Definition Of Land Survey

Land surveying is the process of measuring and mapping the physical characteristics of a piece of land. This includes determining the boundaries of the land, identifying any natural or man-made features such as trees, buildings, or roads, and measuring the elevation of the land. Land surveying is typically conducted by trained professionals using specialized equipment such as GPS devices, total stations, and levels. The information gathered through land surveying is used for a variety of purposes, including property boundary identification, construction planning, and land development.

DIFFERENT TYPE OF LAND SURVEY

Certainly, here are some of the most common types of land surveys:

Boundary Survey: A boundary survey is conducted to identify the exact boundaries of a piece of land, including its corners and any markers or monuments that define the boundary lines. This type of survey is typically required for legal or property ownership purposes.

Topographic Survey: A topographic survey involves measuring the physical features and elevation of a piece of land, including natural and man-made features such as hills, valleys, trees, buildings, and roads. This information is used for land development, construction, and engineering projects.

ALTA/NSPS Survey: An ALTA/NSPS survey (American Land Title Association/National Society of Professional Surveyors) is a type of boundary survey that is often required for commercial real estate transactions. It provides detailed information about the property boundaries, easements, encumbrances, and improvements.

Construction Survey: A construction survey is conducted to provide accurate measurements and marking on a construction site, including the placement of buildings, roads, and other structures. This type of survey ensures that the construction project is completed according to the design plans.

Floodplain Survey: A floodplain survey is conducted to determine the location and extent of a floodplain on a piece of land. This information is used for floodplain management and to determine flood insurance rates.

Subdivision Survey: A subdivision survey is conducted to divide a large piece of land into smaller parcels for development purposes. This type of survey typically involves creating new boundaries, marking lot corners, and creating access points.

These are just a few of the most common types of land surveys, but there are many other specialized surveys as well, depending on the specific needs of the project or research study.

CONCEPT OF LAND DEMARCATION

Land demarcation is the process of physically marking the boundaries of a piece of land. It involves placing permanent or semi-permanent markers or monuments on the land to indicate the exact location and extent of the property. The purpose of land demarcation is to establish clear and defined boundaries between adjacent properties, and to prevent disputes and conflicts over property ownership and use.

Land demarcation is typically carried out by a licensed surveyor using specialized equipment such as GPS devices, total stations, and levels. The surveyor will conduct a boundary survey to determine the exact location and dimensions of the property, and will then place physical markers or monuments at key points along the boundary lines. These markers can be made of a variety of materials, such as metal, concrete, or stone, and are typically placed at corners, along fence lines, or at other significant points along the boundary.

Once the land has been demarcated, property owners can be certain of the exact extent and location of their property, and can use this information to make informed decisions about land use and development. Additionally, land demarcation can help prevent boundary disputes and conflicts, as it provides a clear and objective basis for resolving disputes over property ownership and use.

STUDY OF MAPS AND ITS TYPES

The study of maps is called cartography, and it involves the creation, analysis, interpretation, and use of maps. Maps are visual representations of geographic features and information, and they are used for a wide range of purposes, including navigation, land management, urban planning, environmental monitoring, and scientific research.

Here are some of the most common types of maps:

Physical maps: Physical maps show the natural features of the Earth's surface, such as mountains, rivers, lakes, and deserts.

Political maps: Political maps show the boundaries and territories of countries, states, or other political entities, as well as their capitals and major cities.

Topographic maps: Topographic maps show the elevation and relief of the Earth's surface, including hills, valleys, and other physical features.

Thematic maps: Thematic maps show specific information or themes, such as population density, land use, climate, or natural resources.

Road maps: Road maps show the highways, roads, and streets of a specific area, and are used for navigation.

Nautical charts: Nautical charts show the details of the waterways, including depths, navigation aids, and underwater obstructions, and are used by mariners for safe navigation.

Weather maps: Weather maps show current weather conditions and forecasts for a specific area.

Satellite imagery: Satellite imagery shows high-resolution images of the Earth's surface, captured from space, and can be used for a variety of purposes, including environmental monitoring and land use planning.

These are just a few of the many types of maps that exist, and each type serves a specific purpose and requires specialized skills and techniques for their creation and interpretation.

TYPES OF SCALES USED FOR MAPPING

There are several types of scales used for mapping, and each scale represents a different level of detail or resolution on the map. The scale of a map is typically expressed as a ratio, such as 1:10,000, which indicates the relationship between the size of the mapped area and the actual size of that area on the ground. Here are some of the most common types of scales used for mapping:

Large scale: Large scale maps show a small area in great detail, and are typically used for detailed engineering, land development, or urban planning projects. A large scale map might have a ratio of 1:1,000 or 1:5,000.

Medium scale: Medium scale maps show a larger area with less detail, and are often used for regional planning or environmental assessments. A medium scale map might have a ratio of 1:50,000 or 1:100,000.

Small scale: Small scale maps show a very large area with minimal detail, and are often used for general reference or educational purposes. A small scale map might have a ratio of 1:500,000 or 1:1,000,000.

Fractional scale: Fractional scales are expressed as a fraction, such as 1/24,000, and are commonly used for topographic maps and nautical charts.

Verbal scale: Verbal scales use words to describe the relationship between the map and the ground, such as "one inch represents one mile." Verbal scales are often used on tourist maps or in other situations where the scale is less critical.

Graphic scale: Graphic scales use a bar or line to represent the scale of the map, and are commonly found on maps of all types and scales.

These are just a few of the most common types of scales used for mapping, and the appropriate scale for a given map depends on the purpose of the map and the level of detail required.

SIZE OF LAND SYMBOLS USED ON MAPS TO REPRESENT FEATURES

The size of land symbols used on maps to represent features depends on the scale of the map and the level of detail required. In general, larger symbols are used on maps with a smaller scale, while smaller symbols are used on maps with a larger scale.

The size of the symbol is typically expressed in millimeters, and can vary depending on the type of feature being represented. For example, on a large-scale map, a building might be represented by a symbol that is 10-20 millimeters in size, while on a small-scale map, the same building might be represented by a symbol that is only 2-3 millimeters in size.

