GUJARAT TECHNOLOGICAL UNIVERSITY

DI -3 SEMESTER – OLD PAPER – W22 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Surveying- 4330601

Unit 1 - Introduction to Surveying

Repeated Questions:

1. **Define Surveying and state its purposes.**
    - Appeared in: **WIN 23 (Q1a, 03 marks)**
2. **Explain the Principles of Surveying.**
    - Appeared in: **WIN 22 (Q1a, 03 marks)**, **SUM 23 (Q2b, 04 marks)**, **4330601 (Summer 2025) (Q1b, 04 marks)**
3. **Explain Plane Surveying and Geodetic Surveying.**
    - Appeared in: **SUM 24 (Q1b, 04 marks)**
4. **Define: (i) Ranging (ii) Tie line (iii) Perpendicular offset.**
    - Appeared in: **SUM 24 (Q1a, 03 marks)**
5. **Explain types of ranging in detail.**
    - Appeared in: **WIN 24 (Q1b, 04 marks)**, **SUM 23 (Q2a, 03 marks)**
6. **Explain Chaining on sloping ground. / Write a short note on: Chaining on a sloping ground.**
    - Appeared in: **WIN 22 (Q1c-OR, 07 marks)**, **WIN 24 (Q1c-OR, 07 marks)**
7. **A 20 m chain was found to be 10 cm too long at the beginning and 30 cm too short at the end of survey work. If the distance measured by this chain is 930 m, calculate the correct distance.**
    - Appeared in: **WIN 22 (Q1c, 07 marks)**
8. **A 20 m chain was found 5 cm too short at the starting and 15 cm too long at the end of the survey. If the distance measured by this chain is 1 Km, find the true distance.**
    - Appeared in: **WIN 23 (Q1b, 04 marks)**, **4330601 (Summer 2025) (Q1c-OR(2), 07 marks)**

Other Important Questions:

1. **Define: Contour, Surveying, & Levelling.** (WIN 24 - Q1a, 03 marks)
2. **Define: Scale, Representative fraction.** (4330601 (Summer 2025) - Q1a, 03 marks)

3. **Differentiate between: Check line and Tie line.** (4330601 (Summer 2025) - Q1c(1), Part of 07 marks)
4. **Calculate hypotenuse allowance for a 30 m chain when the sloping ground is 10º.** (4330601 (Summer 2025) - Q1c(2), Part of 07 marks)
5. **With a neat sketch, explain indirect (reciprocal) ranging.** (4330601 (Summer 2025) - Q1c-OR(1), Part of 07 marks)
6. **Enlist any seven survey instruments used in chain, Tape & compass Survey with its functions.** (WIN 24 - Q1c, 07 marks)
7. **Enlist instruments used in chain and tape survey.** (WIN 23 - Q2a, 03 marks)
8. **State the procedure to carry out chain and tape survey.** (WIN 23 - Q2a-OR, 03 marks)
9. **Draw the sketch of a 20m metric chain and explain all parts.** (SUM 23 - Q2a, 03 marks)
10. **Explain Line Ranger.** (WIN 22 - Q1b, 04 marks)
11. **Write a short note: Offset.** (SUM 23 - Q3a-OR, 03 marks)
12. **State the methods of measuring distance on sloping ground and explain any one.** (SUM 23 - Q3b-OR, 04 marks)

Unit 2 - Linear Measurement

Repeated Questions:

1. **A 20 m chain was found to be 10 cm too long at the beginning and 30 cm too short at the end of survey work. If the distance measured by this chain is 930 m, calculate the correct distance.**
    - Appeared in: **WIN 22 (Q1c, 07 marks)**
2. **A 20 m chain was found 5 cm too short at the starting and 15 cm too long at the end of the survey. If the distance measured by this chain is 1 Km / 2 Km, find the true distance.**
    - Appeared in: **WIN 23 (Q1b, 04 marks)**, **4330601 (Summer 2025) (Q1c-OR(2), 07 marks)**
3. **Explain Chaining on sloping ground. / Write a short note on: Chaining on a sloping ground.**
    - Appeared in: **WIN 22 (Q1c-OR, 07 marks)**, **WIN 24 (Q1c-OR, 07 marks)**
4. **State the methods of measuring distance on sloping ground and explain any one.**
    - Appeared in: **SUM 23 (Q3b-OR, 04 marks)**
5. **Calculate hypotenuse allowance for a 30 m chain when the sloping ground is 10º.**
    - Appeared in: **4330601 (Summer 2025) (Q1c(2), Part of 07 marks)**

Other Important Questions:

