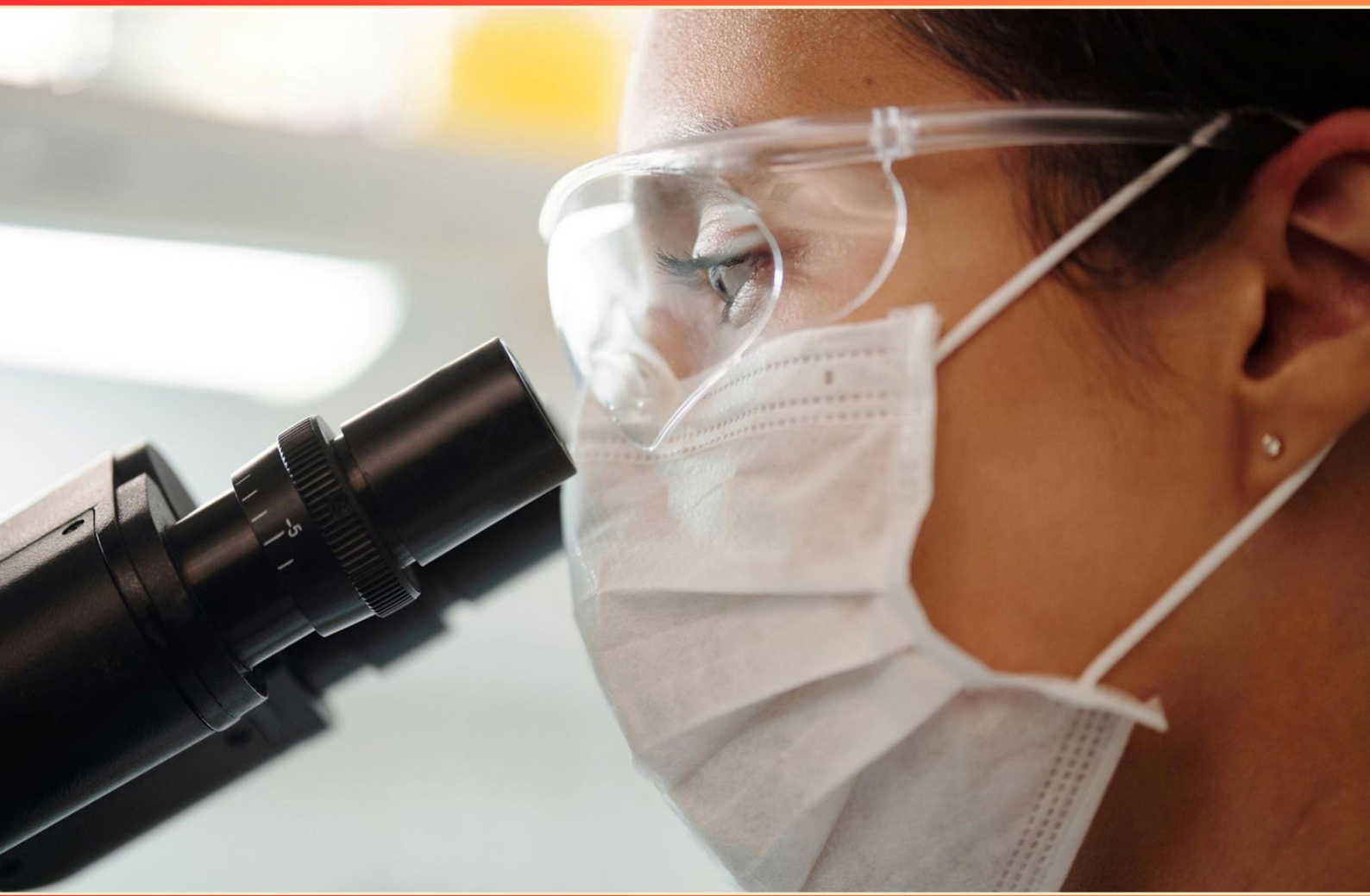
TEXAS A&M UNIVERSITY (TAMU) BIOL111 INTRODUCTORY BIOLOGY I EXAM 3 PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://tamu-biol111exam3.examzify.com

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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.

