This chapter has 52 questions. Scroll down to see and select individual questions or	Select 0 questions at random and keep in order V
narrow the list using the checkboxes below.	
Multiple Choice Questions - (46)	$\Box \text{ Topic: Diffraction and gratings - (9)}$
$\square \ Fill \ In \ The \ Blank \ Questions - (6)$	$\Box \text{ Topic: Electromagnetic Waves - (8)}$
$\Box Odd Numbered - (26)$	$\Box \text{ Topic: Interference of light waves - (5)}$
$\square Even Numbered - (26)$	$\Box \text{ Topic: Polarized light - (8)}$
Accessibility: Keyboard Navigation - (46)	\Box Topic: Wavelength and color - (22)
$\Box \text{ Difficulty: Easy - (28)}$	$\Box \text{ Type: Conceptual - (52)}$
$\square \text{ Difficulty: Hard - (5)}$	L Type: Definition - (4)
U Difficulty: Medium - (19)	a shortost wavalangth?
1. Which of the following colors has the \bigcirc Orange	
$\rightarrow \bigcirc$ Green	
Select C Red	
	Accessibility: Keyboard Navigation
	Difficulty: Easy
Multiple Choice Question MC Which of the following colors has t	a shorta Ture: Concentual
Which of the following colors has a	atromagnetic wave?
2. Which of the following is not an ele \bigcirc Light	cuomagnetic wave?
$\rightarrow \bigcirc$ Sound	
() Microwaves	
Select Select	
□ □ □ □ □ □ □ X-ray	
	A apagsibility: Kayboard Navigation
	Difficulty: Easy
Multiple Choice Question	Topic: Electromagnetic Waves
MC Which of the following is not an ele	ctromagn Type: Conceptual
3. Which statement is true?	
\bigcirc Speed of light in air is le	wer than in glass.
\bigcirc Radio waves in the AM	band are not electromagnetic waves.
\rightarrow \bigcirc Some electromagnetic v	aves will pass through walls that light cannot penetrate.
\bigcirc In air light travels much	faster than radiation from a microwave oven.
Select C Electromagnetic waves	an't travel in perfect vacuum.
	Accessibility: Keyboard Navigation
	Difficulty: Medium
Multiple Choice Question	I opic: Electromagnetic Waves
A The primary difference between inf	and visible light is that
\bigcirc infrared travels faster th	and and visible light
\bigcirc they have different way	lengths
\rightarrow \bigcirc increased does not have	magnetic field associated with its electric field
\bigcirc infrared does not have a	magnetic neid associated with its electric field.
Select Select	iown nave the ability to reflect infrared.
O they have different amp	itudes.
	Accessibility: Vayboard Navigation
	Difficulty Medium
Multiple Choice Question	Topic: Electromagnetic Waves
MC The primary difference between int	rared and Type: Conceptual

MC The primary difference between infrared and ...

- 5. In Young's double-slit experiment, light was first passed through a narrow single slit before going on to the double-slits. The reason for the first slit was
 - \bigcirc to screen out all wavelengths except those in the visible light spectrum.
 - \bigcirc to reduce the brightness of the light so the interference pattern could be seen.
 - \bigcirc to polarize the light.
 - \rightarrow \bigcirc to ensure a constant phase relationship between the interfering light waves.

Accessibility: Keyboard Navigation Difficulty: Hard Topic: Interference of light waves Type: Conceptual

Multiple Choice Question MC In Young's double-slit experiment, light was first passed...

- Select 🔂 6. For visible light, which property of visible electromagnetic waves changes with color?
 - Wavelength
 - Amplitude
 - Frequency
 - \bigcirc Amplitude and frequency
 - \rightarrow \bigcirc Frequency and wavelength

Select

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Wavelength and color Type: Conceptual

 \bigcirc only red and blue. \rightarrow \bigcirc all wavelengths in the visible portion of the electromagnetic spectrum. Select \bigcirc None of the choices is correct. Accessibility: Keyboard Navigation Difficulty: Easy Multiple Choice Question Topic: Wavelength and color MC The light from an incandescent bulb is compo... Type: Conceptual 8. When ultraviolet light reflects from a violet surface, we see \bigcirc red. \bigcirc violet. \bigcirc white. \rightarrow \bigcirc black. Select Q Accessibility: Keyboard Navigation Difficulty: Easy Multiple Choice Question Topic: Wavelength and color MC When ultraviolet light reflects from a viole... Type: Conceptual 9. The frequency of red light is that of a green light. \bigcirc greater than \rightarrow \bigcirc less than \bigcirc the same as Select • greater than, the same as, or less than, depending on a source of light Accessibility: Keyboard Navigation Difficulty: Easy Multiple Choice Question Topic: Wavelength and color MC The frequency of red light is _____ that of... Type: Conceptual 10. The frequency of blue light is that of green light \rightarrow \bigcirc greater than \bigcirc less than \bigcirc the same as Select ○ greater than, the same as, or less than, depending on a source of light Accessibility: Keyboard Navigation Difficulty: Easy Multiple Choice Question Topic: Wavelength and color MC The frequency of blue light is Type: Conceptual that o... 11. Which two primary colors of light can be added to produce yellow? \bigcirc Green and magenta \rightarrow \bigcirc Red and green ○ Blue and green O Red and blue Select