1. **Length of a line was measured using a 20 m chain. The measured length of the line was 325.4 m. If the chain was 12 cm too long, calculate the true length of the line.** (SUM 24 - Q4b, 04 marks)
2. **A 20 m chain was found to be 15 cm too long at the beginning and 25 cm too short at the end of survey work. If the distance measured by this chain is 950 m. Calculate correct distance.** (SUM 23 - Q3b, 04 marks)
3. **Distance between two point P and Q measured along slope is 300 meter. Find the horizontal distance between point p and Q. (a) slope 1:5 and (b) The difference in level is 41 meter.** (SUM 23 - Q4b, 04 marks)
4. **For calculating area between an irregularly shaped boundary, a survey line, first and last offset, following offsets were taken from the survey line to the boundary at 25 m interval. Calculate area by Simpson's rule. 1.1, 2.3, 3.2, 3.5, 4.2, 4.7, 3.6, 2.9, 1.2 (m)** (SUM 24 - Q4b-OR, 04 marks)
5. **State the points to be considered while selecting a survey station for chain and tape survey.** (SUM 24 - Q5c-OR, Part of 07 marks)

Unit 3 - Traverse by Compass and Plane Table

Repeated Questions:

1. **Differentiate between Prismatic compass and Surveyor's compass.**
    - Appeared in: **WIN 23 (Q3b, 04 marks)**, **WIN 24 (Q2b, 04 marks)**, **4330601 (Summer 2025) (Q2a, 03 marks)**
2. **Explain temporary adjustments of prismatic compass.**
    - Appeared in: **WIN 22 (Q2a-OR, 03 marks)**, **WIN 24 (Q2c-OR, 07 marks)**, **4330601 (Summer 2025) (Q5c-OR(1), Part of 07 marks)**
3. **What is orientation? Why it is done? / Explain the Orientation in Plain Table Survey.**
    - Appeared in: **WIN 23 (Q3a, 03 marks)**, **WIN 24 (Q5d, 03 marks)**
4. **State and explain the methods of orientation in plain table survey.**
    - Appeared in: **WIN 22 (Q2b, 04 marks)**
5. **Write advantages and disadvantages of plane table survey. / What are the advantages of plane table surveying?**
    - Appeared in: **WIN 22 (Q2b-OR, 04 marks)**, **WIN 23 (Q3a-OR, 03 marks)**, **SUM 24 (Q1c-OR, Part of 07 marks)**
6. **Write methods of plane table survey and explain any two.**
    - Appeared in: **SUM 23 (Q1c-OR, 07 marks)**
7. **Mention the types of errors in plane table survey.**
    - Appeared in: **WIN 23 (Q3b-OR, 04 marks)**
8. **Enlist any Seven equipment and accessories used in Plain Table Survey with its uses.**
    - Appeared in: **WIN 24 (Q3c, 07 marks)**

Other Important Questions:

1. **Define: Fore bearing, Back bearing, Local Attraction.** (WIN 24 - Q2a, 03 marks)
2. **Define: Magnetic declination, Local Attraction and Fore Bearing.** (4330601 (Summer 2025) - Q2a-OR, 03 marks)
3. **Define (i)Magnetic meridian (ii)Fore bearing (iii)Back bearing.** (SUM 24 - Q2a, 03 marks)
4. **Explain local attraction.** (WIN 22 - Q2a, 03 marks)
5. **Convert the following W.C.B. into Reduced Bearing. (i) 78° (ii) 168°30' (iii) 279°30' (iv) 210°** (WIN 23 - Q2b-OR, 04 marks)
6. **Convert following Fore Bearing into Back Bearing: 1) 185° 30' 2) 345° 30' 3) 1° 30'** (WIN 24 - Q2a-OR, 03 marks)
7. **Convert following Reduced Bearing into Whole Circle Bearing (i) N25°30'W (ii) S46°30'E (iii) S63°15'W** (4330601 (Summer 2025) - Q2c(1), Part of 07 marks)

