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Q:2 (A) How a satellite is launched?
Define the working principle of
GPS. (5 marks)

SATELLITE:

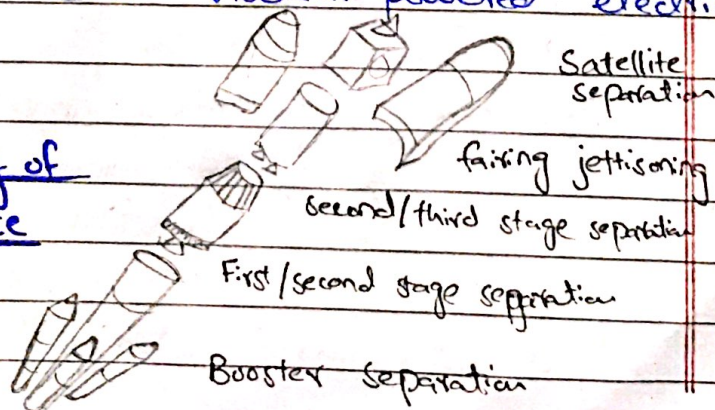
A satellite is any object that revolves around a planet in a circular or elliptical path.

HOW SATELLITES ARE LAUNCHED

The first phase in satellite launch preparation is to make the satellite ready. Once it is ready, the satellite is integrated with the rocket which launches it into orbits high above Earth. Just as a string can keep a spinning rock turning in a circle, so Earth's gravity ^{provides} a centripetal force that keeps satellite in orbit.

Once in place, satellites are powered by large arrays of solar panels for or even nuclear-powered electric motors.

Launching of a Satellite



GLOBAL POSITIONING SYSTEM:

GPS is a satellite based navigation system that transmit signals to GPS receivers, allowing them to determine precise geographic location and movement.

WORKING PRINCIPLE OF GPS:

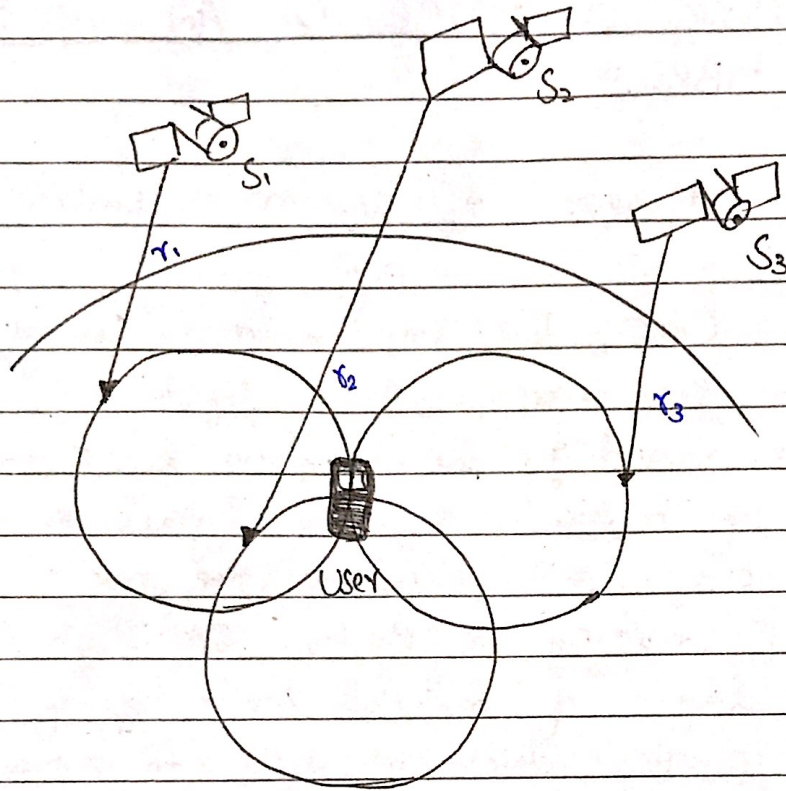
GPS works through a technique called trilateration.

