(b)
Answer: Optical Fiber: Optical fiber is a thin flexible fiber with a glass core through which light signal can be sent with very little loss of strength and transmit more data over long distances faster than other mediums (Figure).

Structure of Optical Fiber:

★**Core:** Thin glass center of fiber where light travels. The core has a diameter of 10 μm - 200 μm.

★**Cladding:** Plastic outer optical material surrounding the core. The refractive index of the cladding is less than that of the core which is a must condition for the working of the Optical Fiber.

★**Buffer:** A polymer layer surrounded by cladding.

★**Jacket:** It coats the whole Optical Fiber.

★**Working of Optical Fiber:** Optical fiber works on the principle of total internal reflection. When a ray of light is incident on the core of Optical Fiber at a small angle, it suffers refraction and strikes the core-cladding

interface. As the diameter of the cladding is very small, hence the angle of incidence is greater than the critical angle. Therefore, the ray suffers total internal reflection at the core cladding interface and strikes the opposite interface. At this interface also the angle of incidence is greater than the critical angle, so it again it suffers total internal reflection. Thus, the ray of light reaches the other end of the fiber after suffering repeated total internal reflection along the length of the fiber. At the other end, the ray suffers refraction and emerges out of the optical fiber without losing energy (figure).

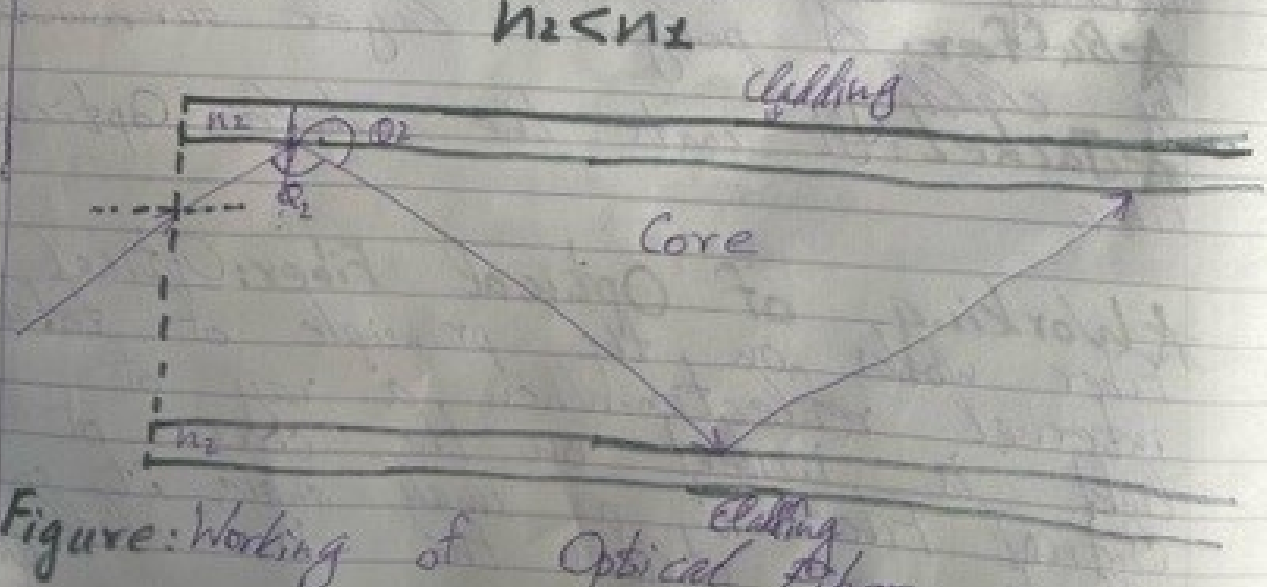

Figure: Working of Optical Fibers.