Accessibility: Keyboard Navigation

Multiple Choice Question MC Which two primary colors can be added to pro...

○ Pink and mauve

Topic: Wavelength and color Type: Conceptual

12. If a surface is illuminated by magenta light and the red is absorbed, then the color of the surface will appear as

→ ○ blue.
○ red.
○ yellow.
○ green.

Select Q

Multiple Choice Ouestion

MC For visible light, which property of visible...

7. The light from an incandescent bulb is composed of
Only red, green, and blue light.
Only red, yellow, and turquoise.

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Wavelength and color Type: Conceptual

Multiple Choice Question MC If a surface is illuminated by magenta light...

Select 3. What primary color must be added to magenta light to produce white light?

RedYellow

○ Blue



Select	q
--------	---

 \bigcirc contains small amounts of red dust that give the air its red color.

 \bigcirc is most efficient at scattering red light.

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Wavelength and color Type: Conceptual

Multiple Choice Question MC The evening sunsets are reddish orange becau...

Select 3 19. EM waves tend to be scattered the most by an object that is

 \bigcirc magnetic.

 \bigcirc a liquid.

 \bigcirc reflective.

 \bigcirc conducting.

 \rightarrow \bigcirc about the same size as the wave.

Multiple Choice Question MC EM waves tend to be scattered the most by an... Accessibility: Keyboard Navigation Difficulty: Easy

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Topic: Electromagnetic Waves Type: Conceptual

- 20. When you look at a white light through a blue piece of glass, you observe blue light. This means that the blue glass
 - \bigcirc absorbs all of the blue light.
 - \bigcirc reflects all of the blue light.
 - \rightarrow \bigcirc transmits only the blue light.
 - \bigcirc transmits all colors except blue.
 - \bigcirc transmits only cyan and magenta.

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Wavelength and color Type: Conceptual

Multiple Choice Question

MC When you look at a white light through a blu...

- 21. A property of electromagnetic waves that makes them different than other kinds of waves such as sound or water waves is that
 - \bigcirc they are transverse waves.
 - \rightarrow \bigcirc they do not require a medium.

MC A property of electromagnetic waves that mak...

 \bigcirc their speed can change when moving in different media.



Select

 \bigcirc they have many possible wavelengths.

Accessibility: Keyboard Navigation Difficulty: Medium

Topic: Electromagnetic Waves

Type: Conceptual

22. A common property of all waves is the relationship between the speed (v), the wavelength (λ), and the frequency of the wave (f). The correct equation for this relationship is which of the following?

 $\bigcirc \lambda = vf$ $\bigcirc f = v\lambda$

 $\rightarrow \bigcirc \mathbf{v} = \mathbf{f}\lambda$

 $\bigcirc v = f/\lambda$

Multiple Choice Question

Select

Select

a

Multiple Choice Question

- MC A common property of all waves is the relati...
- 23. The correct value for the speed of light in air is
 - \bigcirc 3 × 10⁵ km/h.
 - \rightarrow \bigcirc 3 \times 10⁸ m/s.
 - $\bigcirc 3.0 \times 10^5$ m/s.
 - \bigcirc 1.86 × 10⁵ miles/h.

 \bigcirc 1.86 × 10⁵ feet/s.

MC The correct value for the speed of light in...

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Electromagnetic Waves Type: Conceptual

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Electromagnetic Waves Type: Conceptual Type: Definition

- 24. Under the correct conditions, two light waves can produce regions of reinforcement and regions of cancellation. This phenomenon is known as
 - \rightarrow interference.
 - reflection.polarization.
 - \bigcirc refraction.

Multiple Choice Question

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Interference of light waves Type: Conceptual Type: Definition

Multiple Choice Question MC Under the correct conditions, two light wave...

25. Two light waves combine and produce a region of darkness. Which of the following must be true in that region?

 \bigcirc The waves were unpolarized.

 \bigcirc The waves came from the same source.

 \bigcirc The waves had different wavelengths.

 \rightarrow \bigcirc The waves were a half-wavelength out of phase.

