📖 Day 1: Introduction to Surveying + Linear Measurements (Short Notes)

🔹 What is Surveying?

> **Surveying is the art of determining the relative position of points on, above or below the Earth's surface using measurements of distance, angles and elevations.**

🔹 Types of Surveying

1. **Plane Surveying – Earth is assumed flat (used for small areas)**
2. **Geodetic Surveying – Earth's curvature is considered (large areas)**

🔹 Chain Surveying (Linear Measurement)

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> Chain surveying is used when area is fairly level and details can be recorded by linear measurements.

Instruments used:

- Chain (20m / 30m)
- Tape (Steel / Invar)
- Arrows (mark points)
- Ranging Rods (1.5–3 m high, red & white painted)

🔹 Types of Ranging

1. **Direct Ranging:**
   Used when two stations are visible. Done by eye judgment.
2. **Indirect Ranging:**
   Used when inter te points are set using line ranger ciprocal method.

🔹 Errors in Linear Measurement

Type	Example
Instrumental Error	Wrong length chain
Natural Error	Temperature, wind
Personal Error	Bad eyesight or judgment

🧠 Formulas

- Corrected Length = Measured Length × (Correct Chain Length / Actual Chain Length)
- Slope correction = $h^2/(2L)$

📝 Basic Questions (Practice)

1. Define surveying and its two main categories.
2. Explain direct and indirect ranging with

Formulas

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Basic Questions (Practice)

1. Define surveying and its two main categories.
2. Explain direct and indirect ranging with sketch.
3. What is the purpose of arrows and ranging rods in chain survey?
4. A 30m chain was found to be 0.2m too long. What is the corrected length of 500m measured?
5. List three errors in chaining and how to minimize them.

📖 Day 2: Compass Surveying – Short Notes

🔹 What is Compass Surveying?

> **It's a method of measuring the direction of survey lines using a magnetic compass.**

🔹 Types of Compass

Compass Type	Used In
Prismatic Compass	Civil survey work, field angles
Surveyor's Compass	Military/Mining works (less common now)

🔹 Bearing Types

1. Whole Circle Bearing (WCB)

- **Measured from North (0°) clockwise to 360°**

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- Measured from North (0°) clockwise to 360°
- Eg: NE = 60°, SW = 225°

2. Reduced Bearing (RB) or Quadrantal Bearing

- Measured from North/South towards East/West
- Eg: N30°E, S45°W

🔁 Conversion:

- WCB → RB
  - If WCB = 120°, then RB = S60°E
- RB → WCB
  - N60°E = 60°, S60°W = 240°

🔹 Local Attraction

When magnetic needle gets deflected due to nearby metal (iron poles, wires).

Detecting Local Attraction:

- **If fore bearing – back bearing ≠ 180°, error is present.**

🔹 Included Angle

> **Angle between two lines (measured clockwise)**

Formula:
Included angle = F.B. of next line – F.B. of previous line
(*Add 360 if negative*)

📝 Important Formulas

- **Included Angle = F.B. (next) – F.B. (current)**
- **Back Bearing (BB) = F.B. ± 180°**

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- **Back Bearing (BB) = F.B. ± 180°**
  - **Add 180° if F.B. < 180°,**
  - **Subtract 180° if F.B. > 180°**

🧠 Common Questions

1. **Difference between WCB and RB with examples**
2. **Define fore bearing and back bearing**
3. **How do you detect and correct local attraction?**
4. **Convert:**
   - **WCB = 310° → RB = ?**
   - **RB = S45°E → WCB = ?**
5. **A compass line has F.B. = 60°, B.B. = 238°. Is there local attr[illegible]on?**

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📌 Quick Tips

- **Bearings are always measured from North**
- **Practice 2–3 conversion problems daily**
- **Always sketch lines while doing bearing questions**