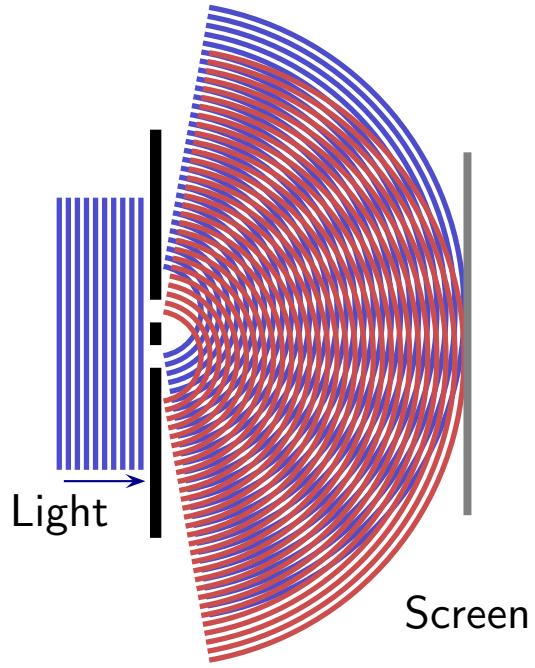
Question 1

Consider waves that are produced by the illustrated double slit arrangement.

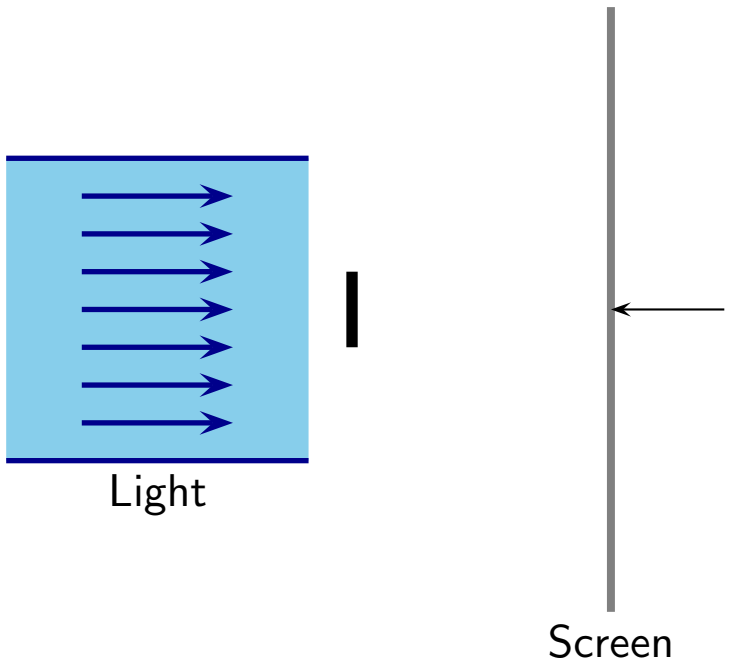


How many bright spots appear on the illustrated screen?

1. Only one.
2. Three
3. Five
4. Seven
5. Infinitely many.

Question 2

Light is incident on a small disk-shaped barrier.

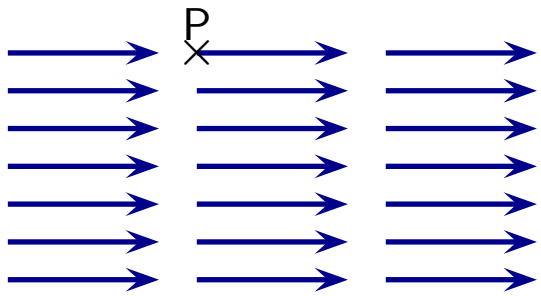


The disk will produce a shadow. The center of this area (marked by an arrow) is:

1. a bright spot,
2. darker than the rest of the shadow,
3. slightly lighter than the rest of the shadow,
4. bright or dark depending on the distance between the screen and the disk.

Question 3

An electric field consists of one arrow at each point in space. A simple (realistic) example is illustrated.



Consider the location labeled P. Which of the following is true?

1. There can only be an electric field arrow at P if there is also a charged particle at P.
2. There can be an electric field arrow at P even if there is no particle of any type at P.

Question 4

Red light has a wavelength of about $650\,\mathrm{nm} = 6.5 \times 10^{-7}\,\mathrm{m}$ while violet light has a wavelength of about $450\,\mathrm{nm} = 4.5 \times 10^{-7}\,\mathrm{m}$. Both colors travel at the same speed in air.

Which of the following is true?

1. Red light has a higher frequency than blue light.
2. Red light has a lower frequency than blue light.
3. Red light has the same frequency as blue light.
4. The frequency depends on the brightness of the light.