- 1: Satellites orbiting the Earth send signals to be read and interpreted by a GPS device
- 2: When a satellite sends a signal, it creates a circle with a radius measured from the GPS device to satellite.
- 3: After adding a second satellite, it creates a second circle, and the location is narrowed down to one of two points where the circle intersect.
- 4: With a third circle satellite, the device's location can finally be determined, as the device is at the intersection of all

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three circles.



Triangulation

Q (B) What is optical fiber? Explain the working principle of optical fiber?

1. OPTICAL FIBER:

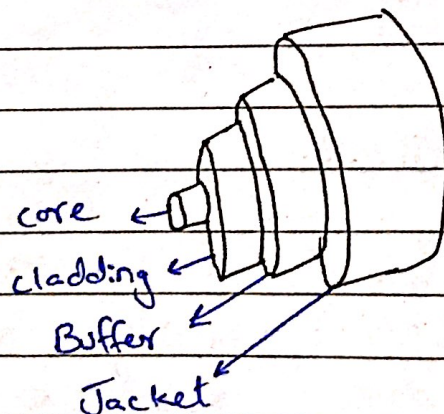
Optical fiber refers to the medium and the technology associated with the transmission of information as light pulses along a hollow glass or plastic wire or fibre.

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2: BASIC STRUCTURE OF AN OPTICAL FIBRE:

It consists of four main parts:

- 1: Core: The core is made of glass that carries the light.
- 2: Cladding: The cladding is a layer of material, made of glass or plastic, surrounding the core.
- 3: Coating or Buffer: It is a layer of material made up of plastic which is used to protect an optical fibre from physical damage.
- 4: Jacket: Jacket is used to bundle all fibres in one cable.



3: WORKING PRINCIPLE OF AN OPTICAL FIBRE:

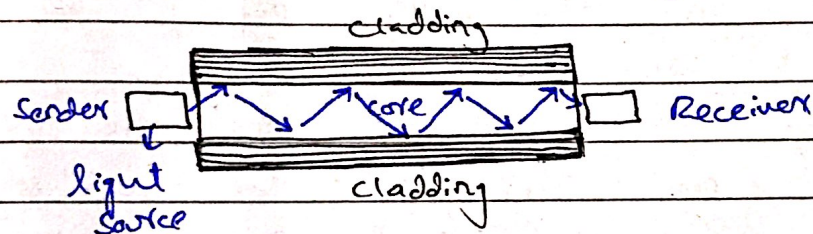
Unlike, copper wire ~~are~~ based

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transmission where the transmission entirely depends on electrical signal passing through the cable, the fibre optics transmission involves transmission of signals in the form of light from one point to another. It works on total internal reflection.

Light travels through the core by bouncing off the cladding, allowing data to be sent over long distances.



(C) Explain the working of a Cell phone:

CELL PHONE:

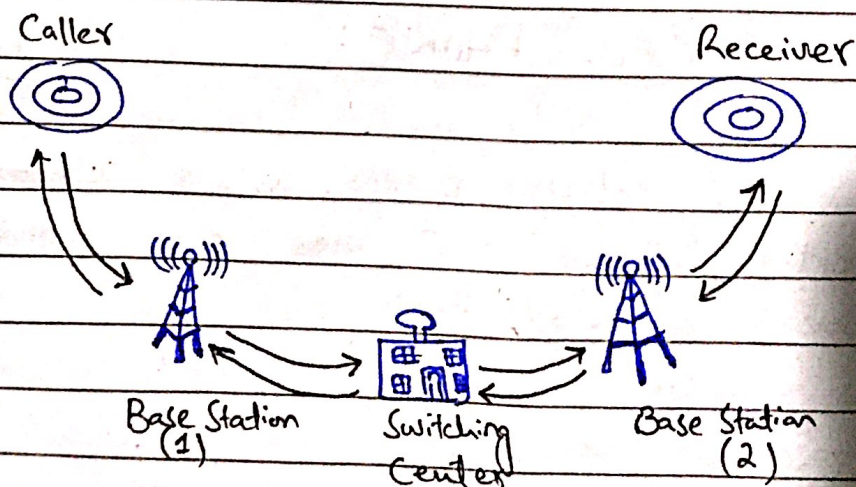
A cellular phone is a telecommunication device that uses radio waves over a networked area (cell) and is served through a cell site or base station at a fixed location, enabling calls to transmit wirelessly over a wide range, to a fixed landline or via the Internet.

