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(iii) Forebearing CD = Backbearing BC + int angle C

or, $271°30' = 192° + \angle C$

$\therefore \angle C = 79°30'$

(iv) Forebearing DE = Backbearing CD + int angle D

or, $189°15' = 91°30' + \angle D$

$\therefore \angle D = 97°45'$

(v): Forebearing EA = Backbearing DE + int angle E

or, $124°45' = 9°15' + \angle E$

$\therefore \angle E = 115°30'$

GNSS:

Fullform: Global Navigation Satellite System.

It is a system of satellites launched for various navigational purposes.

⇒ GPS (Global Positioning System) falls under GNSS.

- No. of satellites: 24
- Orbit: Non-geo-stationary orbit
  Distance: 20k kilometer.

*) Principle of GPS:

Each of 24 satellites emits signals to receivers that determine location or range by computing the difference betⁿ a time that signal is sent and the time it is received.

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Signals contain data that is used by receivers to compute the locations of the satellites needed for accurate positioning.

GPS satellites have atomic clocks that provide extremely accurate time. The time information is placed in the codes broadcast by the satellite so that a receiver can continuously determine the time signal was broadcasted.

For positioning using GPS, we need minimum 3 satellites and 1 satellite is used for error checking. Error's include: clock error and atmospheric error.

The information ranges ~~th~~ to three satellites ~~and~~ ie, 3 satellites determine x-, y- and z- coordinates and 1 checks for error.

GPS measures distance using Electromagnetic radiation.

*) Segments of GPS:

The three segments of GPS are: ~~satellite segment~~ space segment, control segment and uses segment.

(i): Space segment:

→ It is the network of satellites in orbit that send and receive electromagnetic waves.

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(ii): Control segment:
- It consists of a ground stations.
- It tracks the st satellite positioning and keeps it in orbit and helps satellites avoid obstacles.
- It also proceses the systemmatic error and provides data.

(iii): Uses segment.
→ It is the uses / GPS receives.
→ It gets data from satellites to calculate 3-d position of the uses.

*) Various satellite systems or GNSS:

Regional	Global.
i) Beidou - China	i): GPS - American
ii) IRNSS - India	ii) GLONASS - Russia
iii) QZSS → Japan	iii) Galileo - EU
	iv) COMPASS - China.

*) Uses:

(i): Navigation: It provides us with data to travel from one location to another.
(ii) Location Determination: It gives the latitude and longitude of a point

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(iii): Tracking: It monitors objects ~~or~~ tracks personnels for security purposes.

(iv) Mapping: It helps us to make maps using position tracking.

(v) Timing: It gives precise timing and helps tracking time-zone.

In GPS, ~~civ~~ it is divided to civilian code and military code.
Military codes are highly accurate.

GIS

Fullform: ~~Grap~~ Geographic Information System.

*) Geospatial data:
- Also called geographically referenced data.
- The data that describes both the locations and the characteristics of spatial features such as roads, land parcels, and vegetation stands on the Earth's surface.

Here, location represents spatial data.
characteristics are attributes data.

GIS is a computer system designed to capture, store, manipulate, analyze ~~and~~, manage and present all types of geospatial data.

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GIS applications allow users to create interactive queries, analyze spatial information, edit data in maps and present results of all these operations.

*) Components of GIS:

GIS have five components. There are as follows:

i) Hardware
ii) Software
iii) Data
iv) People
v) Infrastructure.

i) Hardware:

→ Also called computer system and it contains computer and OS to run GIS.
→ Other equipment may are: monitors, digitizers, scanners for spatial data input, GPS receivers and mobile devices for fieldwork, printers and plotters for hard-copy data display.

ii) Software:

→ Includes programs and user interface for driving hardware.
- It provides the functions and tools required to store, analyze and display spatial data.
- includes GIS software, database and drawing soft

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(iii) Data:
→ Core of GIS consisting of various kinds of inputs that the system takes.
- Data are two types: spatial and attribute data.
- GIS integrate data from various sources and stores in DBMS.

