Question: 1

Explain the Optical Fiber. Explain how Fiber Optic Communication works?

Optical Fiber:

Definition:

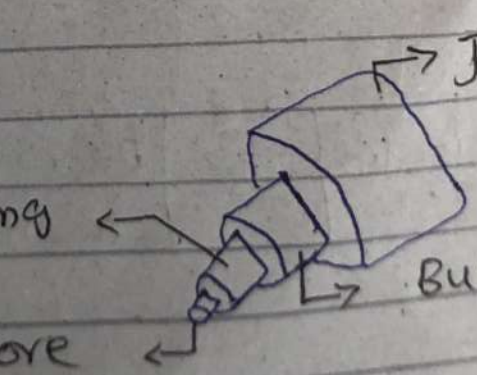
Optical Fiber is defined as:

"A medium or technology associated with the transmition of data or information as light signal along a hollow tube, ~~glass~~ ~~wi~~ plastic wire or fibre is called optical Fiber."

Structure:

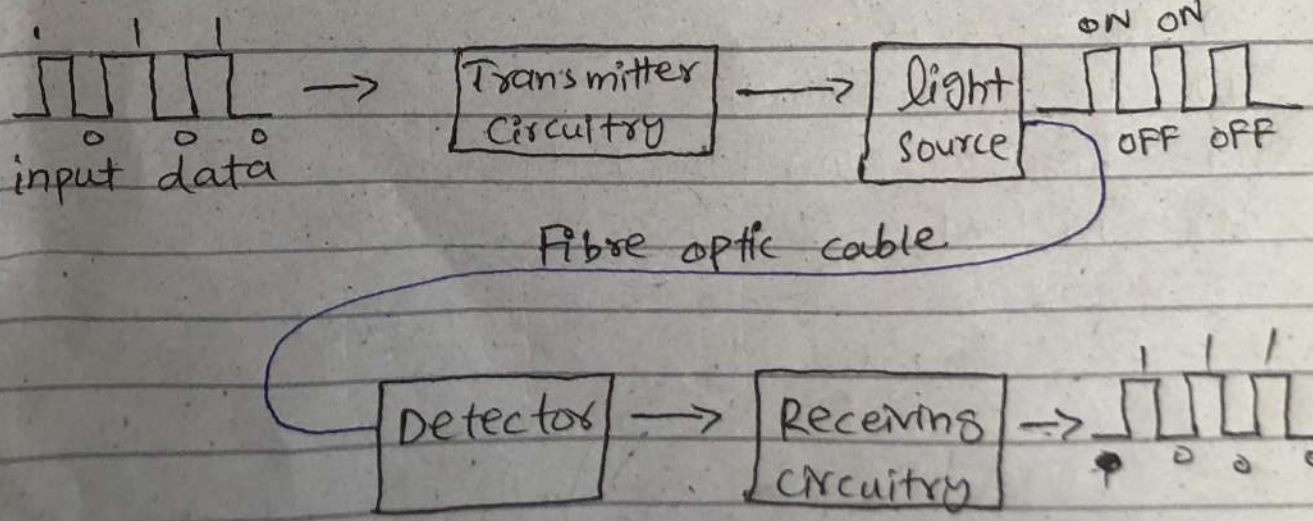
An optical Fibre consists of 4 components:

a) The core
b) The cladding
c) The coating or buffer
d) Jacket



Working:

Fiber optic communication consists of transmitting and receiving circuitry, a light source and detecting devices. Input data in the form of electrical signal is given to transmitting circuitry. It converts this signal into light signal with the help of light source. Source is LED whose amplitude, frequency and phase must remain stable and free from fluctuation in order to have efficient transmission. The light beam from the source is carried by fiber optic cable to the destination circuitry where the information is transmitted back to the electrical signal by a receiving circuit.



The receiving circuit consists of a photo detector, which is capable of measuring magnitude, frequency and phases of the optic field. Both LED and Laser can be used as a light sources based on the application.

Question: 2

Briefly explain the working and structure of a cell phone?

Cell Phone:

A telecommunication device which connects the subscribers using radio waves.

Working of Cell Phone:

Cell phone works in three stages:

① Electromagnetic Waves:

these are the waves which require no medium for their propagation. Mobile phones use

electromagnetic radiations of ~~test~~ least energy, least frequency and highest wavelength i.e. Radio waves.

