1 Light is incident upon a mirror at an angle of 50^0 to a line normal to the surface. What angle does the reflected light make with respect to the normal?

2 Light has a wavelength of 450 nm in vacuum. It enters a glass prism with an index of refraction 1.6. What is the wavelength in glass? What is the speed of light in glass? What is the frequency in glass?

3 Light has a frequency of 5.50×10^{14} Hz in vacuum. It enters a liquid with an index of refraction 1.33. What is the frequency in the liquid? What is the speed of light in the liquid? What is the wavelength in the liquid?

4 Light travels from air (n=1.0) to water (n=1.3). Its angle of incidence is 45^0. What is its angle of refraction?

5 Light travels from water (n=1.3) to air (n=1.0). Its angle of incidence is 36^0. What is its angle of refraction?

6 Light is incident upon a mirror at an angle of 38^0 to a line normal to the surface. What angle does the reflected light make with respect to the normal?

7 Light has a wavelength of 650 nm in vacuum. It enters a glass prism with an index of refraction 1.8. What is the wavelength in glass? What is the speed of light in glass? What is the frequency in glass?

8 Light has a frequency of 4.80×10^{14} Hz in vacuum. It enters a liquid with an index of refraction 1.36. What is the frequency in the liquid? What is the speed of light in the liquid? What is the wavelength in the liquid?

9 Light travels from air (n=1.0) to glass (n=1.5). Its angle of incidence is 55^0. What is its angle of refraction?

10 Light travels from diamond (n=2.4) to air (n=1.0). Its angle of incidence is 15^0. What is its angle of refraction?

11 In a double-slit experiment, the two slits are 2.5 mm apart. Light of wavelength 520 nm is incident on the slits. What is the distance to the first maximum on a screen 4.0 m away?

12 In a double-slit experiment, the two slits are 1.8 mm apart. Light of wavelength 480 nm is incident on the slits. What is the distance to the third maximum on a screen 2.0 m away?

13 In a double-slit experiment, the distance between the central and second order maximum is 1.2 mm. Light of wavelength 620 nm is incident on the slits. What is the distance between the two slits if the screens are 3.0 m apart?

14 The distance between etchings on a Diffraction Grating is 1.8 μm and the distance between the grating and the observation screen is 0.85 m. What is the distance from the midpoint of the screen to the 2nd order maxima for light with a wavelength of 510 nm?

15 A diffraction grating is etched with 6667 lines/cm. The distance between the grating and the observation screen is 0.75 m. What is the distance from the midpoint of the screen to the 1st order maximum for light with a wavelength of 450 nm?

16 Light with a wavelength of 590 nm is incident on a screen with a single slit 0.80 mm wide. What is the distance between the central maximum and the first dark fringe on a screen 2.1 m away from the first screen?

17 Light illuminates a single-slit apparatus with a slit opening of 0.75 mm producing an interference pattern with the central maximum width of 0.40 mm on the second screen 2.8 m away. What is the wavelength of the incident light?

18 Light with a wavelength of 550.0 nm is normally incident on a soap bubble with an index of refraction 1.33. What is the minimum thickness of the bubble in order to produce maximum reflection of the normally incident rays?

19 Light with a wavelength of 580.0 nm illuminates a soap film with an index of refraction of 1.33. What is the minimum thickness of the film in order to produce no reflection for the normally incident rays?

20 A glass lens n = 1.80 is coated with a film n = 1.32. What should be the minimum thickness of the film in order to produce maximum reflection for the normally incident light of wavelength 540.0 nm?

21 A glass lens n = 1.65 is coated with a film n = 1.30. What should be the minimum thickness of the film in order to produce minimum reflection for the normally incident light of wavelength 600.0 nm?

22 In a double-slit experiment, the distance between the central and fifth order maxima is 2.2 mm. Light of wavelength 700.0 nm is incident on the slits. What is the distance between the two slits if the screens are 4.5 m apart?

23 Light striking a double-slit apparatus with a slit spacing of 1.6 mm forms an interference pattern where the distance between two consecutive maxima is 0.80 mm on a screen 2.7 m behind the first screen. What is the wavelength of the incident light?

24 Light striking a double-slit apparatus with a slit spacing of 2.3 mm forms an interference pattern where the distance between two consecutive maxima is 0.90 mm on a screen 3.4 m behind the first screen. What is the wavelength of the incident light?

25 The distance between etchings on a Diffraction Grating is 2.0 μm and the distance between the grating and the observation screen is 0.88 m. What is the distance from the midpoint of the screen to the 1st order maxima for light with a wavelength of 480 nm?

26 A diffraction grating is etched with 7100 lines/cm. The distance between the grating and the observation screen is 0.65 m. What is the distance from the midpoint of the screen to the 2nd order maxima for light with a wavelength of 470 nm?

27 Light illuminates a single-slit apparatus with slit opening of 0.65 mm producing an interference pattern with the central maximum width of 0.50 mm on the second screen 3.1 m away. What is the wavelength of the incident light?

28 Light with a wavelength of 485 nm is incident on a screen with a single slit 0.500 mm wide. What is the distance between the central maximum and the second dark fringe on a screen 1.70 m away from the first screen?

29 Light has a wavelength of 460.0 nm is incident on a soap bubble with an index of refraction 1.33. What is the minimum thickness of the bubble in order to produce maximum reflection of the normally incident rays?

30 Light with a wavelength of 620.0 nm illuminates a soap film with an index of refraction of 1.33. What is the minimum thickness of the film in order to produce no reflection for the normally incident rays?

31 A glass lens n = 1.60 is coated with a film n = 1.25. What should be the minimum thickness of the film in order to produce maximum reflection for the normally incident light of wavelength 560.0 nm?

32 A glass lens n = 1.75 is coated with a film n = 1.28. What should be the minimum thickness of the film in order to produce minimum reflection for the normally incident light of wavelength 520 nm?

33 Light with a wavelength of 400.0 nm travels in vacuum. What is the frequency?

34 Light with a frequency of 6.0×10^{14} Hz travels in vacuum. What is the wavelength?

35 The speed of light in water is 2.26×10^8 m/s. If the frequency of the light in water is 7.50×10^{14} Hz, what is its wavelength?

36 If the wavelength of light in diamond is 686 nm, and its frequency is 1.81×10^{14} Hz, what is its speed?

37 Light with a wavelength of 600.0 nm travels in vacuum. What is the frequency?

38 Light with a frequency of 4.0×10^{14} Hz travels in vacuum. What is the wavelength?

39 The speed of light in diamond is 1.24×10^8 m/s. If the frequency of the light in diamond is 9.55×10^{14} Hz, what is its wavelength?

40 If the wavelength of light in water is 525 nm, and its frequency is 4.30×10^{-14} Hz, what is its speed?

41 Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.400 mm. As result of diffraction an interference pattern is produced on the second screen 4.00 m away.

a. What property of light does this experiment demonstrates?

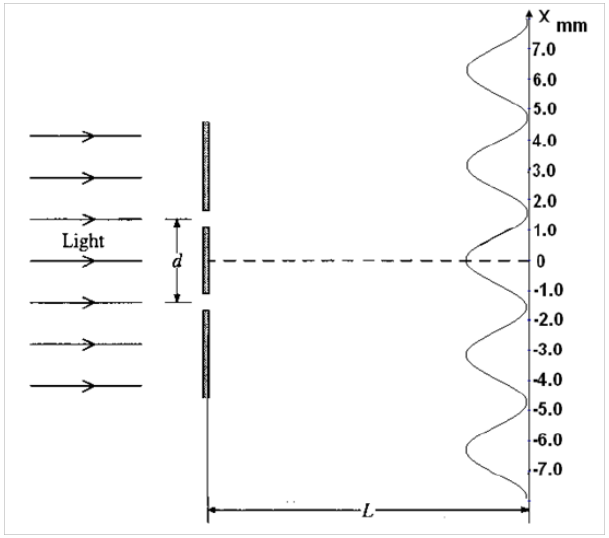
b. Find the wavelength of the incident light based on the interference pattern.

