

MTTC INTEGRATED SCIENCE (SECONDARY) (094) PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED 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. 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. Anabolic reactions are best described as which of the following?**
 - A. Builds larger molecules from smaller ones
 - B. Breaks down molecules to release energy
 - C. Involves genetic replication
 - D. Occurs only in mitochondria
- 2. Which biome is typical of high latitudes?**
 - A. Tundra
 - B. Desert
 - C. Tropical forest
 - D. Grassland
- 3. Which biome is typically found in temperate regions with distinct seasons?**
 - A. Grassland
 - B. Temperate forest
 - C. Desert
 - D. Tropical rainforest
- 4. What is the function of helicase during DNA replication?**
 - A. It stabilizes single-stranded DNA.
 - B. It instigates the denaturation of hydrogen bonds between base pairs.
 - C. It synthesizes a complementary DNA strand.
 - D. It seals breaks in the sugar-phosphate backbone.
- 5. Which statistic describes dispersion and how far data are from the mean?**
 - A. Mean
 - B. Standard Deviation
 - C. Median
 - D. Mode
- 6. Purine bases end with which suffix?**
 - A. -idine
 - B. -osine
 - C. -osome
 - D. -ase

- 7. Dark matter is best described as which of the following?**
- A. A form of energy that travels through space
 - B. Matter that does not give off electromagnetic radiation
 - C. Visible matter that emits light
 - D. Dark dust in interstellar space
- 8. What is the difference between the highest and lowest numbers in a data set called?**
- A. Mean
 - B. Range
 - C. Standard Deviation
 - D. Median
- 9. Smooth muscle is characterized by which features?**
- A. Not striated, spindle-shaped, involuntary
 - B. Striated and under voluntary control
 - C. Cylindrical and multinucleated
 - D. Rapid, forceful contractions
- 10. Dendrites extend from the cell body and are primarily involved in receiving messages.**
- A. True
 - B. False
 - C. They generate action potentials
 - D. They release neurotransmitters

Answers

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

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Explanations

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1. Anabolic reactions are best described as which of the following?

- A. Builds larger molecules from smaller ones**
- B. Breaks down molecules to release energy
- C. Involves genetic replication
- D. Occurs only in mitochondria

Anabolic reactions are processes that build larger, more complex molecules from smaller units, using energy. This assembly is essential for growth, repair, and the creation of biomolecules such as proteins from amino acids or polysaccharides from simple sugars. Because these reactions require energy input and result in more complex products, they contrast with catabolic reactions, which break down molecules to release energy. Saying that replication of genetic material describes anabolic activity is not as precise as recognizing that anabolic processes involve bond-making to assemble large molecules, while many anabolic steps occur outside mitochondria.

2. Which biome is typical of high latitudes?

- A. Tundra**
- B. Desert
- C. Tropical forest
- D. Grassland

High latitudes have cold, long winters and a very short growing season, with soils that are often frozen year-round (permafrost). This harsh climate limits vegetation to low, hardy plants rather than trees. The tundra biome embodies this situation: a treeless expanse with cold temperatures, short summers, and a community of mosses, lichens, grasses, and small shrubs, plus animals adapted to the cold. Deserts are defined by very low rainfall and can be warm or cold, but they aren't the typical high-latitude environment. Tropical forests require year-round warmth and abundant rainfall near the equator, and grasslands occur in more temperate zones with different rainfall patterns.

3. Which biome is typically found in temperate regions with distinct seasons?

- A. Grassland
- B. Temperate forest**
- C. Desert
- D. Tropical rainforest

Biomes reflect the climate patterns of an area, especially how temperature and rainfall vary through the year. In temperate regions, the climate shows four distinct seasons—cold winters and warmer summers with moderate, year-round precipitation. This seasonal cycle supports broadleaf forests where trees shed their leaves in winter and regrow them in spring, creating a diverse, layered ecosystem typical of a temperate forest. While grasslands can exist in temperate zones, they are usually dominated by grasses rather than dense trees, often due to less rainfall or fire regimes. Deserts have very low, unreliable rainfall, and tropical rainforests stay warm and wet all year, lacking distinct seasonal temperature changes. Thus, the biome most characteristic of temperate regions with distinct seasons is the temperate forest.

4. What is the function of helicase during DNA replication?

- A. It stabilizes single-stranded DNA.
- B. It instigates the denaturation of hydrogen bonds between base pairs.**
- C. It synthesizes a complementary DNA strand.
- D. It seals breaks in the sugar-phosphate backbone.

