Q) a) What do you understand by the term Remote Sensing? Write its basic principles. Give its important Implications. [5]

b) Explain the optical Fiber. Explain how Fiber optic communication works? [5]

c) Briefly explain the working and structure of cell phone. [5]

d) Explain artificial intelligence. What do you understand by term Robotics? [5]

a) i) What is Remote Sensing:

Remote Sensing is a process of gathering information about Earth's surface using various type of sensors equipped on aircrafts and satelites.

2) How does remote sensing work:

The process of remote sensing begins with the energy source [ie Sun] illuminating the targetted area. The radiations emitted from the energy source reach the target areas. Some of this light is absorbed by the target and the remaining is reflected off. The reflected light is intercepted by the sensors, which measure its intensity and convert this information into digital form. The data collected from the sensors is sent

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to processing station, where the data is processed and useful information is extracted. This information is then analysed and interpreted

3) Important Implications :

The data gathered and interpreted is then used in many sectors. It helps in recognizing macro-patterns. The data can be used closely monitor environmental resources e.g forest cover. Other enviromental changes such as glaciers melting, can also be monitored. This sort of information is essential for conceiving effective environmenal policies and for anticipating any environmental hazards such as floods. It also assists in disaster management and urban planning.

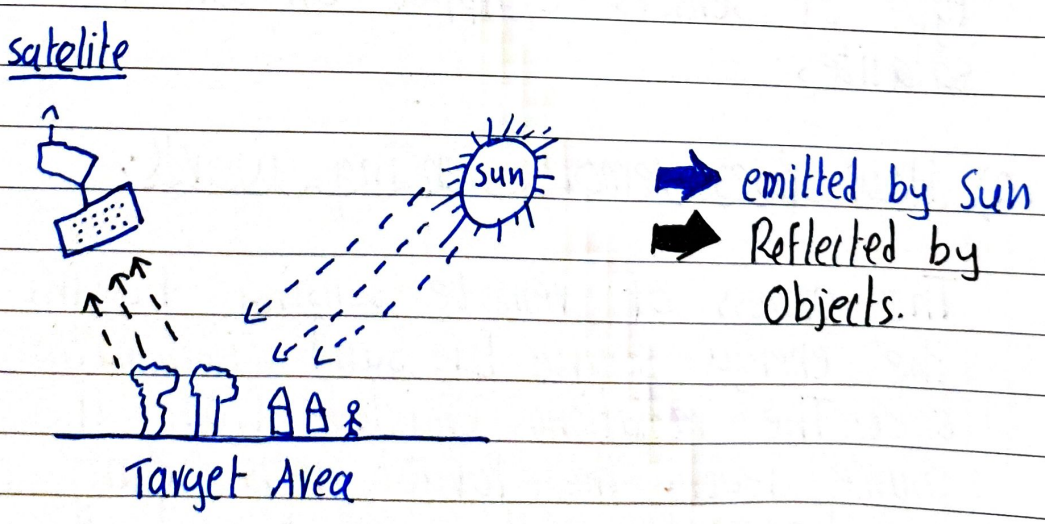

Figure : Brief overview of Remote sensing

b) 1) What is Optical Fiber:

Optical fiber comprises of strands of glass, which is used for transmitting light [ie photons/ energy packets], from one point to another. The main purpose of optical fibers is to transmit information or digital data from one point to another.

2) Constituents of optical Fiber:

Optical Fiber consists of 2 part, namely core and cladding.

2.1) Core:

Core is the central part of an optical fiber. It high density and high refractive index, both of which are crucial for transmitting information

2.2) Cladding:

Cladding is the part that surrounds the core and has a lower refractive index compared to that of the core

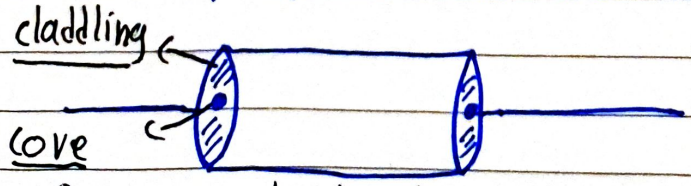

Figure: Optical Fiber and its main constituents

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3) How an optical Fiber works :

Optical Fibers work through the phenomenon of total internal reflection. Light travels down the optical fiber by bouncing of the walls. Total internal reflects enables this bouncing of the light within the cable, preventing it from travelling out from the edges. Total internal reflection occurs when critical angle is achieved, when angle of incidence at which angle of refraction becomes equal to 90°. This enables the light to reflect back at the core-claddling boundary.

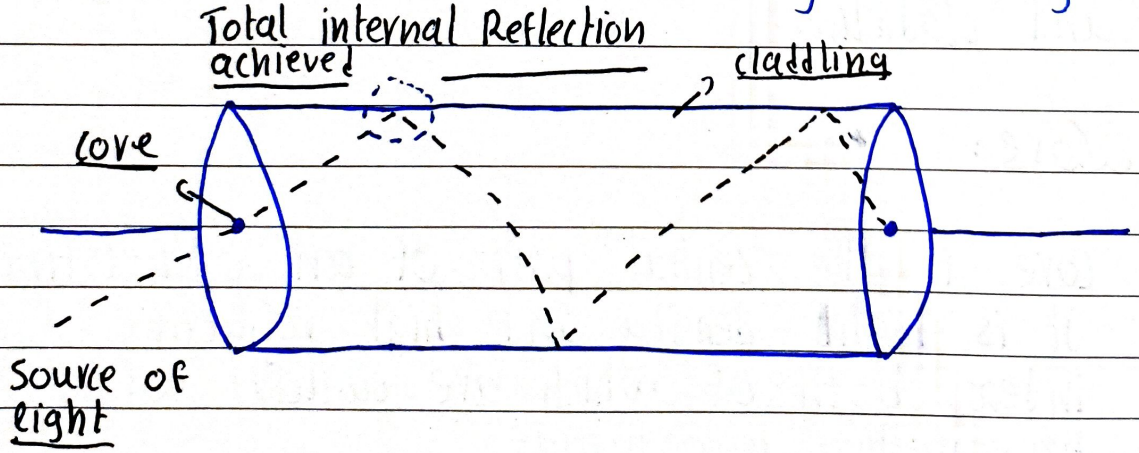

Figure : working of an optical fiber