② **Networking:**

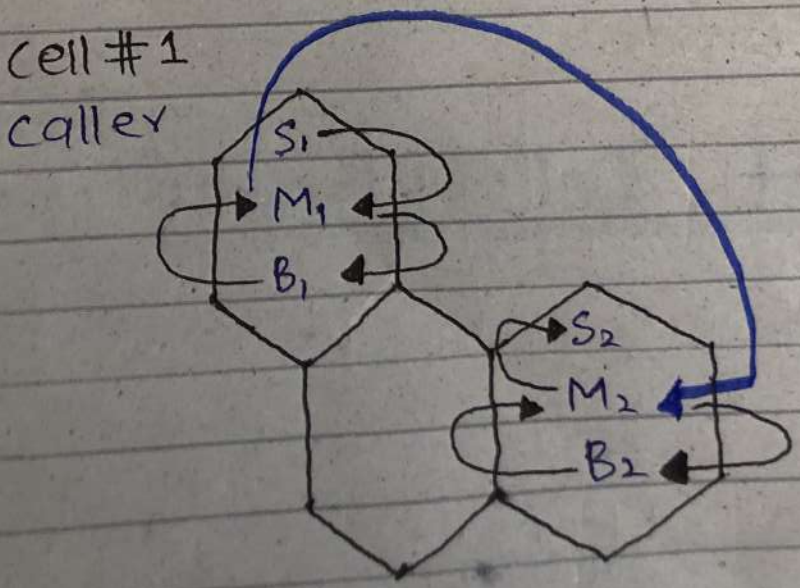
Networking of a cell phone is cellular means that it has divisions. This division is invisible. It is based on two essential cells:

a) Mast

It captures and transmit the signals.

b) Base Station

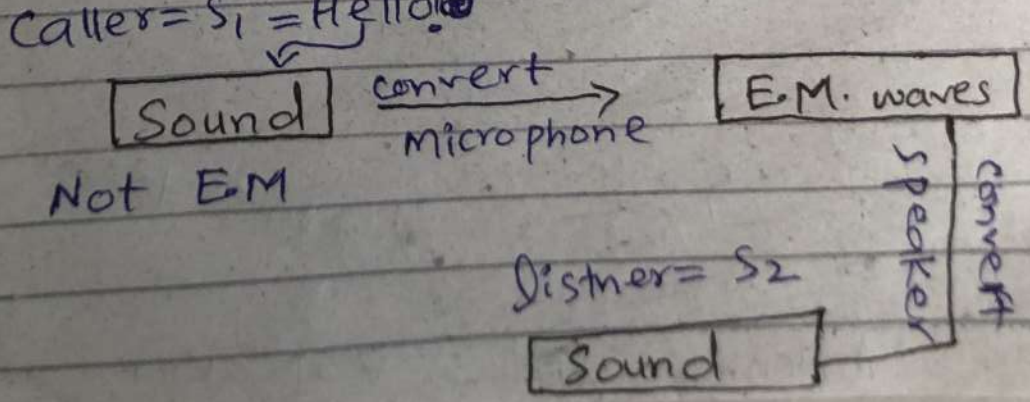
It can carry out necessary processes i-e. modulation, generating electromagnetic waves.



When caller makes a call from Cell #1, mast 1 gets active, captures and transmit the electrical signals to base station which carry out all the necessary processes. After that, it sends information in the form of Electromagnetic waves to mast 1. From there, the signal is transmitted to mast 2 of listner's cell phone. M_2 captures that signal and transmits them to B_2 of listner. Base station processes the information and send it back to M_2. M_2 allow the call and transmit it to S_2. In this way, a phone call completes which happens with the speed of light i.e. 3×10^8 m/sec.

③ Universal Law of Energy:

Total energy remains conserved; however, it can be converted from one form to another.

