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- Discuss the magnetization and demagnetization of ferromagnetic materials
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- Describe the properties of magnetic fields around different magnets

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22.6 The Hall Effect
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22.10 Magnetic Force between Two Parallel Conductors
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- Describe the phase relationship between the voltage and current across an inductor when attached to an AC voltage source
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- Discuss the relationship between the peak source voltage and the peak voltages across the resistor, inductor, and capacitor in an RLC circuit
- Calculate the peak voltages across the resistor, inductor, or capacitor in an RLC circuit, given the other values
- Calculate the impedance of an RLC circuit
- Calculate the rms current in an RLC circuit
- Calculate the resonant frequency and current of an RLC circuit
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- Restate Maxwell's equations
- Describe Hertz's observations regarding the production and reception of electromagnetic waves

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- Describe the characteristics of electric and magnetic waves as they propagate from a source
- Calculate the strength of an electric field or a magnetic field in an electromagnetic wave, given the one of the fields

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- Draw and explain the relative positions, frequencies, and spacings of the regions of the electromagnetic spectrum
- Calculate either the frequency or wavelength of an electromagnetic wave, given the other
- Describe the production of and applications for electromagnetic waves across the spectrum

24.4 Energy in Electromagnetic Waves

- Describe how the energy in an electromagnetic wave is related to its electric and magnetic fields
- Calculate the average intensity of an electromagnetic wave

Chapter 25: Geometric Optics

25.1 The Ray Aspect of Light

- Discuss the ray characteristics of light used in geometric optics

25.2 The Law of Reflection

- Describe the law of reflection
- Describe light reflected from smooth and rough surfaces

25.3 The Law of Refraction
- Describe the speed of light in a medium
- Calculate the speed of light in a medium using the index of refraction
- Use the index of refraction to describe the refraction of light moving from one medium to another
- Use the law of refraction to solve problems involving the refraction of light

25.4 Total Internal Reflection
- Describe the relationship between refraction and total internal reflection
- Solve problems involving the critical angle between media
- Describe applications of the total internal reflection of light

25.5 Dispersion: The Rainbow and Prisms
- Describe how the visible light spectrum is produced by a prism or rainbow
- Describe uses and disadvantages of dispersion

25.6 Image Formation by Lenses
- Describe the effects of a lens on a ray of light
- Calculate the power of a lens
- Describe the production of an image by a thin lens
- Illustrate the formation of images with thin lenses using ray tracing
- Characterize and distinguish between real and virtual images
- Describe the relationship between focal length, object distance, and image distance for a thin lens
- Use the thin lens equations to solve problems involving thin lenses

25.7 Image Formation by Mirrors
- Illustrate and describe image formation by a flat mirror
- Use the thin lens equations to solve problems involving spherical mirrors
- Describe the production of images by spherical mirrors and characterize the images produced
- Illustrate the formation of images with spherical mirrors using ray tracing

Chapter 26: Vision and Optical Instruments

26.1 Physics of the Eye
- Analyze the accommodation of the eye for producing images through distant and near vision
- Use the thin lens equations to solve problems involving image production by the human eye

26.2 Vision Correction
- Identify and discuss common vision defects
- Discuss nearsightedness and farsightedness corrections
- Use the thin lens equations to solve problems relating to the optical correction of vision defects
- Discuss alternatives to spectacle correction of vision defects

26.3 Color and Color Vision
- Discuss the simplified theory of color vision
- Discuss the effect of absorption, reflection, and emission on the perceived color of an object
- Discuss the subtleties of color vision not explained by the simplified theory

26.4 Microscopes
- Discuss, sketch, and characterize an image formed by a compound microscope
- Use the thin lens equation to solve problems involving the magnification achieved by microscopes
- Describe the construction and features of different microscopes

26.5 Telescopes

- Discuss, sketch and characterize the images produced by telescopes
- Use the thin lens equation to solve problems involving telescope magnification
- Discuss the causes of and corrections for optical aberrations

Chapter 27: Wave Optics

27.1 The Wave Aspect of Light: Interference

- Discuss the wave characteristics of light

27.2 Huygens's Principle: Diffraction

- Discuss Huygens's principle
- Use Huygens's principle to explain the bending of light

27.3 Young’s Double Slit Experiment

- Discuss the interference pattern from a double slit
- Describe constructive and destructive interference resulting from a double slit
- Use the path length difference to solve problems involving double slit interference

27.4 Multiple Slit Diffraction

- Contrast the interference pattern from a diffraction grating with that of a double slit
- Use the path length difference to solve problems involving diffraction grating interference

27.5 Single Slit Diffraction

- Use Huygens's principle to explain the single slit diffraction pattern
- Use the path length difference to solve problems involving single slit interference

27.6 Limits of Resolution: The Rayleigh Criterion

- Discuss the Rayleigh criterion
- Use Rayleigh's criterion to solve problems involving limits of resolution

27.7 Thin Film Interference

- Discuss the rainbow formation by thin films
- Use phase changes and path length difference to solve problems involving thin film interference

27.8 Polarization

- Discuss the meaning of polarization
- Use Malus's law to solve problems involving the intensity of polarized light
- Discuss the polarization of light due to reflection
- Use Brewster's law to solve problems involving polarization due to reflection
- Discuss polarization effects and uses in materials

27.9 *Extended Topic* Microscopy Enhanced by the Wave Characteristics of Light

- Discuss the wave characteristics of light used in improving microscopy