The double-slit apparatus is submerged into water (n = 1.33)

c. What is the frequency of the light in water?

d. What is the wavelength of the light in water?

e. What happens to the distance between two adjacent fringes in water?



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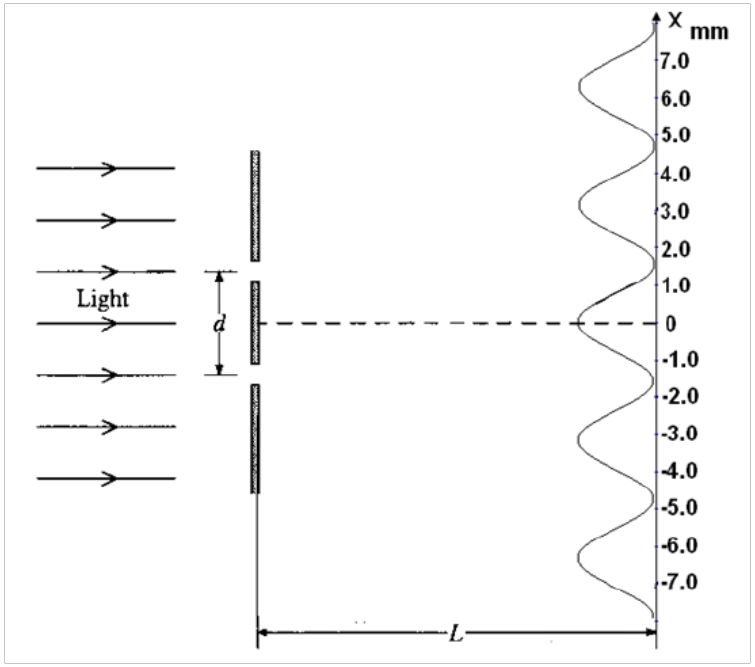
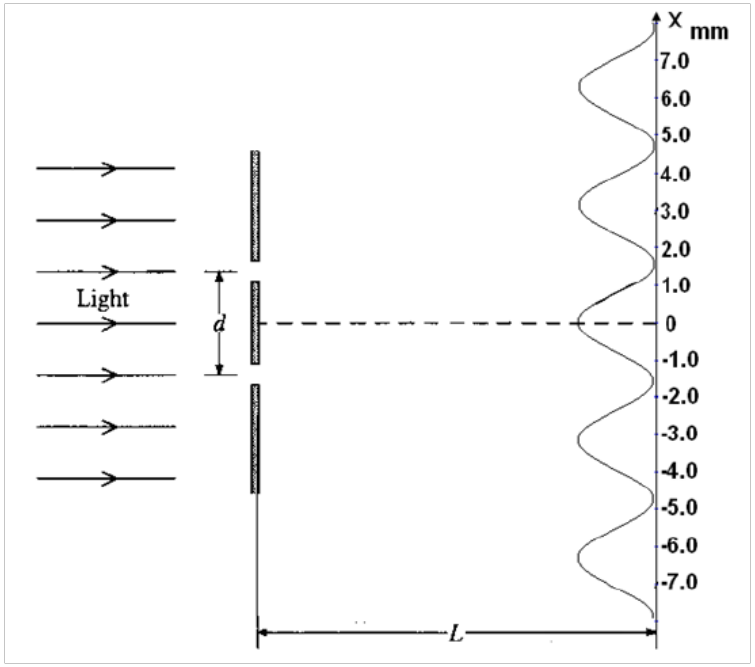


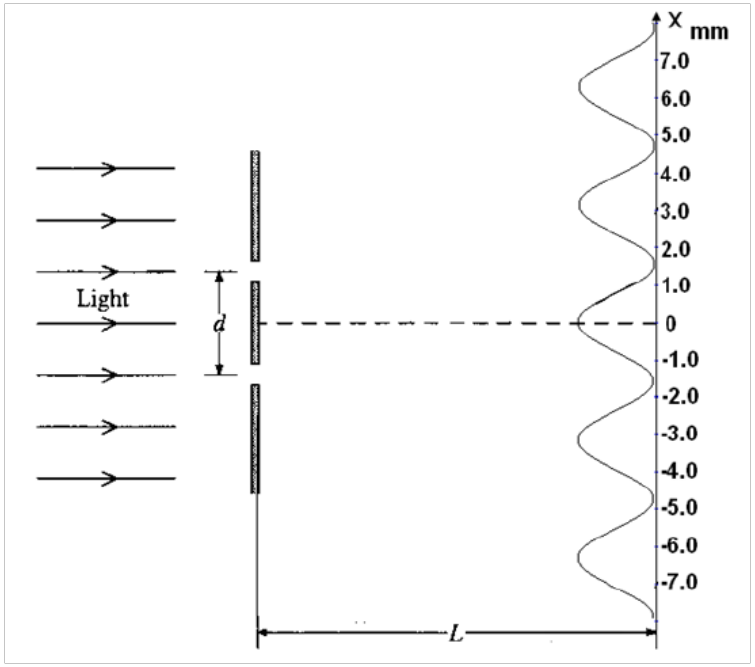
Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.400 mm. As result of diffraction an interference pattern is produced on the second screen 4.00 m away.

b. Find the wavelength of the incident light based on the interference pattern.



Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.400 mm. As result of diffraction an interference pattern is produced on the second screen 4.00 m away. The double-slit apparatus is submerged in water (n=1.33).

c. What is the frequency of light in water?



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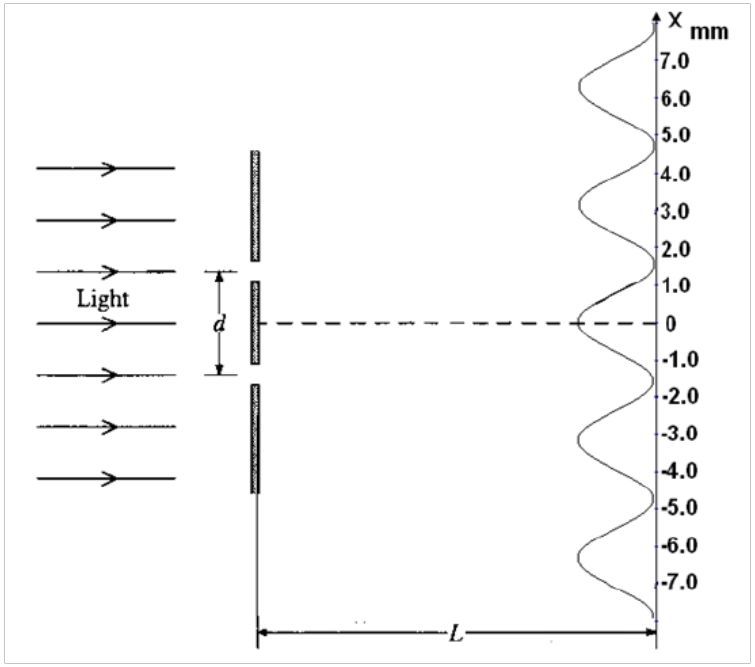
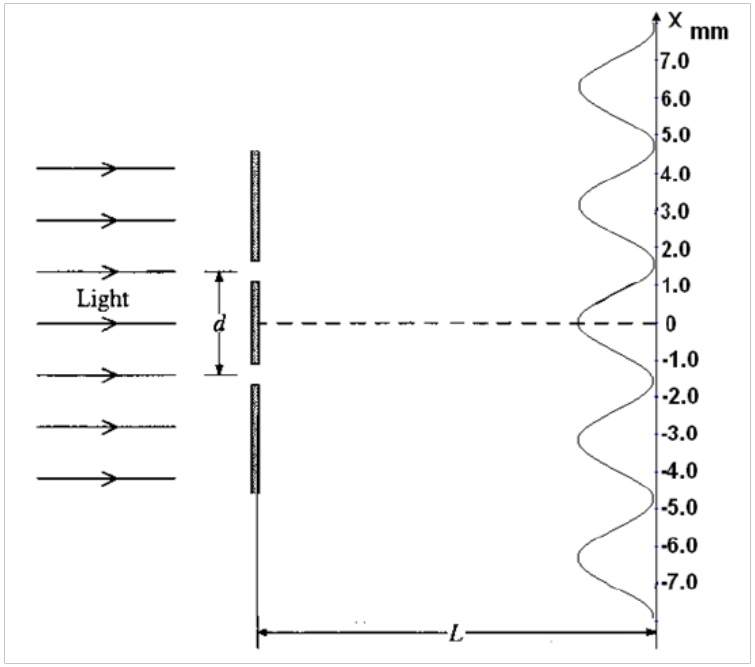
d. What is the wavelength of light in water?



Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.400 mm. As result of diffraction an interference pattern is produced on the second screen 4.00 m away. The double-slit apparatus is submerged in water (n=1.33).

e. What happens to the distance between two adjacent fringes in water?



42 Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.600 mm. As result of diffraction an interference pattern is produced on the second screen 5.00 m away.

a. What property of light does this experiment demonstrates?

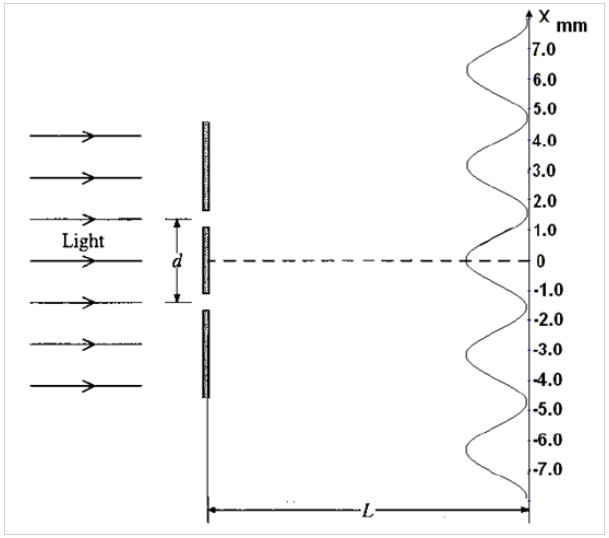
b. Find the wavelength of the incident light based on the interference pattern.

The double-slit apparatus is submerged into water (n = 1.33)

c. What is the frequency of the light in water?

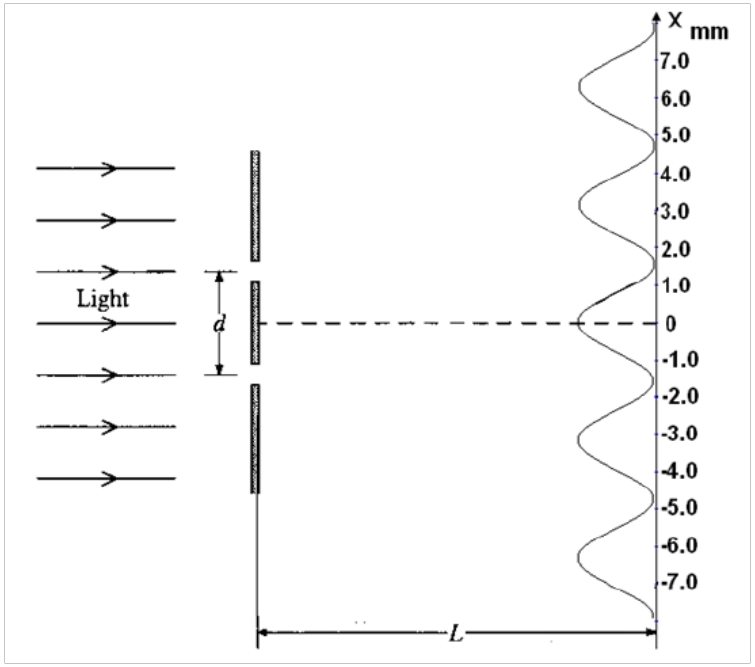
d. What is the wavelength of the light in water?

e. What happens to the distance between two adjacent fringes in water?



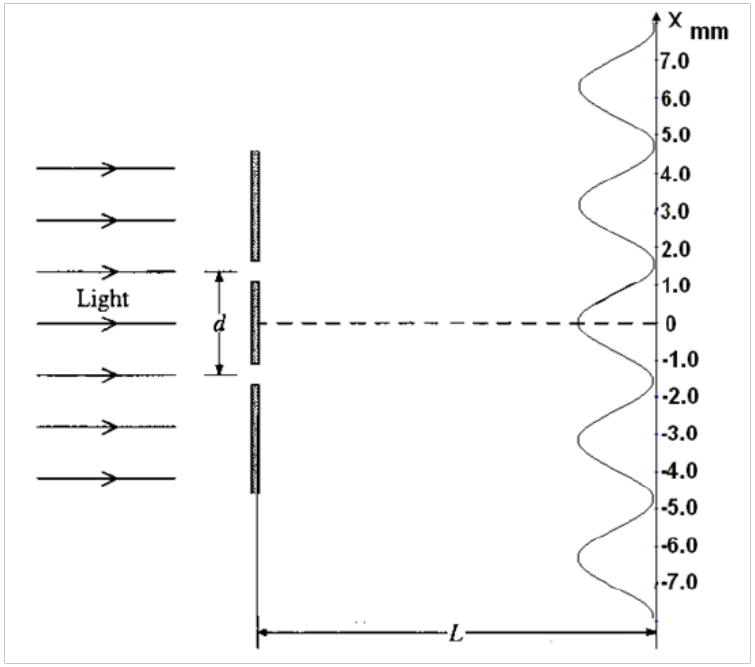
Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.600 mm. As result of diffraction an interference pattern is produced on the second screen 5.00 m away.

a. What property of light does this experiment demonstrate?



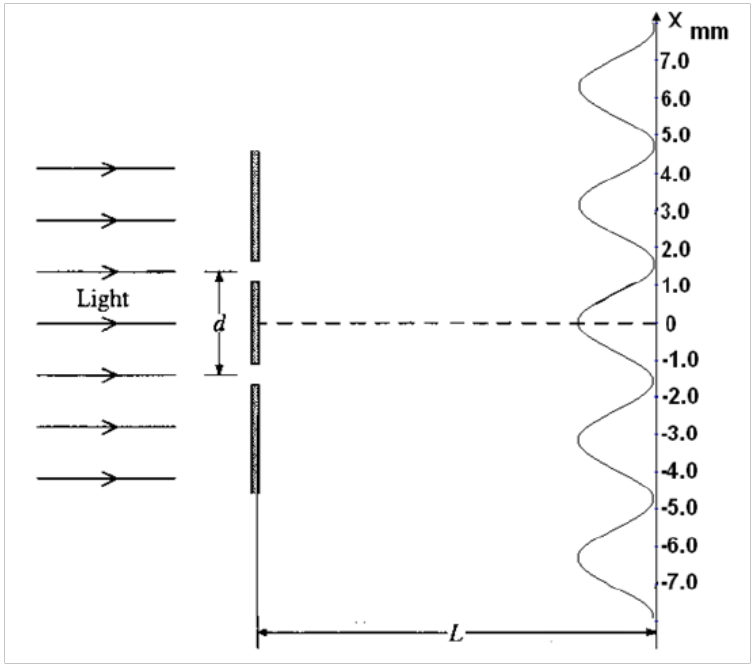
Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.600 mm. As result of diffraction an interference pattern is produced on the second screen 5.00 m away.

b. Find the wavelength of the incident light based on the interference pattern.



