**AIMAN College of Arts and Science for Women**

**Department of Physics**

**Subject Title: Communication Physics**

**Subject Code: 16SMBEPH3**

**Semester : 6**

**UNIT-II**

1. What is the basic principle of optical fiber?

An **optical fiber** is a cylindrical dielectric waveguide (nonconducting waveguide) that transmits light along its axis, by the process of total internal reflection. The **fiber** consists of a core surrounded by a cladding layer, both of which are made of dielectric materials.

1. What are the advantages of fiber optics?

**Fiber optic** cables have a much greater bandwidth than metal cables. The amount of information that can be transmitted per unit time of **fiber** over other transmission media is its most significant **advantage**. An **optical fiber** offers low power loss, which allows for longer transmission distances.

1. What are the applications of optical Fibre?

**Applications**. **Optical fiber** is used by many telecommunications companies to transmit telephone signals, Internet communication and cable television signals. It is also used in a multitude of other industries, including medical, defense/government, for data storage, and industrial/commercial.

1. What is numerical aperture in fiber optics?

The **Numerical Aperture** (NA) of a **fiber** is defined as the sine of the largest angle an incident ray can have for total internal reflectance in the core. Rays launched outside the angle specified by a **fiber's** NA will excite radiation modes of the **fiber**. A higher core index, with respect to the cladding, means larger NA.

1. What is acceptance angle and numerical aperture?

Today let us discuss the terms related to fiber: **Numerical Aperture** (NA): NA is the light gathering ability or capacity of an optical fiber.

**Acceptance angle** (θ): It is the maximum **angle** made by the light ray with the fiber axis, so that light can propagate through the fiber after total internal reflection.

1. What is called critical angle?

The **angle** at which the incident ray after refraction grazes (i.e; makes 90° with the normal) is **called** the **critical angle**. Any ray incident at an **angle** greater than the **critical angle** undergoes total internal reflection.

1. What is acceptable angle?

The acceptance **angle** of an optical fiber is defined based on a purely geometrical consideration (ray optics): it is the maximum **angle** of a ray (against the fiber axis) hitting the fiber core which allows the incident light to be guided by the core.

1. What is critical angle physics?

The **critical angle** is defined as the **angle** of incidence that provides an **angle** of refraction of 90-degrees. Make particular note that the **critical angle** is an **angle** of incidence value. For the water-air boundary, the **critical angle** is 48.6-degrees.

1. What is the difference between critical angle and acceptance angle?

**Critical angle**: When a ray passes from a denser medium to rarer medium. It bends away from the normal. As the **angle** of incidence increases, refracted ray bents more and more away from the normal.

**Acceptance angle**: The maximum **angle** of incidence for which the ray propagates down the fiber is called as **acceptance angle**.

1. What are the properties of optical fiber?

**Optical fibers** typically include a core surrounded by a transparent cladding material with a lower index of refraction. Light is kept in the core by the phenomenon of total internal reflection which causes the **fiber** to act as a waveguide.