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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!

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Questions

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1. What type of primer does primase synthesize during DNA replication?

A. Protein primer

B. DNA primer

C. RNA primer

D. Okazaki fragments

2. What defines the start of the protein synthesis process?

A. Recognition of the promoter region

B. Binding of the ribosome to mRNA

C. Splicing of introns

D. Release factor binding

3. What experiment did Frederick Griffith conduct to discover transformation?

A. Injecting mice with live S cells

B. Injecting mice with heat-killed R cells

C. Injecting mice with heat-killed S cells with living R cells

D. Injecting mice with DNA alone

4. What is the main function of the Golgi apparatus?

A. It produces ATP for energy.

B. It modifies, sorts, and packages proteins and lipids.

C. It synthesizes RNA and DNA.

D. It stores genetic information.

5. Which of the following describes the 10 nm fiber structure of DNA?

A. It is a tightly packed form of DNA

B. It is linear and unbound DNA

C. Nucleosomes connected by stretches of DNA

D. DNA in its replicated form

6. What cellular process follows photosynthesis in plants?

A. Cell division

B. Cellular respiration

C. Protein synthesis

D. Cell aging

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7. Which scientists performed experiments showing that DNA is the genetic material of the T2 phage?

A. Watson and Crick

B. Wilkins and Franklin

C. Hershey and Chase

D. Avery, MacLeod, McCarty

8. During which process are proteins synthesized according to the genetic code?

A. Transcription

B. Translation

C. Replication

D. Translocation

9. How many genes are transcribed as a single mRNA in the tryptophan operon?

A. Three

B. Four

C. Five

D. Six

10. What is the function of ribosomes in cells?

A. To facilitate DNA replication

B. To synthesize proteins

C. To break down lipids

D. To store genetic information

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Answers

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

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Explanations

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1. What type of primer does primase synthesize during DNA replication?

A. Protein primer

B. DNA primer

C. RNA primer

D. Okazaki fragments

Primase synthesizes an RNA primer during DNA replication. This RNA primer is crucial because it provides a starting point for DNA polymerases to begin synthesizing the new DNA strand. DNA polymerases cannot initiate synthesis on their own; they can only add nucleotides to an existing strand of nucleic acid. Therefore, the RNA primer acts as a small segment of RNA that base-pairs with the template strand of DNA, allowing DNA polymerase to extend from it. The RNA primer is typically short, around 5-10 nucleotides long, and is complementary to the DNA template strand. Once the DNA strand is synthesized, the RNA primers are later removed and replaced with DNA nucleotides, maintaining the integrity of the DNA molecule during replication. This process highlights the significance of primase and its role in initializing DNA synthesis. The concept of Okazaki fragments is related but refers specifically to the short segments of DNA synthesized on the lagging strand, which are initiated from RNA primers laid down by primase.

2. What defines the start of the protein synthesis process?

A. Recognition of the promoter region

B. Binding of the ribosome to mRNA

C. Splicing of introns

D. Release factor binding

The start of the protein synthesis process is marked by the binding of the ribosome to mRNA. This event is crucial because it sets the stage for translation, where the genetic information encoded in mRNA is used to assemble a polypeptide chain, ultimately forming a protein. When the ribosome attaches to the mRNA, it scans for the start codon, usually AUG, which signals the beginning of the translation phase. The small subunit of the ribosome binds to the mRNA, and then the large subunit joins to complete the ribosome structure that facilitates the translation process. This interaction ensures that the ribosome is positioned correctly to read the mRNA sequence and initiate protein synthesis. The other choices relate to different biological processes. The recognition of the promoter region pertains to transcription, where RNA polymerase binds to DNA to synthesize mRNA, but this process is distinct from translation. Splicing of introns involves the modification of pre-mRNA before it exits the nucleus, also preceding translation. Release factor binding occurs at the termination stage of translation, signaling the end of protein synthesis. Thus, the binding of the ribosome to mRNA is specifically what signifies the beginning of translation and protein synthesis.