Monochromatic light strikes a double-slit apparatus as shown below. The separation between the slits is 0.600 mm. As result of diffraction an interference pattern is produced on the second screen 5.00 m away. The double-slit apparatus is submerged in water (n=1.33).

c. What is the frequency of light in water?



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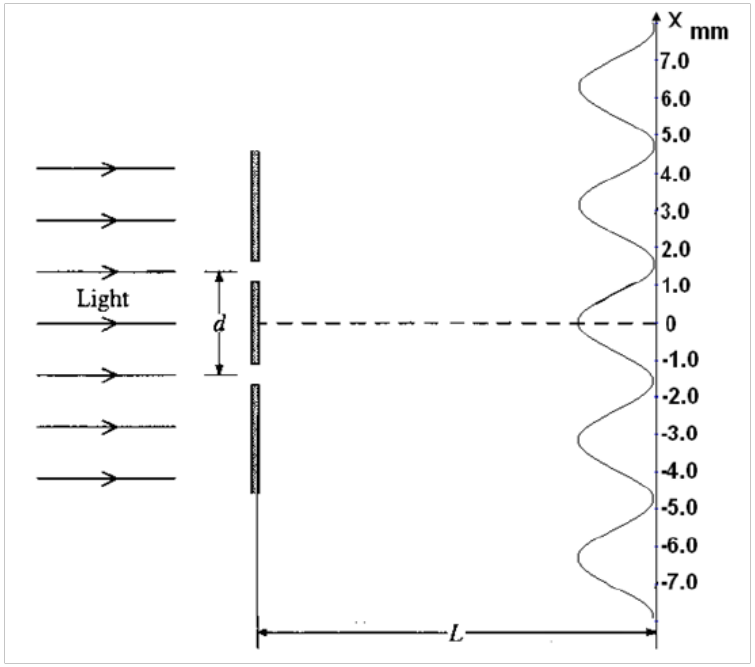

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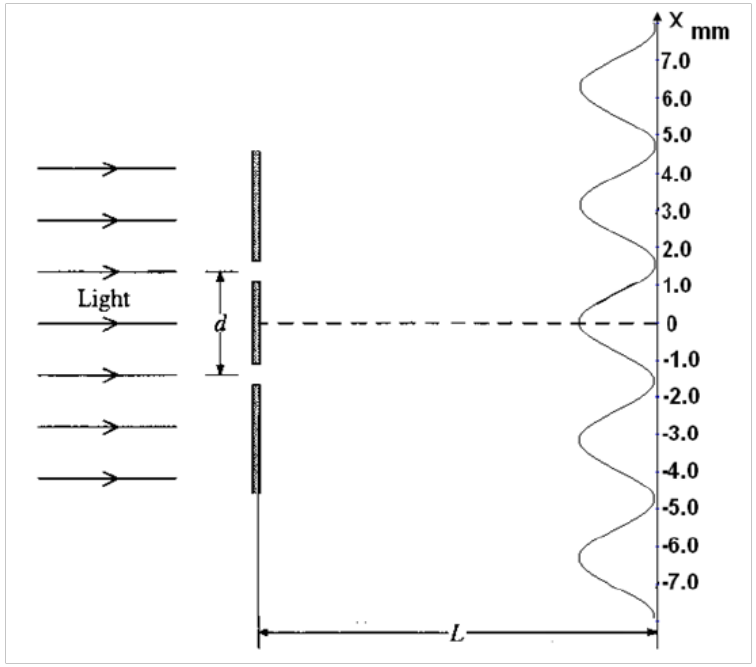
e. What happens to the distance between two adjacent fringes in water?



43 A soap film is illuminated with monochromatic light wavelength of 600.0 nm as shown below.

a. What is the frequency of the incident light in vacuum?

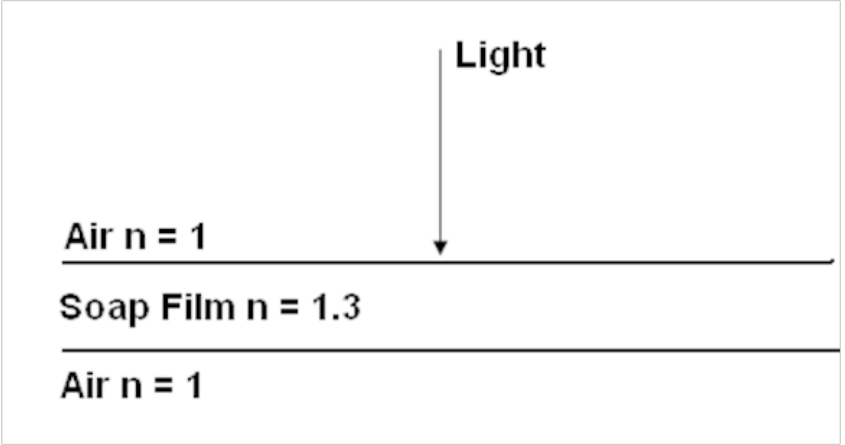
b. What is the frequency of light in the film?

c. What is the speed of light in the film?

d. What is the wavelength of light in the film?

e. Calculate the minimum thickness of the film required to produce no reflected light.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light



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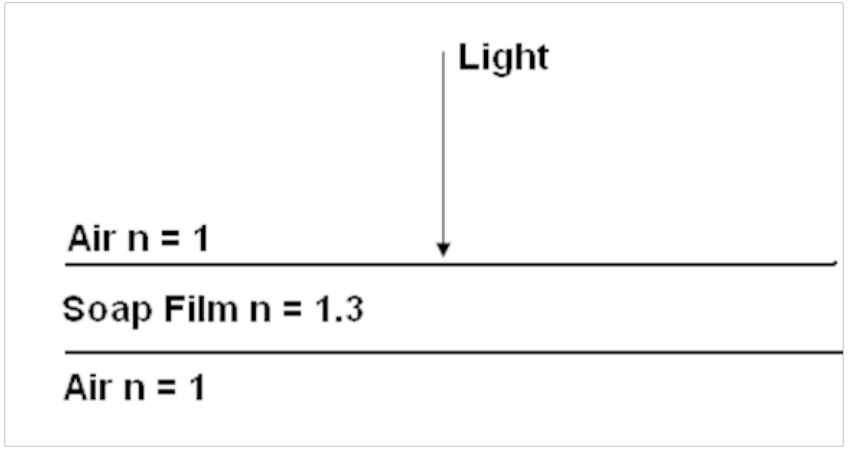
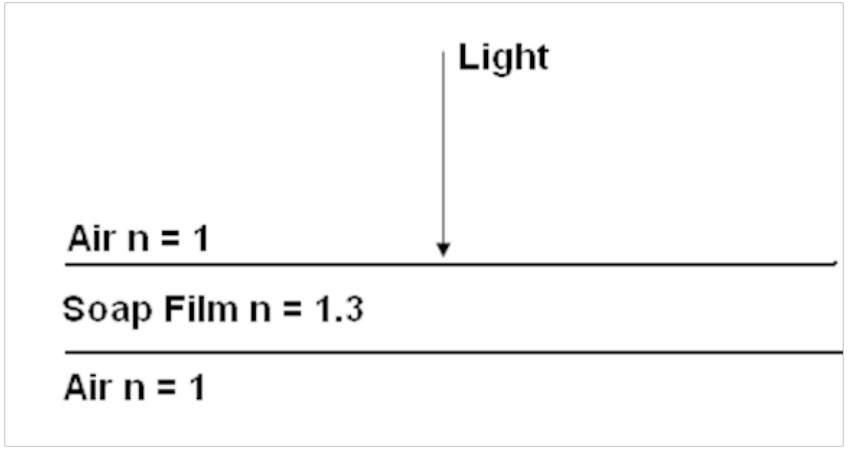
a. What is the frequency of the incident light in vacuum?