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Interference of light waves Type: Conceptual

Multiple Choice Question MC Two light waves combine and produce a region...

Select 26. A beam of orange light illuminates two slits that are closely spaced. The resulting intensity pattern is a series of bright and dark fringes. What happens to the intensity pattern if we now change to blue light?

Select Q

Select

- \bigcirc The series of bright and dark fringes changes to circular fringes.
- \bigcirc The series of bright and dark fringes spreads out.
- \rightarrow \bigcirc The series of bright and dark fringes gets closer together.
 - \bigcirc The series of bright and dark fringes disappears.
 - \bigcirc Nothing changes.

MC A beam of orange light illuminates two slits...

Multiple Choice Question

Multiple Choice Question

Select

Select Q

Select

Select

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Interference of light waves Type: Conceptual

- 27. A thin layer of oil floats on a water puddle. An observer sees a colored pattern. This happens because
 - \rightarrow \bigcirc two surfaces each transmit some light and reflect some light.
 - \bigcirc oil always does this, even if it is not on water.
 - water transmits light and never reflects light.

 \bigcirc sunlight's frequency range shifts to infrared at the boundary of water and oil.

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Diffraction and gratings Type: Conceptual

- MC A thin layer of oil floats on a water puddle...
 28. A piece of ordinary glass transmits about 92% of the visible light incident on the glass. The transmittance of the glass can be increased by
 - \bigcirc increasing the intensity of the incident light.
 - \rightarrow \bigcirc applying an anti-reflective coating to both sides of the glass.
 - \bigcirc slightly tilting the glass with respect to the light beam.
 - \bigcirc making the glass thicker.

Multiple Choice Question

MC A piece of ordinary glass transmits about 92...

29. Which of the following waves exhibit interference?

- \rightarrow \bigcirc Sound, water, and light
 - \bigcirc Only sound
 - \bigcirc Only water
 - \bigcirc Only light
 - \bigcirc None of the choices.

Difficulty: Easy Topic: Diffraction and gratings Type: Conceptual

Accessibility: Keyboard Navigation

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Interference of light waves Type: Conceptual

Multiple Choice Question MC Which of the following waves exhibit interfe.

- 30. When a beam of light passes through a narrow slit we can observe some light in the "geometrical" shadow of the slit. This light arrived by the process of
 - \bigcirc interference.
 - \bigcirc reflection.
 - \bigcirc refraction.
 - \rightarrow \bigcirc diffraction.

Multiple Choice Question MC When a beam of light passes through a narrow... 31. The diffraction of light by the iris of the eye limits

 $\bigcirc the color mean of a second second$

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Diffraction and gratings Type: Conceptual

- \bigcirc the color response of our eyes.
- \rightarrow \bigcirc the ability of our eyes to resolve very fine details.
 - \bigcirc our peripheral vision.

 \bigcirc our ability to see in the dark.

Multiple Choice Question MC The diffraction of light by the iris of the ...

- Select 🔂 32. A common use of a diffraction grating is to
 - \bigcirc split light into different polarizations.
 - \bigcirc focus light onto the retina.
 - $\rightarrow \bigcirc$ separate light into its separate wavelengths.
 - \bigcirc reflect light into a different direction.

Multiple Choice Question MC A common use of a diffraction grating is to Accessibility: Keyboard Navigation Difficulty: Easy Topic: Diffraction and gratings Type: Conceptual

Accessibility: Keyboard Navigation Difficulty: Easy

Select

Topic: Diffraction and gratings Type: Conceptual

- 33. The polarization of a light wave is determined by the direction
 - \rightarrow \bigcirc of the oscillating electric field.
 - \bigcirc of the light's velocity.

MC The polarization of a light wave is determin...

34. One common way to polarize a beam of light is to

 \bigcirc of the fluorescent tube used as a light source.

filter out the longest wavelengths of the spectrum.
 filter out the shortest wavelengths of the spectrum.



Multiple Choice Question

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Polarized light Type: Conceptual

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Polarized light Type: Conceptual

Multiple Choice Question MC One common way to polarize a beam of light i...

Multiple Choice Question

MC A beam of unpolarized light

Select

Select

Select

Select

35. A beam of "unpolarized" light

 \bigcirc does not have any polarized waves.

36. Polaroid sunglasses are designed to transmit primarily

horizontally polarized light.

 \bigcirc light other than blue.

 \rightarrow \bigcirc vertically polarized light.

 \bigcirc longitudinal light waves.

○ refracted waves.

 \bigcirc slow it down using a piece of glass.

 \rightarrow \bigcirc use a sheet of Polaroid material.