Opening idea: DNA replication requires opening the double helix so each strand can serve as a template. Helicase does this by breaking the hydrogen bonds between base pairs, using energy from ATP to unwind the DNA and form the replication fork. This unwinding exposes single-stranded templates for DNA polymerases to copy. Stopping or stabilizing the single strands is done by protective proteins, not helicase. The actual synthesis of a new strand is carried out by DNA polymerase, and sealing any backbone breaks is done by DNA ligase.

5. Which statistic describes dispersion and how far data are from the mean?

- A. Mean
- B. Standard Deviation**
- C. Median
- D. Mode

Dispersion, or variability, is about how spread out the data are around the center. The standard deviation measures the typical distance of each data point from the mean, which gives a direct sense of how much the values vary. A small standard deviation means most data are close to the mean; a large one means they're spread farther away. The other statistics describe where the data tend to sit rather than how spread out they are: the mean is a measure of central tendency, the median is the middle value, and the mode is the most frequent value. While useful for understanding the center, they don't quantify dispersion like the standard deviation does.

6. Purine bases end with which suffix?

- A. -idine
- B. -osine**
- C. -osome
- D. -ase

When naming nucleosides, the suffix tells you which type of base the sugar is attached to. Purine bases, like adenine and guanine, form nucleosides that end with -osine, giving adenosine and guanosine. This pattern helps distinguish them from pyrimidine bases (cytosine, thymine, uracil), which form nucleosides that end with -idine (cytidine, thymidine, uridine). So the suffix -osine is the one used for purine-derived nucleosides, while -idine is used for pyrimidine-derived nucleosides.

7. Dark matter is best described as which of the following?

- A. A form of energy that travels through space
- B. Matter that does not give off electromagnetic radiation**
- C. Visible matter that emits light
- D. Dark dust in interstellar space

Dark matter is best described as matter that does not give off electromagnetic radiation. In other words, it has mass and gravity, but it remains invisible because it does not emit, absorb, or reflect light or other forms of electromagnetic radiation that we can detect. We infer its presence from gravitational effects on visible matter, light, and the universe's structure: galaxies rotate too fast for the amount of visible matter they contain, gravitational lensing reveals more mass than we can see, and the patterns in the cosmic microwave background point to unseen matter shaping early cosmic structures. It is distinct from energy, from visible matter that glows, or from dust that would interact with light and be detectable in other ways.

8. What is the difference between the highest and lowest numbers in a data set called?

- A. Mean
- B. Range**
- C. Standard Deviation
- D. Median

The difference between the highest and lowest numbers in a data set is called the range. It tells you how wide the spread of the data is by looking at the extreme values. For example, if the data set goes from 3 to 15, the range is 15 minus 3, which equals 12. The range is a simple way to describe spread, but it depends only on the endpoints and can be affected by outliers, so it doesn't show how the values are distributed in between. This differs from the mean (the average value), the standard deviation (how far data typically deviate from the mean), and the median (the middle value when data are ordered).

9. Smooth muscle is characterized by which features?

- A. Not striated, spindle-shaped, involuntary**
- B. Striated and under voluntary control
- C. Cylindrical and multinucleated
- D. Rapid, forceful contractions

Distinguishing muscle tissue types by how they look and are controlled. Smooth muscle is not striated under light microscopy, has spindle-shaped cells, and usually a single nucleus. This combination lets it form the walls of hollow organs and blood vessels, where it can contract slowly and involuntarily to move substances along or regulate flow. In contrast, skeletal muscle is striated, composed of long cylindrical fibers with multiple nuclei, and is under voluntary control, capable of rapid, forceful contractions. Cardiac muscle is also striated but has branching cells with intercalated discs and is involuntary. So the description "not striated, spindle-shaped, involuntary" best matches smooth muscle.

10. Dendrites extend from the cell body and are primarily involved in receiving messages.

A. True

B. False

C. They generate action potentials

D. They release neurotransmitters

Dendrites act as the input region of a neuron. They extend from the cell body and have many branches to receive signals from other neurons at synapses. When neurotransmitters bind to receptors on dendrites, they produce small, local changes in membrane potential that travel toward the soma. The neuron then integrates these inputs, and if the combined signal reaches threshold at the axon hillock, an action potential is generated in the axon to carry the message onward. Because of this input-focused role, dendrites are primarily involved in receiving messages rather than generating impulses or releasing neurotransmitters themselves.

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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:

<https://mttc94.examzify.com>

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

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