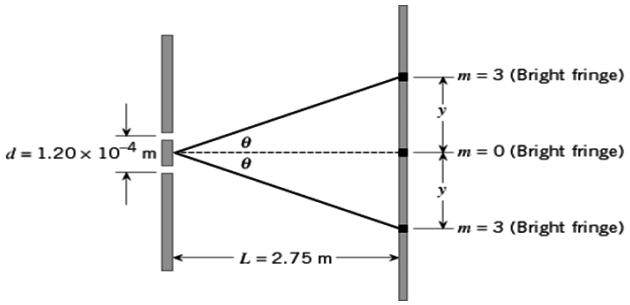
Problem Sheet- Interference

1. Red light (λ = 664 nm in vacuum) is used in Young's experiment with the slits separated by a distance d = 1.20×10^{-4} m. The screen in Figure 1 is located at a distance from the slits given by L = 2.75 m. Find the distance y on the screen between the central bright fringe and the third-order bright fringe.



2. In a Newton's rings experiment the diameter of the 15th ring was found to be 0.59 cm and that of the 5th ring is 0.336 cm. If the radius of curvature of the lens is 100 cm, find the wave length of the light.
3. Newton's rings are observed in the reflected light of wave length 5900 Å. The diameter of 10th dark ring is 0.5 cm. Find the radius of curvature of the lens used.
4. Two slits separated by a distance of 0.2 mm are illuminated by a monochromatic light of wave length 550nm. Calculate the fringe width on a screen at a distance of 1 m from the slits.
5. Two coherent sources whose intensity ratio is 36:1 produce interference fringes. Deduce the ratio of maximum intensity to minimum intensity.
6. In a Newton's ring experiment, the diameter of the 5th ring is 0.30 cm and diameter of the 15th ring is 0.62cm. Find the diameter of the 25th ring
7. Light of wave length 500 nm forms an interference pattern on a screen at a distance of 2 m from the slit. If 100 fringes are formed within a distance of 5 cm on the screen, find the distance between the slits.
8. Calculate the thickness of air film at the 10th dark ring in a Newton's rings system, viewed normally by a reflected light of wave length 500 nm. The diameter of the 10th dark ring is 2 mm.
9. Light waves of wave length 650 nm and 500 nm produce interference fringes on a screen at a distance of 1 m from a double slit of separation 0.5 mm. Find the least distance of a point from the central maximum where the bright fringe due to both sources coincide.