DNA molecules?

A. Dispersive replication

B. Semiconservative replication

C. Conservative replication

D. Origin of replication

10. Which enzyme is responsible for synthesizing RNA primers during DNA replication?

A. Primase

B. DNA polymerase

C. Helicase

D. Ligase

SAMPLE

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Thymine dimers are covalent links between adjacent thymine bases caused by UV exposure. They are an example of which type of lesion?

A. Nucleotide excision lesion

B. Interstrand crosslinks

C. Pyrimidine dimers

D. Single-base substitutions

UV exposure causes covalent bonds between adjacent pyrimidines on the same DNA strand, forming thymine dimers. This is why thymine dimers are classified as pyrimidine dimers—two pyrimidine bases (thymine in this case) linked together distort the DNA and block replication and transcription. Repair typically involves nucleotide excision repair (or photoreactivation in some organisms). The other options describe different issues: interstrand crosslinks connect the two DNA strands, single-base substitutions are mutations that occur after replication, and "nucleotide excision lesion" isn't a standard lesion type—the repair pathway is nucleotide excision repair, not the lesion itself.

2. What is the term for the particular sequence in the genome where DNA replication begins?

A. Replication bubble

B. Origin of replication

C. Template strand

D. Replication fork

Origin of replication is the term for the specific DNA sequence where replication starts. This site is recognized by initiator proteins that recruit helicase and other replication factors to unwind the DNA, creating the setup for copying. As unwinding begins, a replication bubble forms—the open region where the two strands are separated. At the edges of this bubble, replication forks move in opposite directions as DNA polymerases synthesize new strands, copying the parental templates. The replication fork is the Y shaped junction at the edge of the bubble where the two strands are unwinding and new DNA is being built. The template strand refers to the parental strand used as a guide for synthesis; in replication, both strands serve as templates for the new strands, so there isn't a single template designated for the whole process. Origins can be single in bacteria or multiple in eukaryotes, reflecting how replication is organized across the genome.

3. Depurination due to thermal energy results in what?

A. Depurination

B. Deamination

C. Methylation

D. Ubiquitination

Depurination is the loss of a purine base (adenine or guanine) from DNA when the N-glycosidic bond is hydrolyzed, and heat speeds up this reaction. The immediate product is an abasic site (an AP site) where the base is missing, leaving the sugar-phosphate backbone intact but with no base to pair opposite. This can stall replication or lead to mutations if not repaired, so cells use base excision repair to remove the sugar-phosphate around the abasic site and fill in the correct base. So, when depurination occurs due to thermal energy, the process itself is the event described, and the best-match concept among the options is depurination. The other terms describe different forms of DNA damage: deamination changes a base's identity (like cytosine to uracil), methylation adds a methyl group to bases, and ubiquitination is a protein modification tag for degradation, not about removing bases from DNA.

SAMPLE

4. What is the function of replication protein A (RPA) in eukaryotic replication?

A. Binds and stabilizes single-stranded DNA, preventing secondary structures

B. Unwinds double-stranded DNA

C. Priming RNA synthesis

D. Ligation of breaks

The main idea here is how single-stranded DNA is managed during replication. When DNA is opened up, long stretches become single-stranded and are prone to forming secondary structures or being degraded. Replication protein A binds to these single-stranded regions with high affinity, coating and stabilizing them. This prevents hairpins and other structures from forming, protects the ssDNA from nucleases, and keeps the strand ready for synthesis by DNA polymerases. That stabilization and protection of exposed ssDNA is exactly what this protein does. Unwinding double-stranded DNA is done by helicases, not RPA. Priming RNA synthesis is the job of primase. Ligation of breaks is performed by DNA ligase. So those activities don't describe the role of RPA.

5. What are replication factories?

A. Nuclear pores

B. Nuclear subdomains where several replication forks are active

C. Centrosomes

D. Mitochondrial nucleoid sites

Replication factories are discrete regions within the nucleus where several replication forks are active at the same time. In eukaryotic cells, DNA replication isn't carried out from a single fork; instead, clusters of replisomes assemble at specific nuclear subdomains, forming replication factories or foci. These factories concentrate the replication machinery—DNA polymerases, sliding clamps, primases, and other factors—so multiple forks can operate in parallel, which speeds up genome duplication and helps coordinate replication with chromatin structure and transcription. The number and location of factories shift during S phase, reflecting the timing program that distinguishes early- from late-replicating regions. The other options point to structures that serve different roles: nuclear pores regulate transport, centrosomes organize the spindle during mitosis, and mitochondrial nucleoid sites handle replication of mitochondrial DNA, not nuclear DNA replication.

