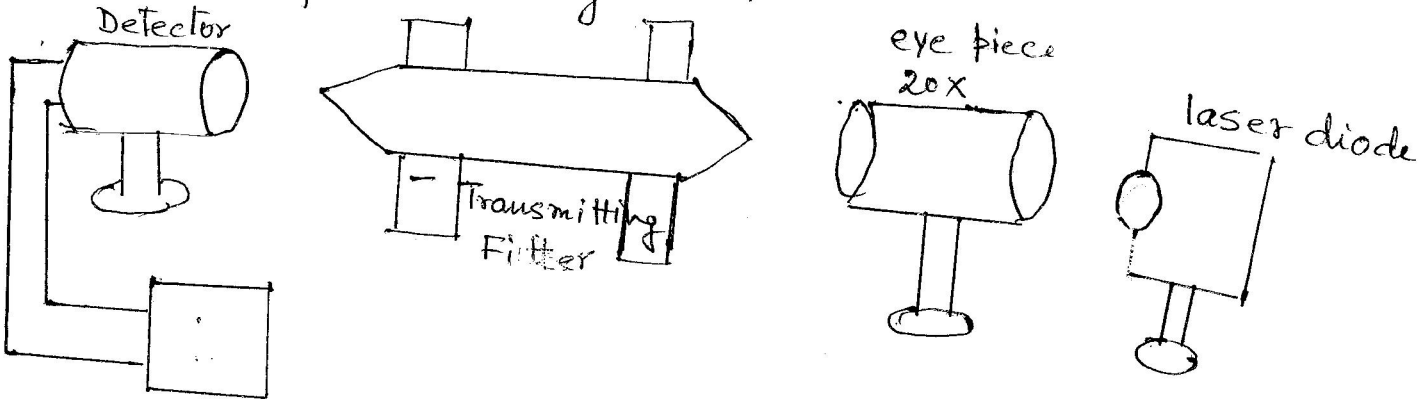
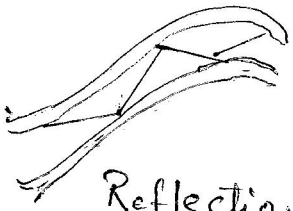
Aim :- To measure the bending loss of optical Fiber.

Apparatus Required :- Laser diode with power supply, eye piece, fiber wire, stand screw, optical fiber, silicon pin hole, detector.

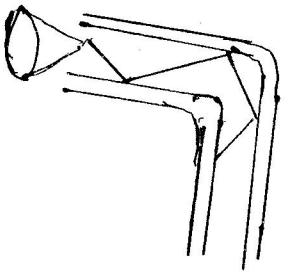
Theory :- In modern communication system, fiber optics play a major role in linking communication system. In particular, the telephone systems are connected via optical fiber cable (OFC), linking the cable to a communication system is an important aspect. light coming out at the fiber before falling on the detector or light emitting the fiber optic cable from the source encounters a change in the medium, which results in the reflection of light beam, emerging out of a fiber optics cable diverges due to change in the refract index of the medium, having lower refractive index. Thus the cable causes the beam to diverge. The bending loss is basically referred to the loss of powe During transmit, light pulse loses some of their photo thus reducing their amplitude. Bending loss in optica fibre is basically measured in terms of decibels/ Kilometer. It can be measured by the reduction of signal strength by comparing the output power with input power. Or it can also be compared in terms of

Apparatus for Bending loss :—

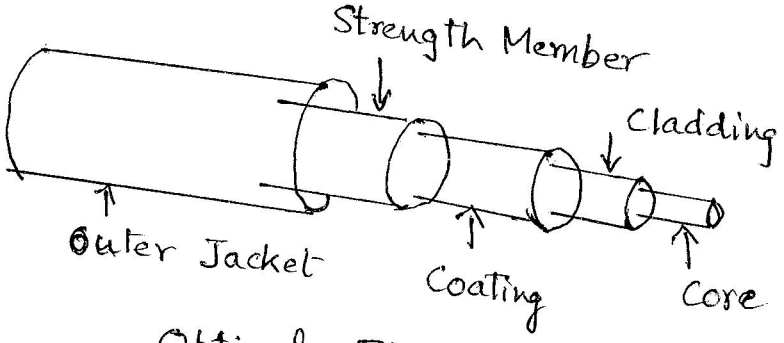




Reflection of light after bending. (allowed)



loss due to bending.



Optical Fiber.

Observation table :—

S.No	Length of bending loop (mm)	Detector current I_o (μA) I	Bending loss in (dB)
1.			
2			
3.			

comparing strength of output current with input current. The basic measurements are made in decibels (dB) by taking the logarithmic ratio of input current I_0 and output current I for different bending loop radius.

If the detector used is smaller than the cross-sectio of the diverging beam part of the data will be lost. Hence the divergence of the beam has to be small. at the center to have proper communication to account for small "numerical aperture".

Formula :-

$$\text{Bending loss} = \frac{20 \times \log I_0}{I} \quad \text{in decibel (dB)}$$

where I_0 is the current without bending, I is the current detected by the detector after bending.

Result :-

A graph has to be plotted by taking the length of the fiber along x-axis and with the corrosponding bending loss along y-axis.

The graph shows that the bending loss increases in the -ive side with increase in the length of the optical Fiber.

Precautions :-

1. The connections should be done properly with proper focussing.
2. The reading should be accurately noted.

Calculation :-

Bending loss in dB = $\frac{20 \times \log I_0}{I}$

where I_0 is the current before bending and I is the current after bending the optical fiber.