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WORKING OF A CELL PHONE:

- A cell phone works by connecting to cellular networks using radio waves.
- When a person speaks into a cell phone, a microphone turns the voice into electrical signals.
- A microchip in the phone modulates a radio wave using the electrical signal.
- The radio waves travel to the nearby cell tower; the tower sends the voice to the person being called and the process is reversed so that the person on the other end can hear the voice.



Q2: Write short note on the following:

(a) Microscope

MICROSCOPE :

1. Definition:

Microscope is an optical instrument that uses a lens or a combination of lenses to produce magnified images of small objects, especially of objects too small to be seen by unaided eye.

2. Types of Microscope:

(i) Simple Microscope

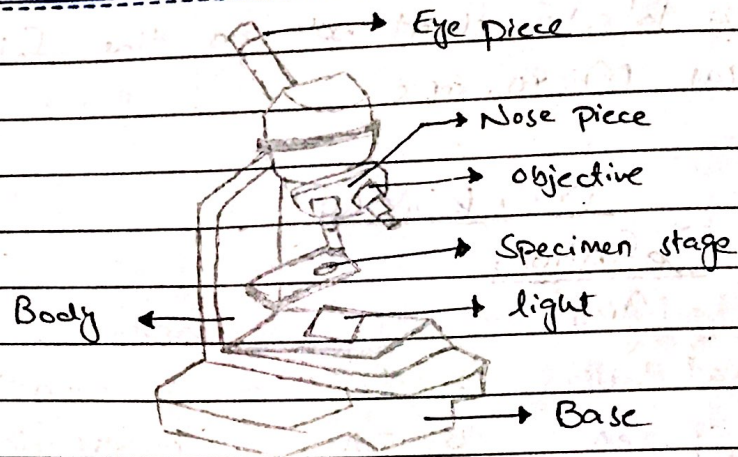
(ii) Compound Microscope

(i) Simple Microscope:

It is the type of microscope that uses a single lens for the magnification of the sample. It is a convex lens with a small focal length.

Applications of Simple Microscope:

- Dermatologists use it to identify different skin diseases.
- It is common among the watchmakers as they can view magnified image of small parts.



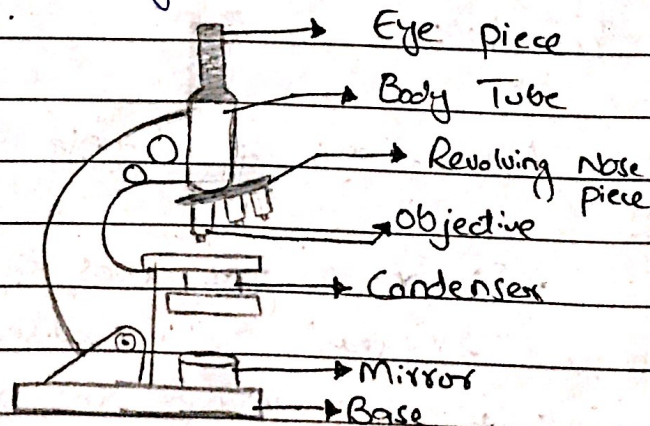
Simple Microscope

(ii) Compound Microscope:

A compound microscope uses more than one lens. It has a combination of lenses and two optical parts known as an objective lens and an eyepiece or ocular lens.

Applications of Compound Microscope:

- It is used to study bacteria and viruses.
- They are widely used in forensic laboratories.



Compound Microscope