Similarly, natural features such as rivers, lakes, and mountains might be represented by symbols that are several centimeters in size on a large-scale map, but only a few millimeters in size on a small-scale map.

The size of the symbol also depends on the importance of the feature being represented. For example, on a large-scale map of a city, a major landmark such as a monument or a cathedral might be represented by a symbol that is larger than other buildings, in order to emphasize its significance.

In summary, the size of land symbols used on maps to represent features depends on the scale of the map, the level of detail required, and the importance of the feature being represented.

IMPORTANCE AND PLANNING OF FIXING GROUND CONTROL POINTS.

Fixing ground control points (GCPs) is an essential step in the process of creating accurate maps and 3D models from aerial or satellite imagery. GCPs are physical markers on the ground that are precisely located and identified, and are used to establish the spatial relationship between the imagery and the actual ground surface. Here are some of the reasons why fixing GCPs is important:

Improves accuracy: Fixing GCPs can greatly improve the accuracy of the resulting maps and models. By establishing a precise spatial relationship between the imagery and the ground surface, errors caused by distortions, scale variations, or other factors can be minimized or eliminated.

Enables georeferencing: GCPs are used to georeference the imagery, which means aligning the imagery with a known coordinate system. This enables the imagery to be integrated with other geospatial data, such as maps or GIS databases, and used for a wide range of applications.

Facilitates 3D modeling: GCPs are also used to create 3D models from aerial or satellite imagery. By providing accurate ground control points, the position, orientation, and scale of the imagery can be determined, and the resulting 3D models can be used for a variety of purposes, including land use planning, environmental monitoring, or architectural design.

Reduces processing time: By fixing GCPs, the processing time required to create accurate maps and models can be greatly reduced. Without accurate ground control, additional time and effort may be required to correct errors or align the imagery with the ground surface.

The planning of fixing ground control points involves selecting the appropriate locations and types of markers to be used, as well as determining the level of accuracy required. The number and distribution of GCPs depends on the size of the area being mapped, the scale of the imagery, and the required level of accuracy. In general, a minimum of three well-distributed GCPs is required to accurately georeference an image, but a larger number of GCPs may be necessary for more complex or larger areas.

In summary, fixing ground control points is a critical step in creating accurate maps and 3D models, and careful planning and execution of this process can greatly improve the quality and usefulness of the resulting products.

LAND MEASUREMENT

Land measurement is a complex subject with many different units of measurement used around the world. Here are some of the most commonly used units of land measurement in various parts of the world:

Acre: An acre is a unit of land measurement used primarily in the United States and the United Kingdom. One acre is equal to 43,560 square feet or approximately 4,047 square meters.

Hectare: A hectare is a unit of land measurement used in most countries around the world. One hectare is equal to 10,000 square meters or approximately 2.47 acres.

Decimal: In India, land is often measured in decimal units, which are typically fractions of an acre. For example, 1 decimal is equal to 435.6 square feet or approximately 40.5 square meters.

Bigha: Bigha is a unit of land measurement used in South Asia, including India, Nepal, and Bangladesh. The size of a bigha varies by region, but is generally between 1/3 and 1 acre.

Katha: Katha is a unit of land measurement used in India, Nepal, and Bangladesh. The size of a katha varies by region, but is generally between 1/20 and 1/5 of an acre.

Ropani: Ropani is a unit of land measurement used in Nepal. One ropani is equal to 508.72 square meters or approximately 5.5 aana.

Dunam: Dunam is a unit of land measurement used in Israel, Palestine, and other parts of the Middle East. One dunam is equal to 1,000 square meters or approximately 1/4 acre.

These are just a few examples of the many units of land measurement used around the world. The appropriate unit to use depends on the location and purpose of the land measurement. It is important to be familiar with the local units of measurement and conversion factors when dealing with land transactions or planning.

MODERN CALCULATION

Modern land surveying instruments and tools are often electronic and include advanced technology to improve accuracy and efficiency. Here are some examples of modern land surveying instruments and tools:

Electronic Total Stations (ETS): An ETS is an electronic instrument that integrates a theodolite, electronic distance meter, and data collector into one unit. It measures angles and distances electronically and records the data digitally, which can be processed in real-time or later on a computer. ETS is faster and more accurate than conventional instruments.

Global Navigation Satellite System (GNSS): GNSS uses satellite signals to measure precise locations on the Earth's surface. GNSS is more accurate than conventional instruments and is widely used in land surveying, construction, and mapping.

Geographic Information Systems (GIS): GIS is a computer-based tool that integrates data from various sources, including land surveying, to create detailed maps and analysis. GIS can store and manage large amounts of data, and helps to make informed decisions for urban and regional planning, environmental management, and disaster management.

Remote Sensing: Remote sensing uses aerial photography and satellite imagery to gather information about the Earth's surface. It provides detailed and up-to-date information about the terrain, vegetation, and other land features that can be used for land surveying, mapping, and environmental monitoring.

Computer-Aided Design (CAD): CAD is a computer-based tool used to create and modify digital designs. It can be used in land surveying to create detailed maps and plans, as well as to simulate and visualize different scenarios.

Digital Calculators: Digital calculators are used to perform complex calculations and conversions for land surveying, such as determining distances, areas, volumes, and angles.

Laser Scanners: Laser scanners are used to create detailed 3D models of the Earth's surface. They use laser light to scan and create point clouds of the terrain, which can be used for land surveying, construction, and mining.

These modern land surveying instruments and tools have revolutionized the land surveying profession, improving accuracy and efficiency, and making it possible to map and monitor large areas of land in great detail.

baseline, reference point, north line, tie line, offset, pre-test, property line and well-conditioned triangle

Here are brief explanations of some common terms used in land surveying:

Baseline: A baseline is a measured straight line that serves as a basis for making other measurements, such as angles and distances, in a survey.

Reference point: A reference point is a fixed point on the ground used as a starting point for taking measurements in a survey.

North line: A north line is a straight line that runs north and south and is used as a reference in land surveying.

