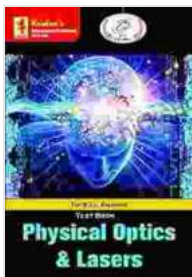


# Tb Physical Optics Lasers Pages 296 Code 776 Edition 7th Concepts Theorems

Physical optics is a branch of optics that deals with the interaction of light with matter. It is a fundamental field of study in physics and has applications in a wide range of fields, including telecommunications, imaging, and medicine.

Lasers are a type of light source that emits a highly concentrated beam of light. They are used in a variety of applications, including laser surgery, laser cutting, and laser pointers.

In this article, we will discuss the concepts and theorems of physical optics lasers. We will cover the following topics:



## TB Physical Optics & Lasers 2.1 | Pages-296 | Code-776 | Edition-7th | Concepts + Theorems/Derivations + Solved Numericals + Practice Exercises | Text Book (Physics 13)

★★★★★ 5 out of 5

Language: English

File size : 6037 KB

Lending : Enabled



- The nature of light
- The interaction of light with matter

- The principles of laser operation
- The applications of lasers

Light is a form of electromagnetic radiation. Electromagnetic radiation is a type of wave that consists of electric and magnetic fields. Light waves are transverse waves, which means that the electric and magnetic fields are perpendicular to the direction of wave propagation.

The wavelength of light is the distance between two consecutive crests or troughs of the wave. The frequency of light is the number of crests or troughs that pass a given point in one second. The speed of light is the distance that light travels in one second.

The speed of light in a vacuum is approximately 299,792,458 meters per second. The speed of light in a medium is less than the speed of light in a vacuum. The refractive index of a medium is a measure of how much the speed of light is reduced in that medium.

When light interacts with matter, it can be reflected, refracted, absorbed, or scattered.

- **Reflection** is the process by which light bounces off a surface. The angle of reflection is equal to the angle of incidence.
- **Refraction** is the process by which light bends when it passes from one medium to another. The angle of refraction is determined by the refractive indices of the two media.
- **Absorption** is the process by which light is absorbed by matter. The amount of light that is absorbed depends on the wavelength of the light

and the material of the object.

- **Scattering** is the process by which light is deflected in all directions by particles in a medium. Scattering can be caused by particles of any size, from atoms to dust particles.

Lasers are devices that emit a highly concentrated beam of light. They are based on the principle of stimulated emission.

Stimulated emission is a process in which an electron is stimulated to emit a photon of light by another photon of light. The two photons have the same wavelength and are in phase with each other.

The process of stimulated emission can be used to create a laser. A laser consists of a gain medium, a pump source, and a resonator.

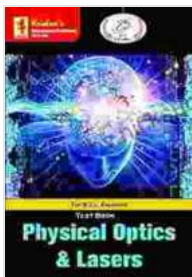
- The **gain medium** is a material that contains a population of excited electrons.
- The **pump source** is a source of energy that excites the electrons in the gain medium.
- The **resonator** is a cavity that contains the gain medium. The resonator reflects the light back into the gain medium, which causes the stimulated emission process to continue.

The wavelength of the laser light is determined by the energy difference between the excited and ground states of the electrons in the gain medium.

Lasers have a wide range of applications in a variety of fields, including:

- **Telecommunications:** Lasers are used in fiber optic communication systems to transmit data over long distances.
- **Imaging:** Lasers are used in a variety of imaging applications, including laser scanning microscopy and laser holography.
- **Medicine:** Lasers are used in a variety of medical applications, including laser surgery, laser eye surgery, and laser cancer treatment.
- **Manufacturing:** Lasers are used in a variety of manufacturing applications, including laser cutting, laser welding, and laser engraving.

Lasers are a powerful tool that have a wide range of applications in a variety of fields. They are based on the principles of physical optics and are a testament to the power of human ingenuity.



**TB Physical Optics & Lasers 2.1 | Pages-296 | Code-776  
| Edition-7th | Concepts + Theorems/Derivations +  
Solved Numericals + Practice Exercises | Text Book  
(Physics 13)**

★★★★★ 5 out of 5

Language : English

File size : 6037 KB

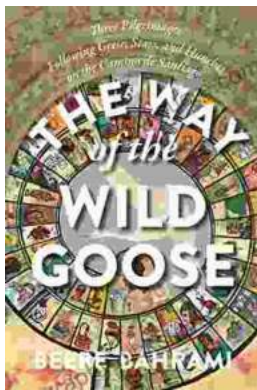
Lending : Enabled





## Embark on an Epic 160-Mile Expedition for Charity on the Appalachian Trail

Prepare yourself for an extraordinary adventure that will leave an enduring mark on your life. Join us for a challenging 160-mile expedition along the...



## The Way of the Wild Goose: A Journey of Embodied Wisdom and Authentic Living

The Way of the Wild Goose is an ancient practice that is said to have originated with the indigenous peoples of North America. It is a path of embodied wisdom that...