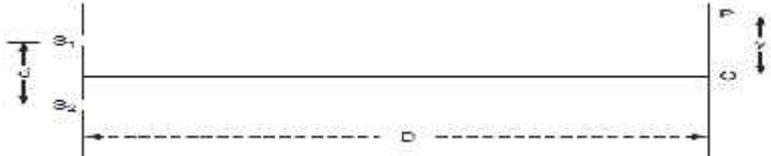| Subject : PHYSICS	CHAPTER 10-<u>WAVE OPTICS</u>		Worksheet #11
Resource Person: SUSAN ANIL		Date : 23.11.17	
Name of the Student :_____		Class & Division : _____	Roll Number : __

	ONE MARK QUESTIONS-
1.	State the reason, why two independent sources of light cannot be considered as coherent sources. (**2008**)
2.	What is the geometrical shape of the wavefront when a plane wave passes through a convex lens? (**2008**)
3.	How does the fringe width of interference fringes change, when the whole apparatus of Young's experiment is kept in a liquid of refractive index 1.3? (**2008**)
	TWO MARK QUESTIONS-
4.	How the angular separation and visibility of fringes in Young will's double slit experiment change when (i) screen is moved away from the plane of the slits, and (ii) width of the source slit is increased? (**2008**)
	THREE MARK QUESTIONS-
5.	How is a wave front defined? Using Huygens construction draw a figure showing the propagation of a plane wave refracting at a plane surface separating two media. Hence verify Snell's law of refraction. (**2008**)
6.	Using Huygens constructions draw a figure showing the propagation of a plane wave reflecting at the interface of the two media. Show that the angle of incidence is equal to the angle of reflection.
7.	In a single slit diffraction experiment, when a tiny circular obstacle is placed in the path of light from a distant source, a bright spot is seen at the centre of the shadow of the obstacle. Explain why? State two points of difference between the interference pattern obtained in Young's double slit experiment and the diffraction pattern due to a single slit. (**2008**)
8.	In Young's double slit experiment, monochromatic light of wavelength 630 nm illuminates the pair of slits and produces an interference pattern in which two consecutive bright fringes are separated by 8.1 mm. Another source of monochromatic light produces the interference pattern in which the two consecutive bright fringes are separated by 7.2 mm. Find the wavelength of light from the second source. What is the effect on the interference fringes if the monochromatic source is replaced by a source of white light? (**2009**)

9.	In Young's double slit experiment, the two slits 0×15 mm apart are illuminated by monochromatic light of wavelength 450 nm. The screen is 1.0 m away from the slits. (*a*) Find the distance of the second (i) bright fringe, (ii) dark fringe from the central maximum. (*b*) How will the fringe pattern change if the screen is moved away from the slits? (**2010**)
10.	How does an unpolarised light get polarised when passed through polaroid? Two polaroids are set in crossed positions. A third polaroid is placed between the two making an angle θ with the pass axis of the first polaroid. Write the expression of the intensity of light transmitted from the second polaroid. In what orientations will the transmitted intensity be (*i*) minimum and (*ii*) maximum? (**2010**)
11.	(a) In a single slit diffraction experiment, a slit of which '*d*' is illuminated by red light of wavelength 650 nm. For what value of '*d*' will: (i) the first minimum fall at an angle of diffraction of 30°, and (ii) the first maximum fall at an angle of diffraction of 30°? (b) Why does the intensity of the secondary maximum become less as compared to the central maximum? (**2009**)
12.	The intensity at the central maxima (O) in a Young's double slit experiment is I_0. If the distance OP equals one-third of the fringe width of the pattern, show that the intensity at point P would be $I_0/4$.
	FIVE MARK QUESTIONS-
13.	(a) What is plane polarised light? Two polaroids are placed at 90° to each other and the transmitted intensity is zero. What happens when one more polaroid is placed between these two, bisecting the angle between them ? How will the intensity of transmitted light vary on further rotating the third polaroid? (b) If a light beam shows no intensity variation when transmitted through a polaroid which is rotated, does it mean that the light is unpolarised ? Explain briefly. (**2008**)
14.	State the importance of coherent sources in the phenomenon of interference. In Young's double slit experiment to produce interference pattern, obtain the conditions for constructive and destructive interference. Hence, deduce the expression for the fringe width. How does the fringe width get affected, if the entire experimental apparatus of Young is immersed in water?(**2011**)
15.	(*a*) State Huygen's principle. Using this principle explain how a diffraction pattern is obtained on a screen due to a narrow slit on which a narrow beam coming from a monochromatic source of light is incident normally. (*b*) Show that the angular width of the first diffraction fringe is half of that of the central fringe. (*c*) If a monochromatic source of light is replaced by white light, what change would you observe in the diffraction pattern? (**2011**)