Tie line: A tie line is a measured straight line that connects two reference points and is used as a basis for making other measurements in a survey.

Offset: An offset is a measured distance from a baseline or tie line to a point of interest, usually at a right angle to the baseline or tie line.

Pre-test: A pre-test is a preliminary survey of an area to determine its suitability for a particular purpose, such as construction or development.

Property line: A property line is a boundary line that separates one property from another.

Well-conditioned triangle: A well-conditioned triangle is a triangle formed by three reference points that is suitable for accurate measurement and computation in a survey.

These terms are important for land surveyors to understand and use in their work to ensure accuracy and consistency in measurements and calculations.

DIFFERENT TYPES OF LINE USED IN SURVEYS

In land surveying, there are different types of lines used to represent various features on a map or in the field. Here are some definitions of common types of lines used in land surveying:

Baseline: A baseline is a straight line used as a reference for taking measurements, such as distances and angles.

Property line: A property line is a boundary line that separates one property from another.

Contour line: A contour line is a line on a map that connects points of equal elevation.

Traverse line: A traverse line is a series of connected straight lines used to establish the boundaries of a property or to survey a particular area.

Grid line: A grid line is a straight line used to establish a grid system for mapping or surveying.

Measured line: A measured line is a line on a map or in the field that represents a measured distance between two points.

Centerline: A centerline is a line that represents the center of a road, highway, or other linear feature.

Offset line: An offset line is a line that is parallel to a measured line, but is offset from it by a known distance.

Understanding the different types of lines used in land surveying is important for accurately representing features on a map or in the field, and for communicating information between surveyors, engineers, and other professionals involved in a project.

set, process definition and description of chain survey and tape survey

In land surveying, there are various methods used for measuring and mapping land. Two common methods are chain survey and tape survey.

Chain Survey: Chain survey is a type of survey in which a chain or tape is used to measure distances between different points on the ground. This method is based on a series of triangles formed by measuring the sides and angles of the triangles. Chain survey is typically used for small to medium-sized areas, and it can be used to map both flat and hilly terrain.

The process of chain survey typically involves the following steps:

Selecting the area to be surveyed

Marking the reference points, such as corners of buildings, trees or stones.

Measuring the baseline using a chain or tape

Measuring perpendicular offsets from the baseline to points of interest

Recording the measurements in a field book

Plotting the survey data on a map using scale and drawing instruments.

Tape Survey: Tape survey, also known as electronic distance measurement (EDM), is a modern surveying technique that uses electronic devices to measure distances with high precision. Tape survey can be used to measure

both horizontal and vertical distances and can be used over long distances, making it ideal for large-scale projects.

The process of tape survey typically involves the following steps:

Setting up the survey equipment, including a total station, prisms, and data collector

Measuring the position of the instrument with respect to a known reference point

Taking measurements using a prism to reflect the laser beam back to the total station

Recording the measurements in the data collector

Processing the data and producing a map or other output using specialized software.

Both chain survey and tape survey are important methods of land surveying. They each have their advantages and disadvantages, and the choice of method depends on factors such as the size and complexity of the area to be surveyed, the accuracy required, and the availability of equipment and personnel.

Types of chain and tape, chain and tape instruments used for surveying introduction of; Overcoming obstacles in the range of the line.

TYPES OF CHAIN AND TAPE INSTRUMENTS USED FOR SURVEYING:

Gunter's chain: This is a type of chain made of 100 links, with each link measuring 7.92 inches. This chain is typically used for measuring long distances and is no longer commonly used in modern land surveying.

Engineer's chain: This is a type of chain made of 100 links, with each link measuring 1 foot. This chain is commonly used for measuring land in the United States and other countries that use the Imperial system of units.

Steel tape: This is a type of tape made of steel, which is typically used for measuring long distances with high precision. Steel tapes come in various lengths and widths, and can be used for measuring both horizontal and vertical distances.

Fiberglass tape: This is a type of tape made of fiberglass, which is durable and resistant to stretching. Fiberglass tapes are typically used for measuring shorter distances, and are often color-coded for easy reading.

Overcoming Obstacles in the Range of the Line: In land surveying, obstacles such as buildings, trees, and other obstructions can make it difficult to measure the range of a line accurately. However, there are several methods that surveyors can use to overcome these obstacles, including:

Offsetting: Surveyors can measure the distance from the obstacle to the line, and then calculate the length of the line using trigonometry.

Tape sag correction: When measuring over long distances using a tape, the tape can sag and affect the accuracy of the measurement. To correct for tape sag, surveyors can use a correction factor based on the span of the tape.

Stadia method: This method involves using a stadia rod to measure vertical angles and calculate distances based on the height of the rod.

Total station: A total station is a modern surveying instrument that uses electronic distance measurement and laser technology to measure distances with high precision. Total stations can be used to measure distances over long ranges and to overcome obstacles that might be in the way of a direct line of sight.

Definition, meaning and importance of compass survey

Compass surveying is a type of surveying in which a compass is used to measure directions and angles of lines and features on the ground. The compass is an instrument that is used to determine the direction of magnetic north, which can be used as a reference point for measuring the direction of other features.

In compass surveying, a base line is established and a compass is used to measure the angles between the base line and other lines and features on the ground. These angles are then used to calculate the distances between the lines and features using trigonometry.

Compass surveying is important because it allows surveyors to determine the locations and boundaries of features on the ground, such as roads, buildings, and property lines. This information is essential for many different types of planning and construction projects, as well as for legal and property purposes.

However, there are limitations to compass surveying. It is only accurate for relatively small areas, and is affected by magnetic declination, which is the difference between magnetic north and true north. In addition, compass surveying is affected by local magnetic variations, such as those caused by underground metal deposits, which can cause errors in the measurements. As a result, compass surveying is typically used in combination with other surveying methods, such as chain surveying, to ensure accuracy and precision.

Prismatic and Surveyor's Brief description of the compass;

The prismatic compass and the surveyor's compass are two types of compass commonly used in surveying.