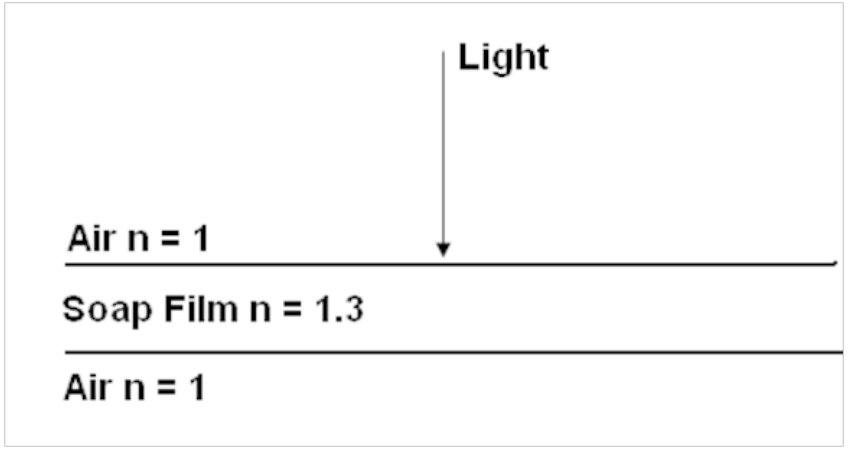
A soap film is illuminated with monochromatic light wavelength of 600.0 nm as shown below.

b. What is the frequency of light in the film?



A soap film is illuminated with monochromatic light wavelength of 600.0 nm as shown below.

c. What is the speed of light in the film?



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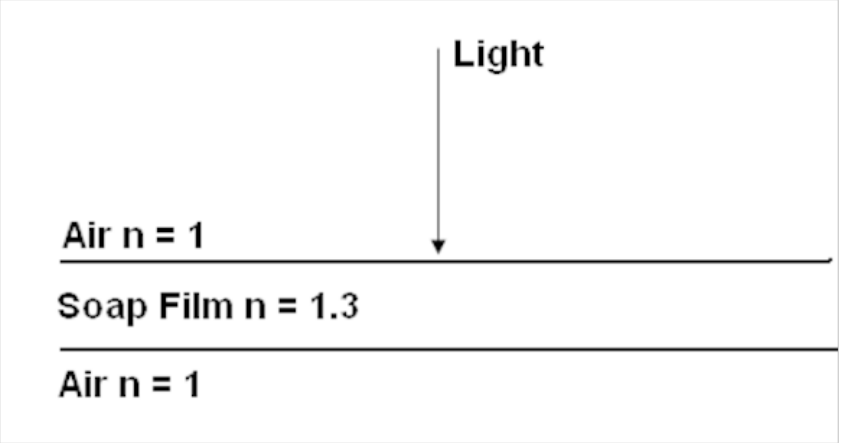
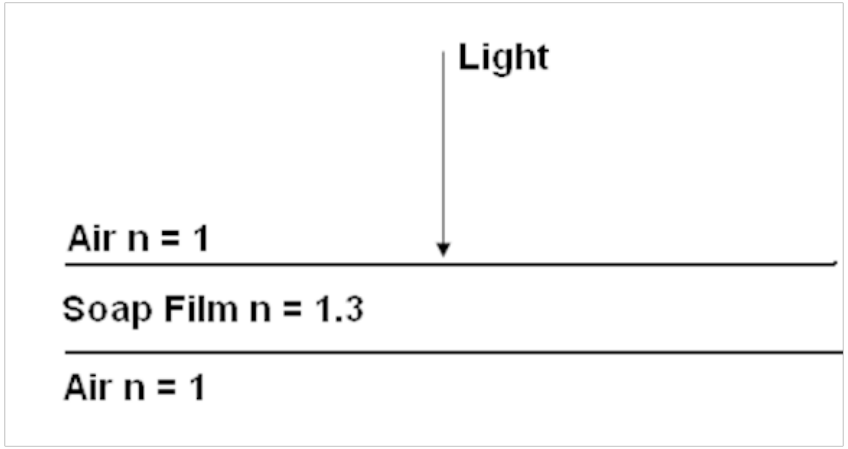


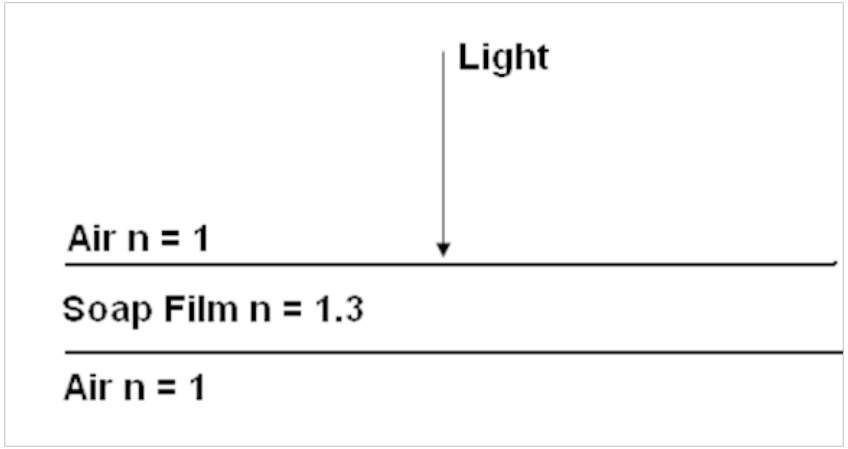
A soap film is illuminated with monochromatic light wavelength of 600.0 nm as shown below.

e. Calculate the minimum thickness of the film required to produce no reflected light.



A soap film is illuminated with monochromatic light wavelength of 600.0 nm as shown below.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.



44 A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

a. What is the frequency of the incident light in vacuum?

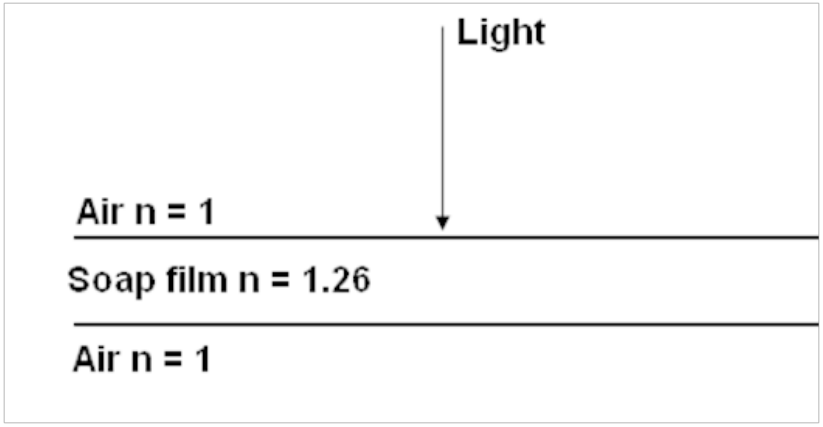
b. What is the frequency of light in the film?

c. What is the speed of light in the film?

d. What is the wavelength of light in the film?