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3. What experiment did Frederick Griffith conduct to discover transformation?

A. Injecting mice with live S cells

B. Injecting mice with heat-killed R cells

C. Injecting mice with heat-killed S cells with living R cells

D. Injecting mice with DNA alone

Frederick Griffith's experiment aimed to investigate the phenomenon of transformation, where genetic material from one organism could be taken up by another organism, leading to a change in its phenotype. In his pivotal study, he used two strains of the bacterium Streptococcus pneumoniae: the virulent S strain (which has a smooth capsule and causes disease) and the non-virulent R strain (which has a rough appearance and does not cause disease). By injecting mice with heat-killed S cells alongside living R cells, Griffith discovered that the R cells were transformed into virulent S cells. This unexpected outcome demonstrated that some "transforming principle" from the heat-killed S cells was taken up by the living R cells, leading to their transformation into a pathogenic form. This experiment provided foundational evidence for the understanding of genetic material and paved the way for later discoveries regarding DNA. The correct selection illustrates how Griffith was able to prove the transfer of genetic information between the two strains under specific experimental conditions, highlighting the significance of transformation in microbiology and genetics.

4. What is the main function of the Golgi apparatus?

A. It produces ATP for energy.

B. It modifies, sorts, and packages proteins and lipids.

C. It synthesizes RNA and DNA.

D. It stores genetic information.

The Golgi apparatus plays a critical role in the process of post-translational modification of proteins and lipids. As proteins and lipids are synthesized in the endoplasmic reticulum, they are transported to the Golgi apparatus, where they undergo various modifications, such as glycosylation, phosphorylation, and selective proteolysis. This modification step is essential for the functionality of these molecules. Once the modifications are complete, the Golgi apparatus sorts and packages these proteins and lipids into vesicles that are directed to their final destinations. These destinations can include the cell membrane, lysosomes, or secretion outside the cell. Thus, the primary role of the Golgi apparatus is to ensure that proteins and lipids are properly processed and dispatched to where they are needed, reflecting its vital function in intracellular transport and processing of macromolecules.

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5. Which of the following describes the 10 nm fiber structure of DNA?

A. It is a tightly packed form of DNA

B. It is linear and unbound DNA

C. Nucleosomes connected by stretches of DNA

D. DNA in its replicated form

The 10 nm fiber structure of DNA, also known as "beads on a string," consists of nucleosomes connected by stretches of linker DNA. This structure is an essential aspect of how DNA is organized within the nucleus of eukaryotic cells. Each nucleosome consists of a segment of DNA wound around a core of histone proteins, creating the "bead" appearance, while the linker DNA represents the "string" connecting these nucleosomes. This arrangement allows for efficient packaging of the long DNA molecules, facilitating their organization and regulation during processes like transcription and replication. The tightly packed form of DNA actually refers to structures like the 30 nm fiber or higher-order chromatin, which are more condensed than the 10 nm fiber. Linear and unbound DNA would not accurately describe the organizational characteristics of nucleosomes, as they imply a lack of structure that is not representative of the 10 nm fiber. Similarly, DNA in its replicated form would refer to the structure of chromosomes during cell division, characterized by two sister chromatids, which is distinct from the 10 nm fiber.

6. What cellular process follows photosynthesis in plants?

A. Cell division

B. Cellular respiration

C. Protein synthesis

D. Cell aging

The cellular process that follows photosynthesis in plants is cellular respiration. During photosynthesis, plants convert light energy into chemical energy stored in glucose. This process takes place in the chloroplasts and produces oxygen as a byproduct. Once the glucose is produced, plants then use it during cellular respiration to generate ATP (adenosine triphosphate), which is the energy currency of the cell. Cellular respiration occurs in the mitochondria of the cell and requires oxygen to break down glucose and release the stored energy. This energy is then used for various cellular activities, helping the plant to grow, develop, and maintain its functions. While cell division, protein synthesis, and cell aging are important processes in plant biology, they do not directly follow photosynthesis in the energy production pathway. Cell division is related to growth and reproduction, protein synthesis involves the creation of proteins from amino acids, and cell aging refers to the gradual decline in cell function over time. Cellular respiration is the key follow-up process that allows the energy captured during photosynthesis to be utilized effectively by the plant.