A prismatic compass is a type of compass that uses a prism to read the compass bearing. It has a sighting device that is used to align the compass with a distant object, and a prism that reflects the compass card onto the sighting device. The prism allows the user to read the compass bearing directly, without having to move the compass or readjust the sighting device. Prismatic compasses are typically used for reconnaissance surveys, where speed and efficiency are important.

A surveyor's compass, also known as a circumferentor or a theodolite compass, is a more advanced type of compass that is used for more precise measurements. It has a compass card that is graduated in degrees, and a sighting device that is mounted on a tripod. The sighting device can be rotated, allowing the user to measure the angle between two points or features on the ground. The surveyor's compass can also be used to measure vertical angles, which is useful for determining the elevation of features. This type of compass is commonly used in land surveying, engineering, and construction projects.

Both types of compasses are important tools in surveying, and are used to determine the locations and boundaries of features on the ground. They are essential for many different types of planning and construction projects, as well as for legal and property purposes.

Concept of Bearing Lines, Magnetic and Pure Bearings, W.C.B. and Concept of RB

In surveying, bearing lines are lines that are defined by their direction relative to magnetic north or true north. Bearings are typically expressed as an angle measured clockwise from north, and are used to describe the direction of a line or feature on the ground.

Magnetic bearings are measured relative to magnetic north, which is the direction of the magnetic field at a specific location. Magnetic north is not the same as true north, and the angle between magnetic north and true north is called magnetic declination. When using magnetic bearings, it is important to account for magnetic declination in order to ensure accurate measurements.

Pure bearings, also known as true bearings or geodetic bearings, are measured relative to true north, which is the direction of the earth's rotational axis. Pure bearings are not affected by magnetic declination, but they are more difficult to measure because true north is not visible and must be determined through other means, such as astronomical observations or GPS.

W.C.B. stands for whole circle bearing, which is a type of bearing that measures the angle between a line and a reference direction, typically north. Whole circle bearings are expressed as angles ranging from 0 to 360 degrees, and are used to describe the direction of a line or feature on the ground.

RB stands for Reduced Bearing, which is a type of bearing that is used in surveying to simplify calculations. Reduced bearings are expressed as angles ranging from 0 to 90 degrees, and are measured clockwise from a reference direction, typically north or south. Reduced bearings are easier to work with mathematically than whole circle bearings, but they must be converted back to whole circle bearings in order to be used in the field.

REFERENCES TO CADASTRAL MAPS ITS UTILITY IN CONDUCTING LAND SURVEY.

Cadastral maps are official maps that are used to define land ownership and property boundaries. These maps are typically created and maintained by government agencies, and they are an important tool for conducting land surveys and managing land use.

The utility of cadastral maps in conducting land survey is significant. Cadastral maps provide a detailed and accurate representation of land ownership and property boundaries, which is essential for conducting surveys that require precise measurements and location information. Land surveyors use cadastral maps to identify the location of property lines, easements, and other legal boundaries, which helps to ensure that the survey is conducted in accordance with legal and regulatory requirements.

Cadastral maps are also used to record survey data and update property ownership information. After a survey is conducted, the survey data is typically recorded on the cadastral map, along with any changes to property boundaries or ownership. This helps to ensure that the cadastral map remains accurate and up-to-date, which is essential for managing land use and resolving disputes over property ownership.

In addition to their use in conducting land surveys, cadastral maps are also an important tool for land management and planning. These maps are used by government agencies to develop land use plans, allocate resources, and manage public lands. They are also used by private companies and individuals for real estate transactions, development projects, and other land-related activities.

Overall, the utility of cadastral maps in land surveying and land management is significant. These maps provide an accurate and comprehensive representation of land ownership and property boundaries, which is essential for conducting surveys and managing land use in an efficient and effective manner.

SKETCHING AND MAINTENANCE OF FIELD BOOK.

Field books are an important tool used by surveyors to record measurements, observations, and other data collected in the field. The field book is a record of

the survey work and provides a permanent record of the survey for future reference.

The following are the steps involved in sketching and maintaining a field book:

Create a title page: The title page should include the name of the survey, the location, the survey date, and the surveyor's name.

Draw the boundary: The first step in sketching the field book is to draw the boundary of the property being surveyed. This should include all physical features such as buildings, roads, and fences.

Record measurements: Record the measurements of each feature, including the length of the boundary, angles, and other measurements as required. Use appropriate symbols to represent different features and use a consistent scale for all measurements.

Record observations: Record any observations made during the survey, including the location of any physical features, such as trees, rocks, and other landmarks.

Draw sketches: Draw sketches of any features that are not easily represented by measurements or symbols. These sketches should be accurate and detailed, including any unique features or distinguishing characteristics.

Maintenance: Keep the field book organized and maintain a consistent format throughout the survey. Use clear and legible handwriting and make sure that all measurements and observations are recorded accurately. Store the field book in a safe and secure location for future reference.

In summary, sketching and maintaining a field book is an important part of the surveying process. A well-maintained field book provides an accurate and permanent record of the survey work and is essential for future reference and legal purposes.

IMPORTANT LAND LAWS OF JHARKHAND

Jharkhand is a state in eastern India that has its own set of land laws and regulations. The following are some of the important land laws of Jharkhand:

Chhotanagpur Tenancy Act, 1908: This act governs the transfer of land and the rights of the tenant and landowner in the Chhotanagpur region of Jharkhand. It provides protection to tenants from eviction and regulates the transfer of agricultural land.

Santhal Parganas Tenancy Act, 1949: This act governs the transfer of land and the rights of the tenant and landowner in the Santhal Parganas region of Jharkhand. It provides protection to tenants from eviction and regulates the transfer of agricultural land.

Jharkhand Land Acquisition Act, 2013: This act provides for the acquisition of land for public purposes, such as the construction of roads, buildings, and other infrastructure projects. It also provides for the payment of compensation to landowners and the rehabilitation of displaced persons.

Jharkhand Land Revenue Act, 2017: This act provides for the administration and collection of land revenue in Jharkhand. It also provides for the maintenance of land records and the settlement of disputes related to land.