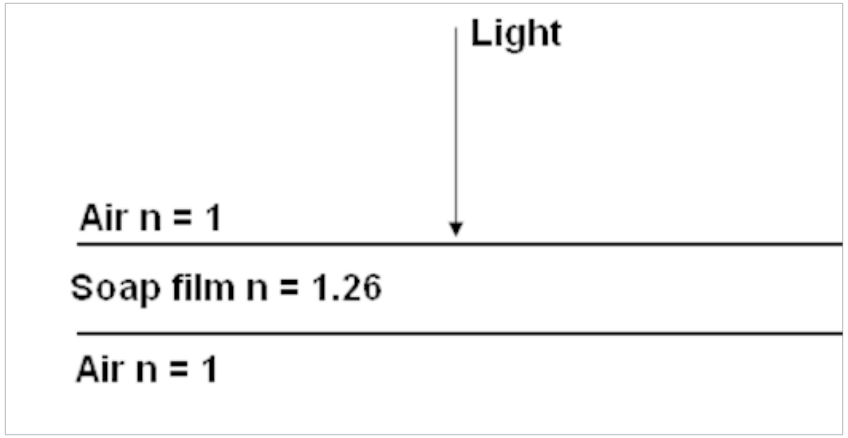
e. Calculate the minimum thickness of the film required to produce no reflected light.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light



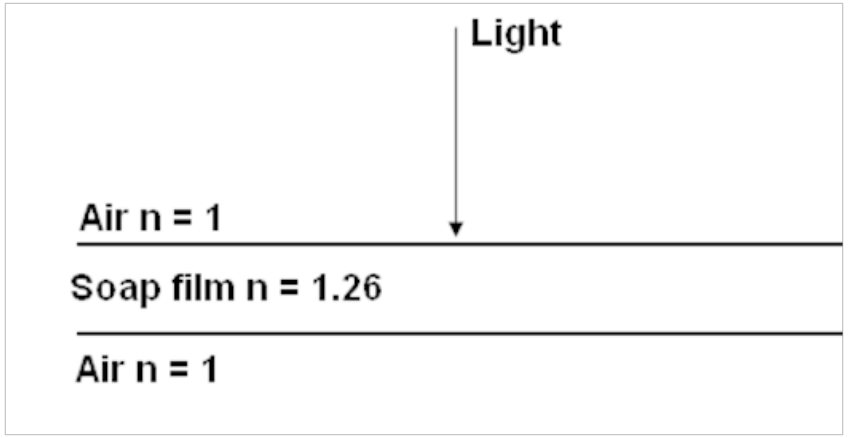
A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

a. What is the frequency of the incident light in vacuum?



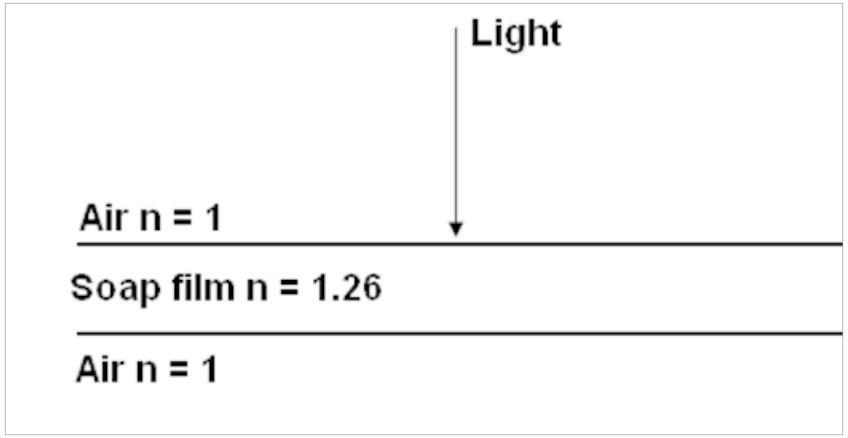
A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

b. What is the frequency of light in the film?



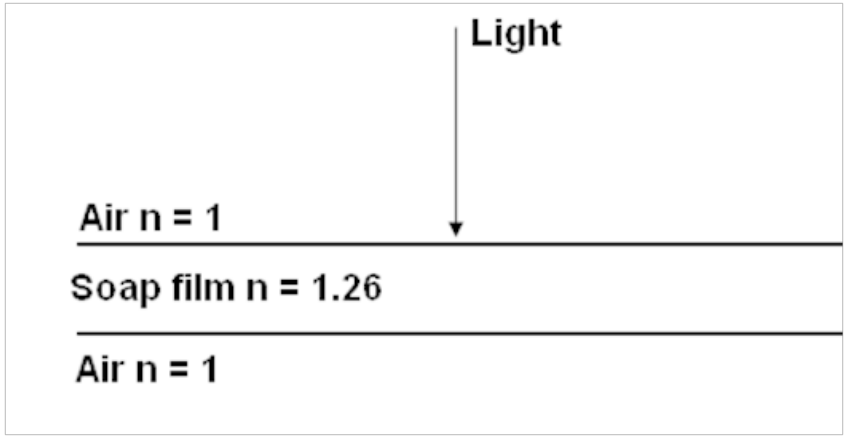
A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

c. What is the speed of light in the film?



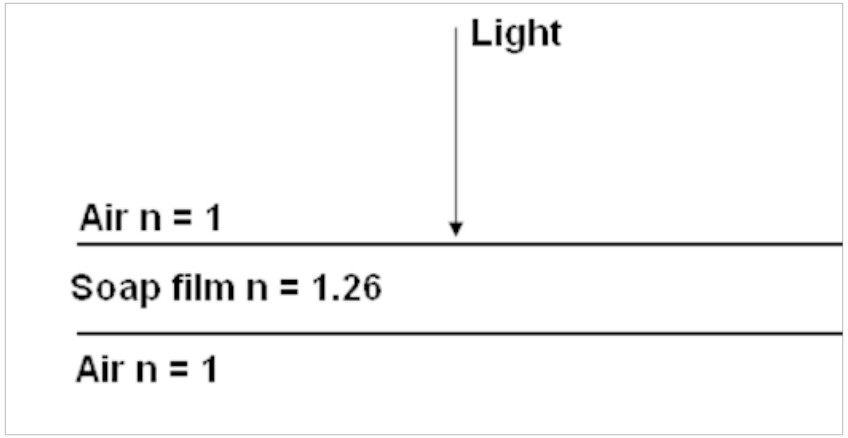
A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

d. What is the wavelength of light in the film?



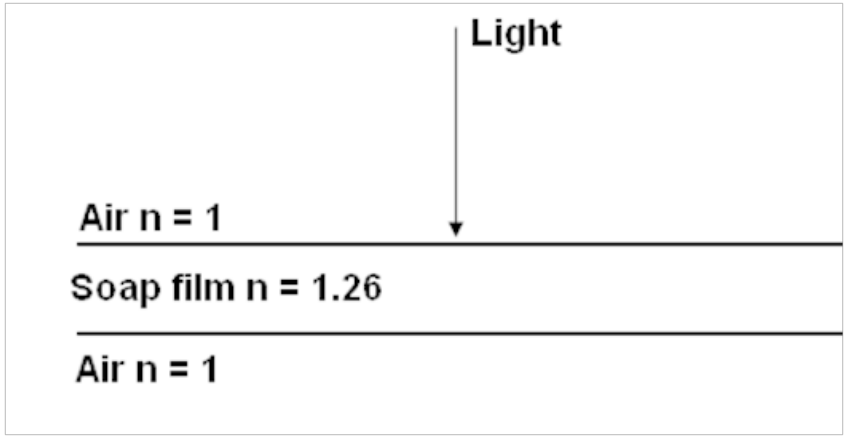
A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

e. Calculate the minimum thickness of the film required to produce no reflected light.



