Class: Roll No:

Experiment No: 4

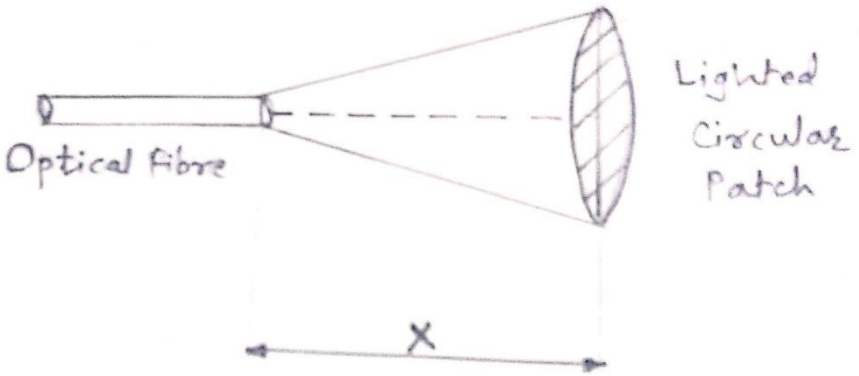
To Determine Numerical Aperture of a given optical Fibre.

Date Of Preparation:

Date of Submission:

Signature of Teacher:

Diagram:



Schematic diagram for Numerical Aperature measurement of optical fibre.

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EXPERIMENT NO. 4

Aim: To Determine Numerical Aperture of given optical Fibre.

Apparatus: Fibre Optics, Numerical Aperture measurement kit, Patch Cords, one side connectorized fibre cable.

Theory: Numerical Aperture is a measure of light gathering capacity of an optical fibre. If the Refractive Indices of the core and cladding of an optical fibre is n1 and n2 respectively. Then Numerical Aperture is defined as: $\sqrt{n_1^2 - n_2^2}$

If the acceptance angle of the given fibre is θ and refractive Index of surrounding medium is no than NA= nosin θm. For optical fibre in air (no=1) NA=sinθm.

If 'x' is the perpendicular distance of the tip of the fibre from the screen and 'r' is the radius of the circulator patch of the lighted portion of the screen then:

$$\text{NA} = \sin\theta m = \frac{r}{(x^2+r^2)^{½}}$$

Observation Table:

Sr.No	X (cm)	Diameter			r (cm)	$\sin\theta m = \frac{r}{(x^2 + r^2)^{1/2}}$ (Numerical Aperture)
		D1	D2	Avg		
1						
2						
3						
4						
5						

Result:

Calculated Numerical Aperture: _____

Standard Value of Numerical aperture: 0.2 – 0.6