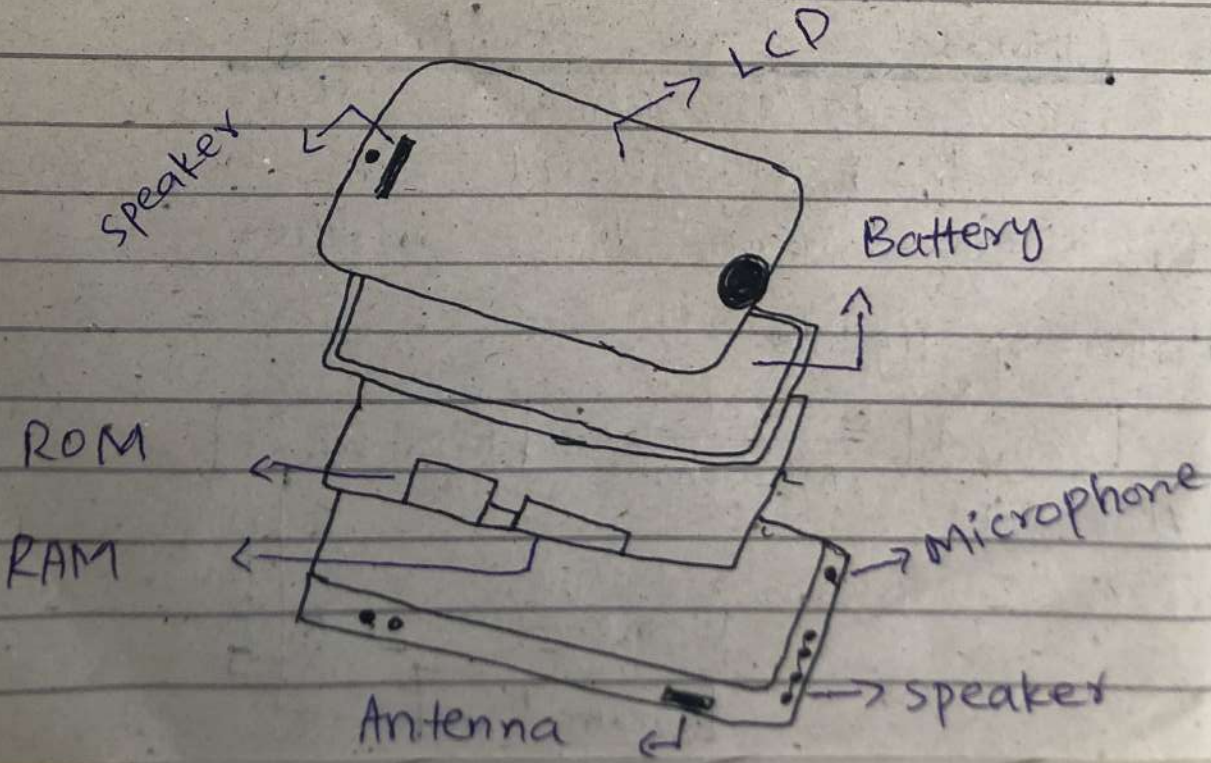


Therefore, one form of energy is converted to another form, but total energy remained conserved.

Structure:

Modern digital cell phones can perform millions of tasks simultaneously. A cell phone comprises of following parts:

a) A circuit board containing microprocessor
b) RAM and ROM
c) A liquid crystal display (LCD)
d) A keyboard
e) Speakers
f) A microphone
g) A battery.
h) An antenna



Question: 3

Explain Artificial Intelligence. What do you understand by the term Robotics?

Artificial Intelligence:

Definition:

"A study and engineering of making intelligent machines capable of performing same kinds of functions that characterize the human thought-"

John Mc Carthy, who coined the term "Artificial Intelligence" in 1956, defined it as:

"A science and engineering of making intelligent machines-"

Especially intelligent computer programs. Intelligence relates to tasks involving high mental processes. For example: pattern recognition, induction, deduction, creativity, solving problems etc.

Artificial Intelligence gives four possible goals to persue:

a) Systems that act like humans
b) Systems that think like humans
c) Systems that act rationally
d) Systems that think rationally

Robotics:

It is one of the most important area in the applications of Artificial Intelligence. Basic disciplines of robotics include AI, Engineering, and Physiology. This technology produces robots with computer intelligence and computer controlled, human like physical capabilities. Different programs and applications have been developed to give robots powers of:

a) Visual Perception: Sight
b) Tactility: Ability to use sense of touch
c) Dexterity: Ability to use hands skillfully
d) Locomotion: Ability to move over any surface
e) Navigation: the intelligence to find ways properly to a destination