A soap film is illuminated with monochromatic light wavelength of 580.0 nm as shown below.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.



45 An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

a. What is the frequency of the incident light in vacuum?

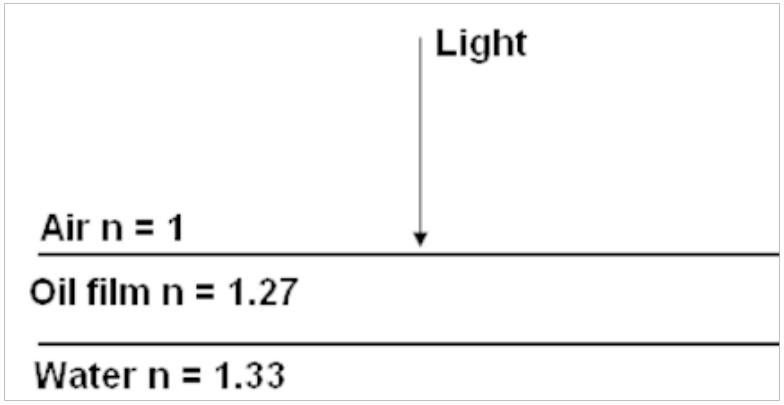
b. What is the frequency of light in the oil film?

c. What is the speed of light in the oil film?

d. What is the wavelength of light in the oil film?

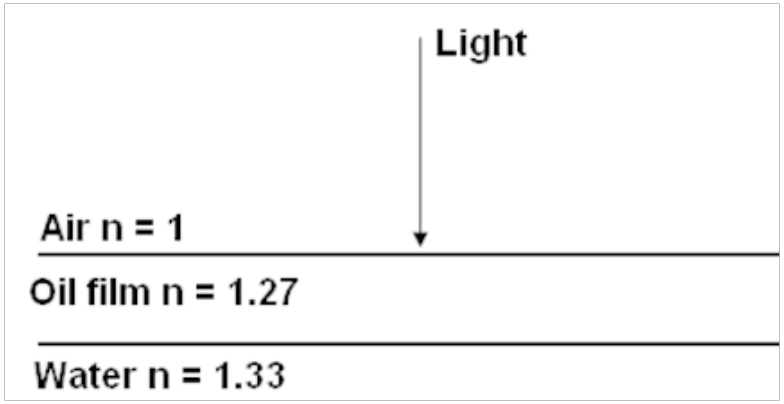
e. Calculate the minimum thickness of the film required to produce no reflected light.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.



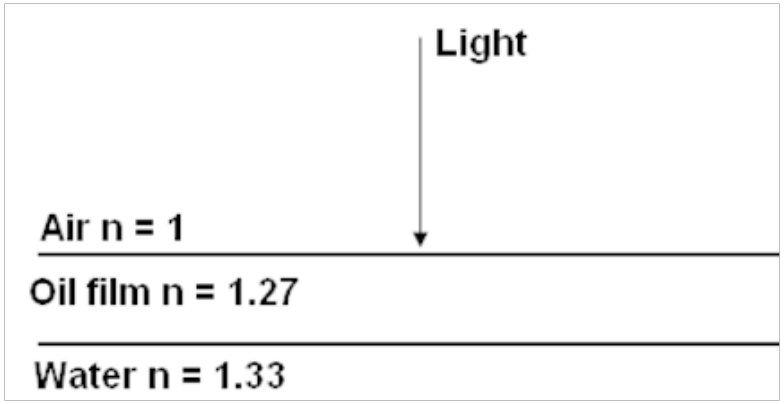
An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

a. What is the frequency of the incident light in vacuum?



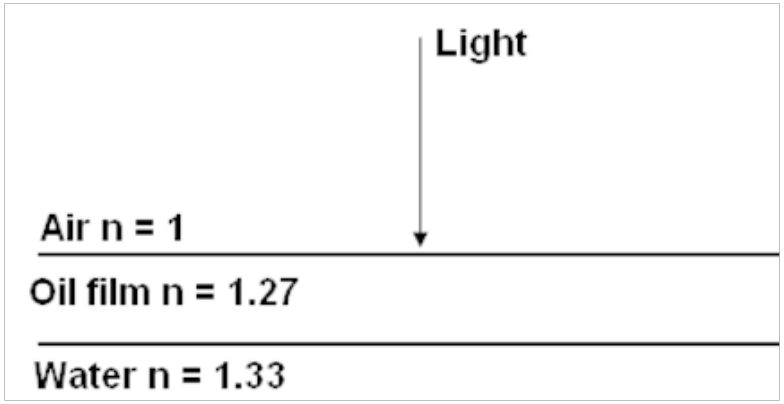
An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

b. What is the frequency of light in the oil film?



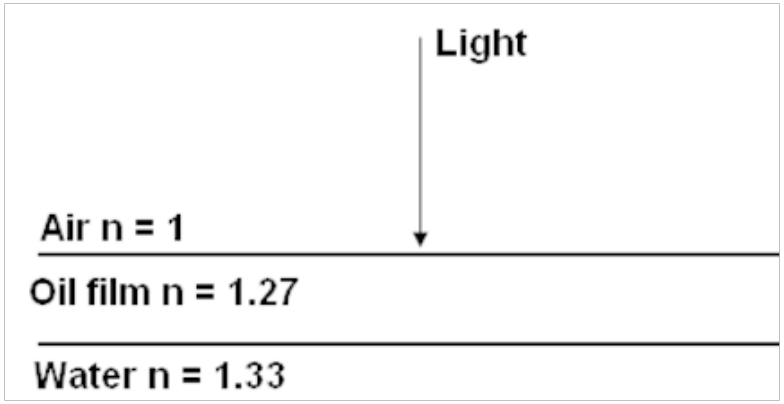
An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

c. What is the speed of light in the oil film?



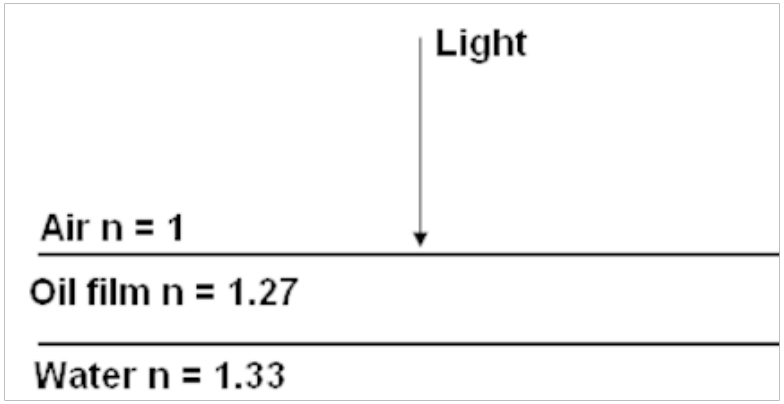
An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

d. What is the wavelength of light in the oil film?