Jharkhand Forest Rights Act, 2006: This act provides for the recognition and vesting of forest rights in forest-dwelling communities and other traditional forest dwellers. It also provides for the conservation and sustainable use of forests and forest resources.

Jharkhand Prevention of Damage to Public Property Act, 2017: This act provides for the prevention of damage to public property and the recovery of damages from persons responsible for such damage.

Jharkhand Land and Water Resources Conservation Act, 2000: This act provides for the conservation and management of land and water resources in Jharkhand. It also provides for the prevention of soil erosion, the protection of water resources, and the promotion of sustainable agriculture.

In summary, these are some of the important land laws of Jharkhand that govern the acquisition, ownership, and management of land in the state.

JHARKHAND SPECIAL SURVEY AND SETTLEMENT ACT

The Jharkhand Special Survey and Settlement Act, 2011 is an important law that governs the process of survey and settlement of land in the state of Jharkhand. The act was enacted to provide for a comprehensive and scientific survey and settlement of land in the state and to update land records. The act aims to resolve disputes related to land ownership, provide land title certificates to landowners, and ensure that land records are maintained accurately and updated regularly.

Under the Jharkhand Special Survey and Settlement Act, the state government can constitute a survey and settlement authority for carrying out survey and settlement operations in the state. The authority is responsible for conducting a survey of all land in the state, identifying the owners of the land, and preparing land records. The authority also has the power to resolve disputes related to land ownership and to issue land title certificates.

The act provides for the formation of a settlement tribunal to resolve disputes related to the survey and settlement of land. The tribunal has the power to hear appeals against the decisions of the survey and settlement authority and to decide on matters related to land ownership and title.

The Jharkhand Special Survey and Settlement Act also provides for the establishment of a land records management system to maintain land records and update them regularly. The act mandates that all land transactions, including sales, leases, and mortgages, must be registered with the land records management system to ensure that land records are accurate and up to date.

In summary, the Jharkhand Special Survey and Settlement Act is an important law that provides for the survey and settlement of land in the state of Jharkhand. The act aims to ensure that land records are accurate and up to date, resolve disputes related to land ownership, and provide land title certificates to landowners.

LEVELING INSTRUMENTS (DUMPY LEVEL/AUTO LEVEL)

Leveling instruments, such as dumpy levels and auto levels, are surveying tools used to measure height differences between points and to create a level surface. They are commonly used in construction, civil engineering, and land surveying to determine elevations and prepare accurate site plans. The dumpy level consists of a telescope mounted on a tripod, while the auto level includes a compensator that automatically corrects any errors in the level's horizontal plane. Both instruments use a spirit level or pendulum to indicate when the telescope is level, and measurements are taken by reading a graduated rod held at the desired elevation.

METHODS OF LEVELING, SURVEYING AND MEASUREMENT OF RURAL AND URBAN LAND

Methods of leveling, surveying, and measurement of rural and urban land can vary, but some common ones include:

Dumpy level method: This is a traditional method of leveling that involves using a dumpy level instrument to determine height differences between different points. It is commonly used for surveying large areas of land.

Auto level method: This is a more modern method of leveling that involves using an auto level instrument, which is a self-leveling optical instrument. It is commonly used for smaller land surveys and construction projects.

Total station method: This is a modern surveying method that uses an electronic instrument to measure angles and distances between points. It can be used for both rural and urban land surveys.

GPS method: This method uses GPS technology to determine the location and elevation of different points. It can be useful for larger land surveys and mapping.

Measurement of land typically involves determining the length and width of a piece of land to calculate its area. In rural areas, this can be done using a measuring tape or a measuring wheel, while in urban areas, it may involve using more precise instruments like a total station or GPS.

Overall, the specific methods used will depend on the needs and goals of the survey or measurement, as well as the resources and technology available.

LEVELING THE LONGITUDINAL AND CROSS-SECTIONAL PROFILE ON THE SITE

Leveling the longitudinal and cross-sectional profile on a site is an important part of surveying and site analysis. This process involves using a leveling instrument, such as a dumpy level or an auto level, to establish a series of elevation benchmarks or points on the site. These benchmarks are then used to establish the overall elevation of the site, as well as to create a detailed topographic map of the area. The longitudinal profile refers to the elevation changes along the length of the site, while the cross-sectional profile shows the elevation changes across the width of the site. This information is crucial for proper site design and construction, as it allows engineers and architects to account for changes in elevation and plan accordingly.

Concepts of Forward Sight (F.S.), Rear Sight (B.S.), Intermediate Sight (1.S), Bench Mark (B.M.), Temporary Bench Mark (T.B.M.), Low Level (R.L.), Altitude and Mean Sea Level (MSL)

Forward Sight (F.S.), Rear Sight (B.S.), Intermediate Sight (1.S), Bench Mark (B.M.), Temporary Bench Mark (T.B.M.), Low Level (R.L.), Altitude and Mean Sea Level (MSL) are all important concepts in land surveying and leveling.

Forward Sight (F.S.): It is the reading on the leveling staff taken on a point in front of the instrument.

Rear Sight (B.S.): It is the reading on the leveling staff taken on a point behind the instrument.

Intermediate Sight (1.S.): It is the reading on the leveling staff taken on a point between the forward and rear sights.

Bench Mark (B.M.): It is a permanent reference point of known elevation to which other points can be related.

Temporary Bench Mark (T.B.M.): It is a temporary point of known elevation that is established for a specific survey and is used to tie other points in the survey to a common reference.

Low Level (R.L.): It is the height of a point above a datum, usually mean sea level (MSL).

Altitude: It is the height of a point above a reference plane, such as the horizon or a level surface.

Mean Sea Level (MSL): It is the average height of the sea surface, used as a reference plane for measuring elevations.

These concepts are important for accurately measuring and recording elevations, as well as for creating detailed maps and plans of land areas.