6. Which enzyme catalyzes the formation of the phosphodiester bond to seal the BER gap?

A. DNA Polymerase

B. RNA Ligase

C. DNA Ligase

D. AP Endonuclease

In base excision repair, the final step is sealing the remaining nick in the sugar-phosphate backbone. DNA ligase is the enzyme that does this, creating the phosphodiester bond to join the ends and restore the intact DNA strand. It's specialized for sealing nicks in DNA, using a cofactor (NAD+ in bacteria, ATP in eukaryotes) to activate the ends before ligation. The other enzymes have different roles: AP endonuclease cuts the backbone at the damaged site to create a gap; DNA polymerase fills in the missing nucleotides but does not seal the backbone; RNA ligase works on RNA, not DNA. So DNA ligase is the correct enzyme for sealing the BER gap.

SAMPLE

7. What is the function of the clamp at the replication fork?

A. It seals nicks between fragments

B. It holds DNA polymerase to the lagging strand

C. It unwinds the DNA ahead of the fork

D. It primes RNA synthesis on the lagging strand

The key idea is that the sliding clamp acts as a tether that keeps DNA polymerase attached to the DNA, boosting processivity. At the replication fork, polymerase needs to synthesize long stretches without falling off the template, so the clamp forms a ring around the DNA and the polymerase rides with it as it moves. This tethering is especially important on the lagging strand, where the polymerase repeatedly dissociates after finishing each Okazaki fragment; the clamp helps it quickly reengage with the DNA to start the next fragment. That's why holding the polymerase to the DNA is the correct description of the clamp's function. For context, sealing nicks is done by DNA ligase, unwinding ahead of the fork is done by helicase, and priming RNA synthesis on the lagging strand is done by primase.

8. Which enzyme introduces a double-stranded break ahead of the replication fork to relieve torsional stress?

A. Gyrase (topoisomerase II)

B. Helicase

C. Primase

D. Ligase

As the replication fork progresses, unwinding of the DNA ahead creates positive supercoiling that can stall synthesis. To relieve this torsional stress, cells use topoisomerases that transiently cut one or both strands to allow the DNA to relax and then reseal. The enzyme that makes a controlled double-stranded break to pass a DNA segment through and thereby relieve supercoiling is DNA gyrase, a type II topoisomerase. In bacteria, gyrase is especially known for introducing negative supercoils and removing the positive twist ahead of the fork. The other enzymes have different roles: helicase unwinds the DNA, primase lays down RNA primers, and ligase seals nicks after synthesis. So the enzyme responsible for the double-stranded break to relieve torsional stress is gyrase (topoisomerase II).

9. Which model suggested random interspersion of parental and new segments in daughter DNA molecules?

A. Dispersive replication

B. Semiconservative replication

C. Conservative replication

D. Origin of replication

Dispersive replication describes a pattern where parental DNA and newly synthesized DNA are interspersed together in both strands of the daughter molecules, creating a mosaic of old and new sequences in each strand. That random interspersion means there isn't a clean one-old-one-new arrangement on a strand; instead, the segments from both sources are mixed throughout. In contrast, semiconservative replication would produce daughters each containing one complete parental strand paired with one new strand, so old and new DNA aren't randomly mixed within a single strand. Conservative replication would keep the two parental strands together in one daughter and form a completely new double helix from fresh DNA in the other, which again doesn't match the idea of random interspersion. The origin of replication concept refers to where replication starts, not how the parental and new segments are distributed in each daughter molecule.

SAMPLE

10. Which enzyme is responsible for synthesizing RNA primers during DNA replication?

A. Primase

B. DNA polymerase

C. Helicase

D. Ligase

Primase is the enzyme that makes the short RNA primers used to start synthesis. DNA polymerases can only add nucleotides onto an existing 3' end, so they can't begin a new strand from scratch. Primase provides that starting point by laying down a brief RNA sequence. Once the primer is in place, DNA polymerase can extend it with DNA nucleotides. On the leading strand, a single primer suffices for continuous synthesis; on the lagging strand, primase repeatedly lays down primers for each Okazaki fragment, and DNA polymerase then extends from each primer before the RNA is removed and replaced with DNA and the fragments are joined by ligase. The other enzymes have different roles: DNA polymerase builds DNA, helicase unwinds the double helix, and ligase seals the gaps between fragments.

SAMPLE

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://dnareplication.examzify.com

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

SAMPLE