- contains a single light wave with a fixed polarization direction
- \rightarrow \bigcirc can be polarized by reflecting it from a flat surface.
- \bigcirc has a polarization direction that is constantly rotating.

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Polarized light Type: Conceptual

Accessibility: Keyboard Navigation Difficulty: Hard Topic: Polarized light Type: Conceptual

Multiple Choice Question

MC Polaroid sunglasses are designed to transmit...

- 37. The leaves of an oak tree are green and those leaves use light to help the tree grow. If the tree were exposed only to green light
 - \bigcirc it would grow more quickly because green light is used by the tree.
 - \bigcirc the growth rate of the tree would not change.
 - \rightarrow \bigcirc it would not grow well because the tree does not use much green light compared to other wavelengths.
 - \bigcirc the growth rate would depend on how hot the green light was.

Accessibility: Keyboard Navigation Difficulty: Hard Topic: Wavelength and color Type: Conceptual

Multiple Choice Question

MC The leaves of an oak tree are green and thos...

38. If a person has a shiny nose, applying powder will remove the shine without reducing the amount of light reflecting from the nose. This is an example of

- \bigcirc polarization.
- \bigcirc diffraction.
- \bigcirc specular reflection.



 \rightarrow \bigcirc diffuse reflection.

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Polarized light Type: Conceptual

Multiple Choice Question MC If a person has a shiny nose, applying powde...

Select 39. When you see your shadow on a sunny day, it has a fuzzy edge. This is

 \rightarrow \bigcirc not caused by diffraction because the wavelength of visible light is too small to produce visible diffraction around a person.

○ not caused by diffraction because diffraction only occurs for openings, not objects blocking light.

 \bigcirc an example of diffraction.

 \bigcirc not caused by diffraction because there are too many wavelengths in sunlight to see the effect.

Accessibility: Keyboard Navigation Difficulty: Medium Topic: Diffraction and gratings Multiple Choice Question MC When you see your shadow on a sunny day, it ... Type: Conceptual 40. When diffraction of light occurs with a single slit, \bigcirc the interference fringes have the same brightness as the central bright spot. \rightarrow \bigcirc a number of interference fringes are produced around the central bright spot. \bigcirc a central bright spot with one dimmer spot on each side can be seen. Select \bigcirc only one interference fringe can be seen. Accessibility: Keyboard Navigation Difficulty: Easy Topic: Diffraction and gratings Multiple Choice Question MC When diffraction of light occurs with a sing... Type: Conceptual 41. When unpolarized light passes through a polarizing filter, \bigcirc all the light passes through and remains unpolarized. \bigcirc all the light passes through and is now polarized. \bigcirc it is completely absorbed by the filter. \bigcirc about half the light passes through and remains unpolarized. Select Q \rightarrow \bigcirc about half the light passes through and is now polarized. Accessibility: Keyboard Navigation Difficulty: Medium Topic: Polarized light Multiple Choice Question Type: Conceptual MC When unpolarized light passes through a pola... 42. Which of the following types of radiation diffracts most when it passes through a diffraction grating? \bigcirc Blue ○ Violet ○ Yellow Select $\rightarrow \bigcirc$ Red Accessibility: Keyboard Navigation Difficulty: Hard Multiple Choice Question Topic: Wavelength and color MC Which of the following types of radiation di... Type: Conceptual 43. Radio waves have wavelength and frequency relative to visible light. O longer; larger \rightarrow \bigcirc longer; smaller \bigcirc shorter; larger Select \bigcirc shorter; smaller Accessibility: Keyboard Navigation Difficulty: Medium Multiple Choice Question Topic: Wavelength and color wavelength and MC Radio waves have Type: Conceptual 44. Ultraviolet light has wavelength and frequency relative to visible light. \bigcirc longer; larger \bigcirc longer; smaller \rightarrow \bigcirc shorter; larger ○ shorter; smaller Select

Select

MC Ultraviolet light has wavelength an...

45. Prisms and diffraction gratings can both

 $\bigcirc\,$ invert a light ray's frequency and wavelength.

 \bigcirc change sunlight into a single color.

 \bigcirc slow down light to a few meters per second, if used back-to-back.

 \rightarrow \bigcirc break the incoming light beam into its constituent colors.

Type: Conceptual

Accessibility: Keyboard Navigation Difficulty: Easy Topic: Diffraction and gratings Type: Conceptual

Multiple Choice Question MC Prisms and diffraction gratings can both

Select 🛛 🔁 46. An unpolarized beam of light of a single pure color can be split apart into two separate beams by using

 \rightarrow \bigcirc a birefringent material like calcite.

 \bigcirc the human retina.

 \bigcirc metal-ceramic inversion.

 \bigcirc a thin layer of oil.