BRIEF KNOWLEDGE OF FLAT TABLE SURVEYING

Flat table surveying is a type of surveying in which the measurements are taken on a flat surface, typically a table, rather than on the ground. In this method, the field observations such as angles and distances are taken on a small scale drawing, usually on a piece of paper. These field measurements are then transferred to a larger-scale map or plan. This type of surveying is commonly used for small-scale surveys such as building sites, gardens, or subdivisions. It is a simple and cost-effective method of surveying and can provide accurate results for smaller projects. However, it may not be suitable for larger-scale surveys or complex terrain.

Installation, leveling centralization and orientation

Installation, leveling, centralization, and orientation are key steps in setting up surveying instruments, such as theodolites, total stations, and other measurement devices. Here's a brief explanation of each:

Installation: This involves setting up the instrument securely and properly on a tripod or other stable platform.

Leveling: This is the process of adjusting the instrument so that it is level, meaning the vertical axis is perpendicular to the surface of the earth. Leveling is necessary for accurate measurements and helps to eliminate errors caused by uneven ground.

Centralization: This refers to aligning the instrument with the survey point or target. The instrument needs to be centered over the point of interest to get accurate measurements.

Orientation: This involves aligning the instrument with true north or magnetic north, depending on the type of survey being conducted. Orientation is important for accurate measurements and for determining the direction of lines and angles on the site.

INSTRUMENTS USED IN FLAT TABLE SURVEYING

In flat table surveying, the following instruments are commonly used:

Plane table: It is a drawing board with a level mounted on a tripod. It is used for making a plan of the surveyed area.

Alidade: It is a straight edge with a sighting device, such as a telescope or a sight vane, mounted on it. It is used to measure angles and to sight distant points.

Spirit level: It is used to determine the level of the plane table.

Ranging rod: It is a graduated rod that is placed at different points to measure distances.

Chain or tape: It is used to measure linear distances.

Prismatic compass: It is used to determine the magnetic bearing of a line.

UTILITY OF TS IN LAND SURVEYING.

Total stations (TS) have a wide range of applications in land surveying. They are electronic surveying instruments that combine electronic theodolites with

electronic distance meters (EDMs). Some of the utilities of TS in land surveying include:

Measurement of angles and distances: Total stations can accurately measure both horizontal and vertical angles, as well as distances using the integrated EDM. This allows for precise mapping and measurement of land features.

Topographic surveys: Total stations can be used to create topographic maps by measuring and recording the elevation of various points on the land surface.

Setting out: Total stations can be used to precisely set out positions for building foundations, roads, and other structures.

Volume calculations: With the use of TS, accurate volume calculations can be carried out for earthworks, mining, and other excavation projects.

Monitoring: Total stations can be used for monitoring structures for movement or deformation, such as dams, bridges, and buildings.

Overall, the use of total stations in land surveying can improve the accuracy and efficiency of surveys, making it a valuable tool in the field.

THEODOLITE SURVEYING: DESCRIPTION AND MEASUREMENT OF THE INSTRUMENT OF SURVEY WORK

Theodolite surveying is a technique used for precise measurement of angles and horizontal and vertical distances in surveying. The instrument used in theodolite surveying is a theodolite, which consists of a telescope mounted on a rotating base and a vertical axis.

The theodolite is used to measure horizontal and vertical angles between points on the ground or on structures. It can also be used to measure distances by using a method called triangulation, where the theodolite is used to measure the angles between two points and the distance between the two points is calculated using trigonometry.

In addition to measuring angles and distances, theodolites can also be used to measure elevations and to create a horizontal plane for leveling. The instrument is leveled using a bubble level and then pointed at a known reference point to establish a horizontal plane. This allows for accurate measurement of elevation differences between points on the ground.

Theodolite surveying is commonly used in a variety of survey work, including land surveys, construction surveys, and engineering surveys. It allows for precise measurement of angles and distances, which is critical for accurate mapping and construction of structures.

Horizontal and vertical of inaccessible/accessible objects for verification and centering angles, traverse survey with theodolite, sources of errors and in traversing Test.

To measure the horizontal and vertical angles of inaccessible or accessible objects, theodolites are commonly used in surveying. Theodolites can be used to measure horizontal angles with great accuracy, typically to within a few seconds of arc. They can also measure vertical angles with a similar degree of precision.

Traverse surveying with a theodolite involves using the instrument to measure a series of connected angles and distances along a route, which can be used to create a map or plan of the surveyed area. Theodolites are commonly used in traverse surveying due to their high precision and ability to measure angles in a variety of conditions.

Sources of error in traverse surveying can include errors in the measurement of angles and distances, as well as errors introduced by the surveying instruments themselves. To reduce these errors, it is important to use high-quality instruments and to take measurements under optimal conditions whenever possible.

A test in traverse surveying might involve measuring a series of angles and distances along a known route, and comparing the results to a previously

established map or plan. This can help to identify any errors in the measurements and ensure the accuracy of the final survey.

ELECTRONIC TOTAL STATION (ETS)

An Electronic Total Station (ETS) is an advanced surveying instrument used to measure angles and distances, and record data for mapping and land surveying. ETS instruments integrate a theodolite for measuring angles and a distance meter for measuring distances, allowing for more efficient and accurate measurement of land and topography. ETS instruments use electronic sensors and data processing software to calculate and record measurements, and can store data in digital formats for later use in computer-aided drafting and design (CADD) software. ETS instruments also have features such as automatic target tracking, laser plummets, and built-in levels for easy and accurate set up. ETS is commonly used in a variety of surveying applications, such as construction, engineering, and land development.

GLOBAL POSITIONING SYSTEM (GPS)

Global Positioning System (GPS) is a satellite-based navigation system that provides location and time information anywhere on or near the Earth. It consists of a network of 24 operational satellites in orbit, ground control stations, and GPS receivers. The system uses trilateration to determine the position of a GPS receiver based on the time it takes for signals from at least four satellites to reach the receiver.

GPS technology has many applications, including land surveying, mapping, navigation, and tracking. In land surveying, GPS receivers can be used to determine precise location and elevation data, which can be used to create accurate maps and models of the land. GPS can also be used to guide heavy equipment in construction projects, to track the movement of wildlife, and to monitor the movement of vehicles and other assets.

DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS)

Differential Global Positioning System (DGPS) is a technology used to improve the accuracy of GPS (Global Positioning System). It works by using a network of fixed ground-based reference stations that broadcast error corrections to GPS receivers. The GPS receiver can then use this information to correct any errors in its position calculation caused by atmospheric conditions, clock drift, or other factors. DGPS can improve GPS accuracy from around 10 meters to within a few centimeters, making it useful in applications that require high precision, such as surveying, mapping, and navigation.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Geographic Information System (GIS) is a computer-based system designed to store, analyze, and display spatial data. It integrates hardware, software, and data to capture, manage, and analyze all forms of geographically referenced information.

GIS allows users to create maps, perform spatial analyses, and manage large amounts of geographic data from various sources. It can be used in a variety of fields such as urban planning, environmental management, public health, and natural resource management.

GIS works by storing data in layers, each layer containing information about a specific feature or attribute of a geographic area. The data can be displayed as maps or tables, and users can perform various spatial analyses, such as proximity analysis, overlay analysis, and network analysis.

Some of the common components of a GIS system include a database management system, a map creation and display system, and an analysis and modeling system. GIS software can be used to import and export data in a variety of formats, including shapefiles, KML files, and GeoJSON files.

Electronic Distance Measurement Instrument (EDMI)

Electronic Distance Measurement Instrument (EDMI) is a surveying instrument used to measure distances with high accuracy. It works on the principle of electromagnetic waves to measure distances. The instrument consists of two

units, the transmitter and the receiver, that are aimed at each other. The transmitter sends a modulated wave to the reflector, which reflects it back to the receiver. The time taken for the wave to travel back and forth is measured, and the distance is calculated using the speed of light. EDMI is commonly used in conjunction with a total station to measure distances between the instrument and the reflector. It can also be used for topographical and hydrographic surveys, as well as in construction and engineering projects.

Digital Introduction, operation and maintenance of modern surveying instruments like land surveyors

Modern surveying instruments such as land surveyors are digital instruments that utilize electronic technology to make surveying faster, more accurate, and more efficient. They have replaced traditional surveying methods, making surveying tasks easier, faster and more precise.

A land surveyor is a digital instrument used for measuring distances and angles between different points on the ground. It can measure distances up to several hundred meters and is capable of measuring horizontal and vertical angles with a high degree of accuracy. The device uses a telescope for sighting objects and has an electronic distance measurement (EDM) unit for measuring the distance between objects.

To operate and maintain these modern surveying instruments, the user must be properly trained and have a good understanding of the instrument's capabilities and limitations. They must also be familiar with the instrument's software and be able to interpret and analyze data collected by the instrument. Routine maintenance is also necessary to ensure that the instrument is working properly and is calibrated correctly. Calibration is critical to maintaining the instrument's accuracy and requires the use of specialized equipment and expertise.

VARIOUS FORMATS OF DATA TYPES.

In computer programming, data types refer to the classification of data that a variable or expression can hold. The most common data types include:

Integer: This data type is used to store whole numbers, both positive and negative.

Float: This data type is used to store floating-point numbers with decimal places.

Double: This data type is used to store double-precision floating-point numbers with more decimal places than float.

Boolean: This data type is used to store true or false values.

Character: This data type is used to store a single character, such as a letter, digit, or symbol.

String: This data type is used to store a sequence of characters, such as a word, phrase, or sentence.

Array: This data type is used to store a collection of elements of the same data type.

Pointer: This data type is used to store the memory address of another variable.

Structure: This data type is used to group related variables of different data types.

Union: This data type is used to allocate memory to a single variable for different data types.

Enum: This data type is used to define a set of named constants.

Void: This data type is used to indicate the absence of a value.

The specific data types available may vary depending on the programming language being used.

INTRODUCTION TO MAPPING SOFTWARE I.E. ARC GIS & Q GIS GIS.

ArcGIS and QGIS are two popular mapping software tools used by geospatial professionals for creating, analyzing, and managing spatial data.

ArcGIS is a proprietary software developed by ESRI, and is widely used in various industries such as environmental management, urban planning, natural resources

management, and defense. It offers advanced functionality and features, such as 3D visualization, advanced geoprocessing, and extensive data analysis tools.

QGIS, on the other hand, is an open source software, which makes it freely available for download and use. It offers many of the same capabilities as ArcGIS, including spatial data analysis and cartographic visualization. QGIS has a strong user community, which regularly develops new plugins and features for the software.

Both ArcGIS and QGIS have extensive user interfaces, which can be used to edit, project, and analyze geospatial data on a computer. The software allows users to import various types of data files such as shapefiles, GPS data, imagery, and more. The software can also create different types of maps, including thematic maps, topographic maps, and customized maps.

EDITING AND PROJECTING OF DATA ON COMPUTER.

Editing and projecting data on a computer typically involves the use of a Geographic Information System (GIS) software. GIS software allows users to store, analyze, and manipulate geospatial data in various formats such as shapefiles, raster images, and geodatabases.

To edit data, users can typically select and modify individual features such as points, lines, and polygons within a GIS software's editing environment. Projections of data involve transforming the spatial reference of the data to a different coordinate system, which can be necessary for certain analytical and mapping applications. GIS software typically provides tools for transforming and projecting data, such as the ability to define a new projection or to convert data between different coordinate systems.

Overall, GIS software can provide a powerful suite of tools for managing, editing, and projecting geospatial data on a computer.

Introduction to computer and its peripheral devices

A computer is an electronic device that can perform a wide range of tasks based on a set of instructions given to it by a user. It consists of hardware and software components. The hardware includes the physical components of the computer such as the central processing unit (CPU), memory, hard drive, monitor, keyboard, mouse, and other input/output devices. The software includes the programs and applications that run on the computer.

Peripheral devices are external hardware devices that are connected to a computer to expand its functionality. Some common peripheral devices include printers, scanners, webcams, microphones, speakers, external hard drives, USB drives, and input devices such as keyboards and mice.

Different types of computers and peripheral devices are available in the market, including desktops, laptops, tablets, smart phones, and other mobile devices. They can be used for a variety of purposes, including personal use, business operations, education, research, and more.