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7. Which scientists performed experiments showing that DNA is the genetic material of the T2 phage?

A. Watson and Crick

B. Wilkins and Franklin

C. Hershey and Chase

D. Avery, MacLeod, McCarty

Hershey and Chase conducted landmark experiments in 1952 using the T2 bacteriophage to demonstrate that DNA is the genetic material. They used two separate isotopes to label DNA and proteins in the phage: sulfur, which labels the protein coat, and phosphorus, which labels the DNA. After allowing the T2 phage to infect E. coli, they used a blender to separate the phage coats from the bacterial cells and then measured the presence of the isotopes in the bacteria. The results showed that only the phosphorus (DNA) entered the bacterial cells and directed the formation of new phages, while the sulfur (protein) remained outside. This provided clear evidence that DNA, not protein, carries genetic information, establishing DNA as the hereditary material in this viral model, which was a significant finding in molecular biology.

8. During which process are proteins synthesized according to the genetic code?

A. Transcription

B. Translation

C. Replication

D. Translocation

Proteins are synthesized according to the genetic code during translation. This process occurs in the ribosomes of the cell and involves converting the information encoded in messenger RNA (mRNA) into a sequence of amino acids, which form a protein. During translation, the ribosome reads the mRNA sequence in sets of three nucleotide bases, known as codons, each of which specifies a particular amino acid. Transfer RNA (tRNA) molecules bring the appropriate amino acids to the ribosome based on their anticodon that pairs with the mRNA codon. This assembly of amino acids continues until a stop codon is reached, resulting in the formation of a complete polypeptide chain that folds into a functional protein. Transcription refers to the process of copying a segment of DNA into mRNA, which is the precursor to translation. Replication involves the duplication of DNA before cell division, ensuring that each daughter cell receives a complete set of genetic information. Translocation is a term often used in the context of the movement of chromosomes or ribosomes in a cell but does not directly relate to protein synthesis in the way that translation does.

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9. How many genes are transcribed as a single mRNA in the tryptophan operon?

A. Three

B. Four

C. Five

D. Six

In the tryptophan operon, a single mRNA molecule is transcribed that encodes for multiple genes involved in the biosynthesis of tryptophan. Specifically, the operon contains five structural genes, which are involved in various stages of tryptophan synthesis. When this operon is expressed, it results in a single polycistronic mRNA that includes the coding sequences for all five of these genes. This arrangement allows for coordinated regulation of the enzymes necessary for tryptophan production, enabling the cell to efficiently produce this amino acid in response to its availability. Understanding that the operon's structure allows for the transcription of multiple genes as one continuous mRNA is crucial for grasping how bacterial gene regulation and expression work, especially in relation to operons.

10. What is the function of ribosomes in cells?

A. To facilitate DNA replication

B. To synthesize proteins

C. To break down lipids

D. To store genetic information

Ribosomes play a crucial role in the process of protein synthesis within cells. They are the molecular machines where the translation of messenger RNA (mRNA) into polypeptide chains occurs. Specifically, ribosomes read the sequence of the mRNA and use it as a template to assemble amino acids in the correct order, ultimately forming proteins. This process is vital because proteins carry out a multitude of functions in living organisms, including acting as enzymes, structural components, and signaling molecules. In the context of the other options presented, DNA replication involves different enzymes and proteins, such as DNA polymerases; therefore, ribosomes are not involved in that process. The breakdown of lipids is managed by other cellular organelles and enzymes, such as lysosomes or peroxisomes, while storage of genetic information is primarily the role of DNA located in the nucleus of eukaryotic cells and nucleoid region in prokaryotes. Thus, the unique function of ribosomes as the sites of protein synthesis clearly distinguishes them from the other options.

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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:

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

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