Alberta Grade 8 Science – Light and Optical Systems Practice Test (Sample)

Study Guide

BY EXAMZIFY

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

1. In farsighted vision, where is the image formed relative to retina?

A. On the retina

B. In front of the retina

C. Behind the retina

D. At the pupil

2. What is amplitude?

A. The distance between crests

B. The speed of the wave

C. The energy of the wave

D. The measurement from the middle level of a wave to the crest (or to the trough)

3. Which line is the normal line in reflection?

A. A line drawn along the surface of the mirror.

B. A line drawn perpendicular to the incident ray.

C. A line drawn perpendicular to the reflecting surface at the point of incidence.

D. A line that lies halfway between the incident and reflected rays.

4. Which term describes the distance between adjacent crests?

A. Frequency

B. Wavelength

C. Amplitude

D. Period

5. Which type of lens produces an upright image?

A. Concave lens

B. Convex lens

C. Plane lens

D. Spherical lens

6. In a telescope, the term objective refers to the lens or mirror that first ...

A. To magnify the image

B. To filter light

C. Collects and forms the initial image

D. Displays the final image

7. What is a compression wave?

A. The wave has crests and troughs

B. Matter moves back and forth along the direction the wave travels

C. The medium does not move

D. The wave travels faster in air than in water

8. In astronomy, which radiation is used to study dense interstellar clouds and track the motion of cold gas?

A. Gamma rays

B. Radio waves and microwaves

C. Ultraviolet

D. Visible light

9. Which statement about electromagnetic waves is true?

A. They can travel through a vacuum

B. They require a medium to propagate

C. They are slower than sound in air

D. They cannot be refracted

10. Where do light rays cross after passing through a converging lens?

A. Normal line

B. Index of refraction

C. Angle of reflection

D. Focal point

Answers

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

Explanations

1. In farsighted vision, where is the image formed relative to retina?

A. On the retina

B. In front of the retina

C. Behind the retina

D. At the pupil

In farsightedness, the eye doesn't bend light enough to bring the image onto the retina. The focal point sits behind the retina, so light from a nearby object would focus behind the retina instead of on it. This is why close objects appear blurry—the eye would need more optical power to move the focus forward onto the retina, which the eye can try to do by changing the lens shape (accommodation). For distant objects, the eye can sometimes bring the focus onto the retina, but near vision remains blurry unless strong accommodation is possible.

2. What is amplitude?

A. The distance between crests

B. The speed of the wave

C. The energy of the wave

D. The measurement from the middle level of a wave to the crest (or to the trough)

Amplitude is the maximum distance the particles of a medium move away from their resting position as a wave passes. In a transverse wave, the medium oscillates around the equilibrium line, and the height from this middle line up to a crest (or down to a trough) is the amplitude. The distance between crests is the wavelength, not amplitude, and the speed is how fast the wave moves, determined by the medium and other factors. Energy is related to amplitude (larger amplitude generally means more energy) but is not the same thing as amplitude. So the measure from the middle level to a crest or to a trough is amplitude.

3. Which line is the normal line in reflection?

A. A line drawn along the surface of the mirror.

B. A line drawn perpendicular to the incident ray.

C. A line drawn perpendicular to the reflecting surface at the point of incidence.

D. A line that lies halfway between the incident and reflected rays.

The normal line is the line that is perpendicular to the reflecting surface at the point where the light ray meets the surface. It provides the reference for measuring the angles of incidence and reflection, which are equal when light reflects. The surface itself runs along the tangent to the boundary, not perpendicular to it, so a line along the surface isn't the normal. A line perpendicular to the incident ray isn't the defining reference for reflection, and the line halfway between the incident and reflected rays would be the bisector of the angle between them, not the normal. So the line that is perpendicular to the reflecting surface at the point of incidence is the normal.

4. Which term describes the distance between adjacent crests?

A. Frequency

B. Wavelength

C. Amplitude

D. Period

Wavelength is the distance between adjacent crests. It's a spatial measure of how long one complete cycle of the wave extends in space, telling you how far the wave travels before the pattern repeats. In light, the wavelength also relates to color—the visible spectrum ranges from shorter wavelengths (blue/violet) to longer wavelengths (red). The other terms describe different aspects: frequency is how many crests pass a point each second, period is the time for one complete cycle, and amplitude is how high the wave oscillates from rest. These describe timing and height, not the spacing between crests, so they don't define the distance between adjacent crests.