(iv) People:
→ GIS professionals who define the purpose and objectives and provides reasons and justification for using GIS.
→ GIS users range: Technical specialist to people doing everyday work.

(v): Infrastructure:
→ Necessary physical, organizational, administrative and cultural environments supporting GIS operations.

*) Uses of GIS:
(i) Location: It provide us with location to a point ie, latitude and longitude.
(ii) Condition: It gives us data to find suitable spots for suitable work.
(iii) Trend: It helps us understand various natural and man-made trends and changes occuring.
(iv): Patterns: It helps us find geographical data.
(v): Modelling: It helps us build models and understand the implications of actions.

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Remote Sensing

Remote sensing is an art, science and technology of observing an object, scene or phenomenon by instruments-based techniques without physical contact.

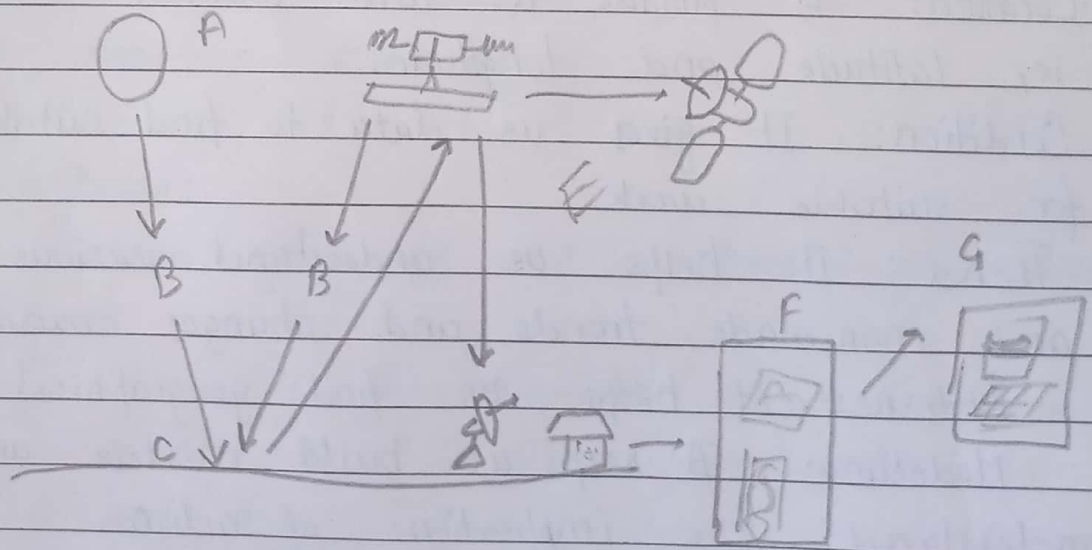
→ It is also called remote extraction of data.

*) Instruments used: Drones or Satellites.

In remote sensing, the sensors are not in direct contact with the objects or events being observed.

The EM radiation is used as information carrier and the output of RS system is an ~~image~~ pixel image representing the observation.

Further image analysis and interpretation is done to extract useful information.



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processes involved in RS:

i) A = Energy source / Illumination
ii) B = Radiation and atmosphere.
iii) C = Interaction with target
iv) D = Recording energy by Sensor.
v) E = Transmission, reception and processing.
vi) F = Interpretation and Analysis
vii) G = application.

*) Types of Remote Sensing:

(i): Passive Remote Sensing:

→ RS system measuring naturally available energy.
→ Passive sensors detects energy.
→ For recording energy, sufficient amount of energy must be present.
→ Sun is the major energy source.

(ii): Active Remote Sensing:

→ In RS, the energy is emitted to scan objects and areas and which gets reflected and then it is detected by sensor.

*) Applications of RS:

i) Environment assesment and monitoring
ii) Global change detection and monitoring
iii) Agriculture and non-renewable resource exploration.
iv) Meteorology and Mapping
v) Military surveillance and reconnaissance.