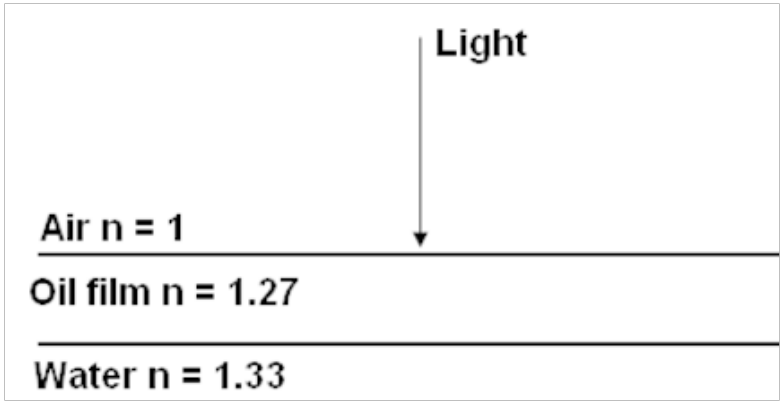
An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

e. Calculate the minimum thickness of the film required to produce no reflected light.



An oil film on the surface of water is illuminated with monochromatic light of wavelength 560.0 nm as shown below.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.



46 The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

a. What is the frequency of the incident light in vacuum?

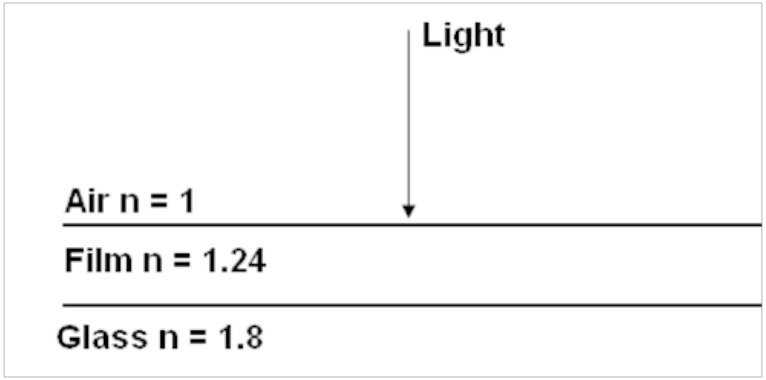
b. What is the frequency of light in the film?

c. What is the speed of light in the film?

d. What is the wavelength of light in the film?

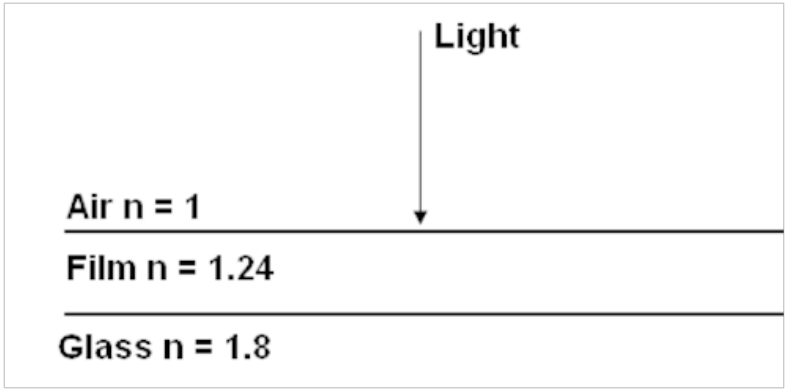
e. Calculate the minimum thickness of the film required to produce no reflected light.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.



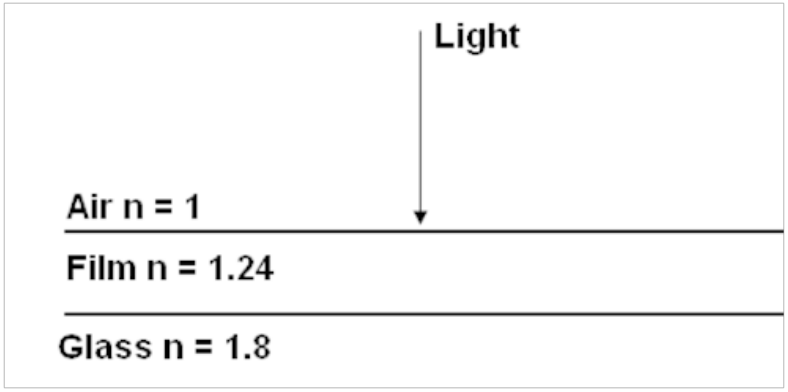
The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

a. What is the frequency of the incident light in vacuum?



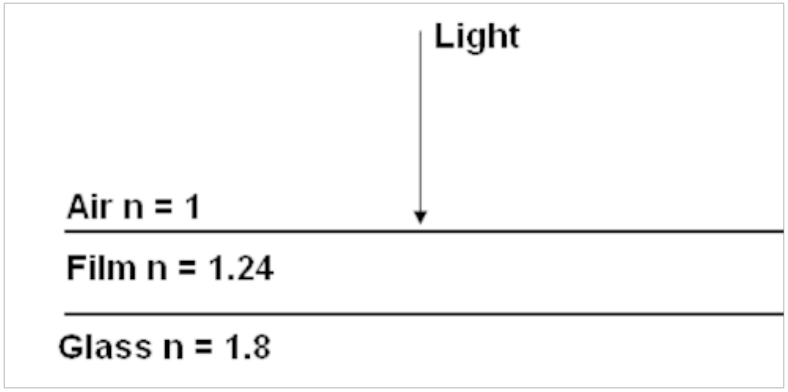
The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

b. What is the frequency of light in the film?



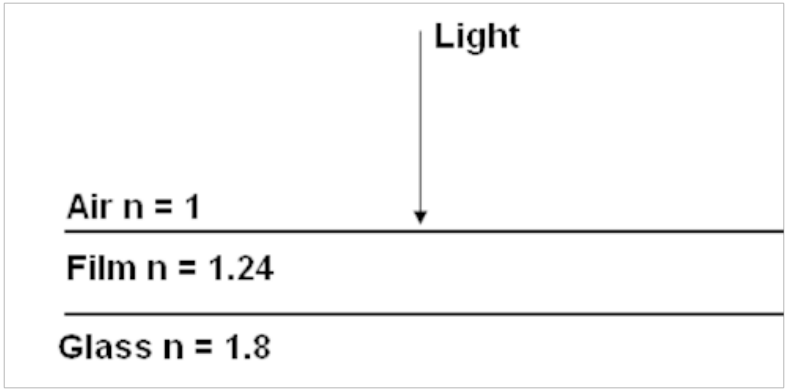
The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

c. What is the speed of light in the film?



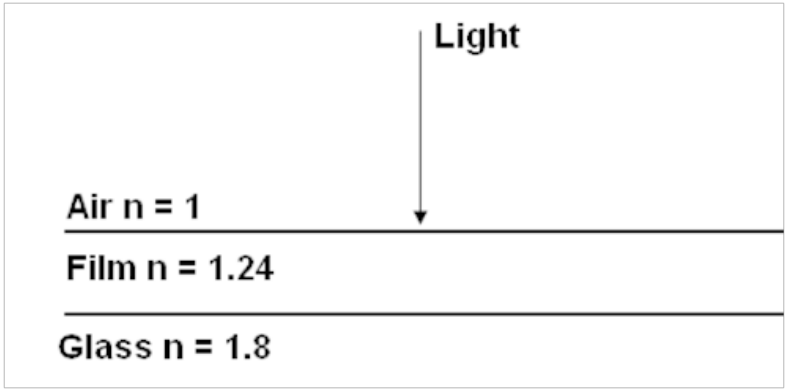
The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

d. What is the wavelength of light in the film?



The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

e. Calculate the minimum thickness of the film required to produce no reflected light.



The glass surface is coated with a thin film and illuminated with monochromatic light of wavelength 555 nm.

f. Calculate the minimum thickness of the film required to produce maximum intensity of the reflected light.