5. Which type of lens produces an upright image?

A. Concave lens

B. Convex lens

C. Plane lens

D. Spherical lens

A diverging (concave) lens spreads light rays outward. When you trace those rays backward, they appear to come from a point on the same side of the lens as the object, forming a virtual image that is upright and smaller than the object. Because this kind of lens always produces an upright image, it's the best answer. A convex lens can produce upright images only in specific cases (when the object is very close to the lens), but not always. A plane surface doesn't create a real optical image in the same sense, and a spherical lens is just a general term for curved lenses that can produce different orientations depending on arrangement.

6. In a telescope, the term objective refers to the lens or mirror that first ...

A. To magnify the image

B. To filter light

C. Collects and forms the initial image

D. Displays the final image

The objective is the lens or mirror that collects light from a distant object and forms the first image. This initial image is created at the telescope's focal plane, and it's the eyepiece that magnifies that image for us to see. The objective doesn't filter light or display the final image; filtering would be an accessory, and displaying the final image happens when we view it through the eyepiece or a camera. So the essential role is to gather light and form the initial image.

7. What is a compression wave?

A. The wave has crests and troughs

B. Matter moves back and forth along the direction the wave travels

C. The medium does not move

D. The wave travels faster in air than in water

Compression waves are longitudinal waves in which the particles of the medium vibrate parallel to the direction the wave travels. As the wave moves, the medium is alternately squeezed together and spread apart, creating regions of higher density (compressions) and lower density (rarefactions). That back-and-forth motion along the travel direction is what defines this type of wave, and explains why sound waves in air are a common example. The idea of crests and troughs belongs to transverse waves, where motion is perpendicular to the travel direction. The statement that the medium doesn't move isn't true for compression waves, since the particles oscillate as the wave passes. And the fact that a wave travels faster in one medium than another doesn't define a compression wave—it's about how fast waves propagate in different materials, not the wave's type.

8. In astronomy, which radiation is used to study dense interstellar clouds and track the motion of cold gas?

A. Gamma rays

B. Radio waves and microwaves

C. Ultraviolet

D. Visible light

Long-wavelength radiation is ideal for studying dense, dusty regions because dust blocks visible and ultraviolet light but is transparent to radio waves and microwaves. In these wavelengths, astronomers observe spectral lines from molecules like carbon monoxide and other cold-gas tracers, which come from rotational and vibrational transitions in the gas. By analyzing these lines, you can determine what the gas is made of and its temperature. The Doppler shifts of the lines also reveal how the gas is moving along the line of sight, so you can track the motion within the cloud. So radio waves and microwaves are used to study dense interstellar clouds and the kinematics of cold gas. Gamma rays, ultraviolet, and visible light don't provide the same penetrating view or tracers for cold, dense gas, and infrared, while also useful, isn't the focus here.

9. Which statement about electromagnetic waves is true?

A. They can travel through a vacuum

B. They require a medium to propagate

C. They are slower than sound in air

D. They cannot be refracted

Electromagnetic waves can propagate through space without any material medium because they are oscillating electric and magnetic fields that transfer energy. This lets them travel in a vacuum, which is why sunlight and radio signals reach us from space. They move at the speed of light in vacuum—about 300,000 kilometers per second—and in air they remain incredibly fast, much faster than sound, which needs a medium to travel. Electromagnetic waves can be refracted when they move from one material to another because their speed changes with the medium, causing the path to bend. So the statement that they can travel through a vacuum is true, while saying they require a medium, that they are slower than sound in air, or that they cannot be refracted are all incorrect.

10. Where do light rays cross after passing through a converging lens?

A. Normal line

B. Index of refraction

C. Angle of reflection

D. Focal point

When light passes through a converging lens, parallel rays bend toward the optical axis and meet at a single point on the opposite side. That meeting point is the focal point, a specific location along the axis where rays from objects at infinity converge after refraction. The other terms don't describe this behavior: the normal line is just a surface-perpendicular reference, the index of refraction is a property of the material, and the angle of reflection relates to bouncing off a surface rather than where refracted rays cross.

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://albertagr8sciencelightopticalsys.examzify.com

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