MS OFFICE

MS Office is a suite of productivity applications developed by Microsoft Corporation. It includes various software like Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Access, Microsoft Outlook, and many more. These applications are used for creating documents, spreadsheets, presentations, and databases. MS Office is widely used in businesses, educational institutions, and personal use for managing information and data.

Microsoft Office is a suite of productivity applications developed by Microsoft Corporation. The package includes a collection of software programs that are commonly used in an office environment, such as Word, Excel, PowerPoint, and Outlook.

Microsoft Word is a word processing application used to create, edit, and format documents. It is commonly used for creating letters, reports, and other text-based documents.

Microsoft Excel is a spreadsheet application used to organize, analyze, and visualize data. It is commonly used for financial calculations, statistical analysis, and creating charts and graphs.

Microsoft PowerPoint is a presentation application used to create slide shows, typically for use in meetings and presentations. It includes tools for creating visual aids such as charts, diagrams, and images.

Microsoft Outlook is an email and calendar application used for managing emails, appointments, and contacts. It includes features such as email filtering, automated replies, and scheduling meetings.

Other applications included in the Microsoft Office package may include Access, OneNote, and Publisher, depending on the version and edition of the software.

BRIEF INFORMATION ON EXCEL SOFTWARE PACKAGE

Microsoft Excel is a spreadsheet software program developed by Microsoft Corporation. It is a powerful tool for organizing, analyzing and manipulating data. Excel allows users to create spreadsheets that are used to display data, perform calculations and create charts and graphs.

Excel can be used for a wide range of tasks, including budgeting, financial analysis, project management, data analysis, and data visualization. Excel is equipped with a variety of features such as formulas, charts, tables, and pivot tables that allow users to easily manage and analyze data.

Some of the key features of Excel include conditional formatting, which allows users to highlight cells that meet certain criteria; data validation, which allows users to control the types of data that are entered into cells; and macros, which allow users to automate repetitive tasks.

Excel also has the ability to import data from other sources, such as text files and databases, and to export data to other formats. It also allows users to collaborate on spreadsheets in real-time with other users, making it a useful tool for team projects.

Overall, Excel is a versatile and powerful tool that can be used in a wide variety of industries and applications.

INTRODUCTION TO INTERNET,ITS BROWSING AND EMAIL INTRODUCTION

The internet is a global network of interconnected computers that allows people to access and share information. Browsing the internet refers to using a web browser such as Google Chrome or Mozilla Firefox to access websites and online resources.

Email is a means of sending and receiving messages over the internet. It involves using an email client, such as Microsoft Outlook or Gmail, to compose, send, and receive messages. Email allows users to communicate with others quickly and easily, regardless of their location.

To access the internet, one needs an internet connection and a device, such as a computer, smartphone, or tablet. Browsers are software programs that allow users to access the internet, search for information, and view websites. Email clients are software programs that allow users to send, receive, and organize emails.

When browsing the internet, users can search for information, access social media platforms, shop online, and more. Email can be used for personal or professional communication and is a widely used tool for keeping in touch with friends, family, and colleagues.

Jharkhand's Revenue Department/Survey and Settlement

The Revenue Department of Jharkhand is responsible for the administration of revenue laws and collection of revenue for the state. The department plays a crucial role in maintaining land records, land surveys, and land revenue administration. The Survey and Settlement Department of Jharkhand is responsible for conducting surveys to determine the ownership of land, preparation and maintenance of land records, and settlement of land disputes.

The Survey and Settlement Department is responsible for conducting cadastral surveys and creating land maps, maintaining and updating land records, and implementing land settlement projects. The department also provides services related to land valuation, mutation, and registration. In addition, it provides technical assistance to other government departments, such as the Agriculture Department and the Rural Development Department, in matters related to land and revenue administration.

The Revenue Department and Survey and Settlement Department of Jharkhand work together to ensure efficient and transparent administration of land and revenue matters in the state.

LAND SURVEY SOFTWARE INTRODUCTION

There are many land survey software programs available for professionals and surveying students. These software programs offer a range of tools and capabilities to help with land surveying tasks, including measuring angles, distances, and areas, creating and managing point clouds, and producing accurate 2D and 3D drawings.

Some of the commonly used land survey software programs are AutoCAD Civil 3D, Trimble Business Center, Global Mapper, Surfer, Leica Infinity, Carlson Survey, Topcon Magnet Office, and many others. These software programs often require extensive training and expertise to use them effectively. Some software programs can be integrated with other tools like GPS receivers, total stations, and unmanned aerial vehicles (UAVs) to improve the accuracy and efficiency of land surveying work.

LAND MAP SOFTWARE

Land mapping software is a type of software designed to assist in mapping and surveying land areas. It allows users to create accurate maps and land surveys using advanced mapping techniques and tools. These tools can include aerial imagery, satellite imagery, topographic data, and other geographic data that can be used to create a detailed and accurate map of the land. Some land mapping

software also includes features for data analysis, 3D visualization, and project management. Examples of land mapping software include ArcGIS, QGIS, AutoCAD Map 3D, and Trimble Business Center.There are various types of land mapping software available that can be used for different purposes, such as creating topographic maps, cadastral maps, and 3D terrain models. Some popular land mapping software programs include:

ArcGIS: This is a comprehensive geographic information system software used for creating, editing, analyzing, and sharing maps, as well as collecting and managing geographic data.

QGIS: This is a free and open-source geographic information system software that allows users to create, edit, and analyze maps.

AutoCAD Map 3D: This is a professional mapping software that allows users to create, edit, and analyze maps and geographic data.

Global Mapper: This is a powerful mapping software that allows users to create, edit, and analyze maps and terrain data, as well as perform 3D modeling and analysis.

Google Earth: This is a free software that allows users to explore the world in 3D, including maps, terrain, and satellite imagery.

OpenStreetMap: This is a free and open-source mapping platform that allows users to create, edit, and share maps of the world.

These are just a few examples of the many land mapping software programs available. The choice of software will depend on the specific needs and requirements of the user.