

## SURVEYING – OBJECTIVE QUESTIONS WITH FULL ANSWERS (UNIT-WISE)

### UNIT – I

1. Differentiate clearly between Plan and Geodetic Surveying.

Plan surveying is done over small areas where the curvature of the earth is negligible. All lines are considered plane and simple geometry is used. Geodetic surveying covers large areas and takes the earth's curvature into account, using spherical trigonometry for high precision.

2. What are errors in chaining?

Errors in chaining occur due to incorrect chain length, sagging of chain, wrong alignment of chain, variations in temperature affecting chain length, poor marking of endpoints, and improper application of tension. These errors cause incorrect measurement of distances.

3. Find the bearing of line AB whose FB is  $N14^{\circ}48'E$  and BB is  $S14^{\circ}40'E$ .

The true back bearing should differ by  $180^{\circ}$ . A difference of 8 minutes indicates local attraction. Therefore, corrected bearings become approximately:

FB =  $N14^{\circ}48'E$  and BB =  $S14^{\circ}48'W$  (after adjusting for attraction).

4. Define magnetic declination. What are the types?

Magnetic declination is the horizontal angle between true meridian and magnetic meridian at a place. It occurs because magnetic north is not the same as geographic north. Types include: (i) East declination – magnetic north lies east of true north; (ii) West declination – magnetic north lies west of true north.

5. Define dip.

Dip is the vertical angle made by the earth's magnetic field lines with the horizontal plane. It increases as one moves from the equator toward the magnetic poles. It is measured using a dip circle.

### UNIT – II

1. Define: Benchmark, Parallax, Line of Collimation, Level Surface, Vertical Line, Bubble Line, Reduced Level, Dip of Horizon, Backsight.

Benchmark: A permanent reference point of known elevation used for levelling. Parallax: Apparent shift in the image when the eye position changes, caused by improper focusing. Line of collimation: The imaginary line joining the optical center of the objective lens and the center of the crosshairs. Level surface: A curved surface at every point perpendicular to gravity. Vertical line: A line following the direction of gravity, shown by a plumb bob. Bubble line: The center line of the bubble in a level tube indicating horizontality. Reduced level: The vertical height of a point relative to a chosen datum. Dip of horizon: Angular depression of visible horizon below the true horizontal. Backsight: Staff reading taken on a known elevation point to find HI.

2. List various methods of contouring.

Methods include: Direct method – levels are taken at points lying directly on contour lines. Indirect method – levels are taken on a grid or along cross-sections and contours are interpolated.

3. What are the different types of levelling staff?

Types include: Self-reading staff, Target staff, Folding staff, and Telescopic staff. Each staff is designed to provide accurate readings depending on the type of levelling used.

4. Difference between Dumpy Level, Y-Level, and Tilting Level.

Dumpy Level: Telescope is fixed and rigid; highly stable and used for precise work. Y-Level: Telescope can be removed from Y-shaped supports; offers flexibility in adjustments. Tilting Level: Telescope can be tilted slightly using a screw, allowing quick temporary adjustments without perfect levelling.

5. List various temporary adjustments of a dumpy level.

Temporary adjustments include: Setting up the instrument on tripod; Levelling the instrument using foot screws; Focusing the eyepiece to remove parallax; Focusing the objective lens on staff for clear image.

### UNIT – III

1. Define: Face right and face left, Swinging telescope, Transiting telescope, Telescope normal.

Face right: Vertical circle is on observer's right. Face left: Vertical circle is on observer's left. Swinging the telescope: Rotating the telescope in the horizontal plane. Transiting: Rotating the telescope 180° in the vertical plane. Telescope normal: Position where vertical circle reads zero when line of collimation is horizontal.

2. What are the various methods of theodolite traverse?

Methods include: Open traverse, Closed traverse, Traverse using included angles, Traverse using deflection angles. Each method differs in how angles and bearings are used.

3. Explain various parts of a theodolite.

Main parts include: Telescope for sighting, Vertical circle for vertical angle measurement, Horizontal circle for horizontal angle measurement, Levelling head with foot screws, Tribrach for detaching instrument, Clamp screws and tangent screws for fine adjustments, and plumb bob for centering.

4. How can you find the height of a building using vertical angle when base is accessible?

Measure the horizontal distance (D) from instrument to building. Measure vertical angle ( $\theta$ ). Height =  $D \times \tan \theta$  + height of instrument above ground.

5. List the various methods of traverse.

Chain traverse, Compass traverse, Theodolite traverse, Plane table traverse. Choice depends on accuracy required and instrument availability.

### UNIT – IV

1. What is the primary difference between stadia and tangential methods of tachometry?

Stadia method uses fixed stadia hairs and a single observation to determine distance. Tangential method uses two different vertical angles and corresponding staff readings when no stadia hairs exist.

2. Define the term “stadia method” and explain its basic principle.

Stadia method is an indirect method of distance measurement using a tacheometer. The horizontal distance is computed using  $D = KS + C$ , where S is staff intercept and K, C are stadia constants.

3. List the different types of curves.

Types include: Simple circular curve, Compound curve, Reverse curve, and Transition curve.

4. Explain: Simple curve, Compound curve, Reverse curve.

Simple curve: A single arc of constant radius joining two tangents. Compound curve: Two arcs of different radii bending in the same direction. Reverse curve: Two arcs of opposite curvature used to change direction smoothly.

5. What is meant by ‘Point of Intersection’ (PI)?

PI is the point where the two tangents of a curve intersect. It is the key reference point for setting out horizontal curves.

## UNIT – V

1. List the types of EDM instruments commonly used in surveying.

Types include: Microwave EDM, Infrared EDM, Laser EDM, and Total Station instruments integrated with EDM capability.

2. List two typical applications of LiDAR in environmental monitoring.

Applications include: Mapping forest canopy height and density; Generating digital elevation models (DEMs) for flood and watershed analysis.

3. What is the primary purpose of using stereo-plotting instruments in photogrammetry?

Stereo-plotters allow the creation of 3D topographic maps by viewing overlapping aerial photographs and extracting height information.

4. Explain the role of Total Stations in modern surveying.

Total stations combine electronic angle measurement, EDM distance measurement, microprocessor computation, and data storage. They provide high accuracy and speed in field surveying.

5. What are the limitations of GPS in surveying?

Limitations include signal obstruction by buildings or trees, multipath errors due to reflections, ionospheric and tropospheric delays, need for clear satellite visibility, and reduced accuracy in urban canyons.