8. **Convert following Whole Circle Bearing into Reduced Bearing (i) 245°30' (ii) 320°15' (iii) 167°45'** (4330601 (Summer 2025) - Q2c-OR(1), Part of 07 marks)
9. **Differentiate between Whole Circle Bearing and Quadrantal Bearing.** (WIN 24 - Q2b-OR, 04 marks)
10. **The following bearings of the lines observed for closed traverse ABCDA. Calculate the included angles.** (WIN 23 - Q2b, 04 marks)
11. **The following bearings of lines observed for closed traverse ABCDA. Calculate included angles. Line AB: FB =45° and BB= 225°; Line BC: FB=135° and BB= 315°; Line CD: FB =225° and BB=45°; Line DA: FB =315° and BB=135°** (WIN 24 - Q2c, 07 marks)
12. **Calculate the included angles from the following observation of closed traverse ABCDA. Line AB: N40°00´E; BC: S65°30´E; CD: S13°30´W; DA: N80°00´W** (WIN 22 - Q2c-OR, 07 marks)
13. **Calculate the included angle from the following bearing of closed traverse ABCDA. And apply usual checks. Line AB: N 58° 30'E; BC: S 45° 30'E; CD: S 30° 30'W; DA: N 35° 30'W** (SUM 23 - Q1c, 07 marks)
14. **Explain whole circle bearing. And then calculate internal angles for following closed traverse. Apply usual check. Line AB: FB 65° BB 245°; BC: FB 145° BB 325°; CD: FB 255° BB 75°; DA: FB 345° BB 165°** (SUM 24 - Q1c, 07 marks)
15. **The following bearings were observed while traversing with a compass where do you suspect local attraction, correct it. Line AB: FB 75° BB 255°; BC: FB 116° BB 296°; CD: FB 165° BB 347°; DE: FB 226° BB 42°; EA: FB 303° BB 125°** (WIN 22 - Q2c, 07 marks)
16. **Following observations were taken for a closed traverse ABCDA. Correct the bearings for local attraction. Line AB: FB 66°30' BB 245°30'; BC: FB 128°30' BB 310°30'; CD: FB 251° BB 70°; DA: FB 345° BB 165°** (4330601 (Summer 2025) - Q2c(2), Part of 07 marks)
17. **Following Bearing were taken of a closed traverse PQRSP. Calculate the interior angles of the traverse and apply usual check. Line PQ: FB 44°30' BB 224°30'; QR: FB 123°30' BB 303°30'; RS: FB 201° BB 21°; SP: FB 290° BB 110°** (4330601 (Summer 2025) - Q2c-OR(2), Part of 07 marks)

Unit 4 - Leveling & Contours

Repeated Questions:

1. **Explain reciprocal leveling.**
    - Appeared in: **WIN 22 (Q3b, 04 marks)**, **SUM 23 (Q5a-OR, 03 marks)**
2. **Explain the characteristics of contour.**
    - Appeared in: **WIN 22 (Q3c, 07 marks)**, **SUM 23 (Q5a, 03 marks)**
3. **Write uses of contour.**
    - Appeared in: **WIN 22 (Q3b-OR, 04 marks)**
4. **Draw contour plans for: Hill, pond, steep slope, and overhanging cliff.**
    - Appeared in: **WIN 23 (Q5b-OR, Part of 07 marks)**
5. **Define: Back sight, Fore sight, Change Point.**
    - Appeared in: **SUM 23 (Q4a-OR, 03 marks)**
6. **Explain the corrections for curvature and refraction to be applied in levelling.**
    - Appeared in: **SUM 24 (Q5a-OR, 03 marks)**
7. **The following consecutive readings were taken with a dumpy level... Calculate R.L. of all points by H.I. method / Rise and Fall method. Apply usual checks.**
    - Appeared in: **WIN 23 (Q2c, 07 marks)**, **WIN 23 (Q3c-OR, 07 marks)**, **SUM 23 (Q3c, 07 marks)**, **SUM 23 (Q3c-OR, 07 marks)**, **SUM 24 (Q2c, 07 marks)**, **SUM 24 (Q2c-OR, 07 marks)**, **4330601 (Summer 2025) (Q3c, 07 marks)**

Other Important Questions:

1. **Define (1) Level surface (2) Axis of bubble tube (3) Reduced Level.** (WIN 22 - Q3a, 03 marks)
2. **Draw a neat sketch of dumpy level and label all components.** (WIN 22 - Q3a-OR, 03 marks)
3. **Draw a neat sketch of dumpy level and label its parts.** (SUM 24 - Q5a, 03 marks)
4. **Describe procedure for temporary adjustments of a dumpy level.** (SUM 24 - Q2b, 04 marks)
5. **Explain temporary adjustment of dumpy level.** (4330601 (Summer 2025) - Q3a-OR, 03 marks)
6. **Enlist instruments used in Levelling with its functions.** (WIN 24 - Q3a-OR, 03 marks)
7. **Enlist the various types of levels used in leveling.** (WIN 24 - Q3b-OR, 03 marks)
8. **List various errors in leveling and its Elimination.** (SUM 23 - Q4a, 03 marks)
9. **Define: Line of collimation, reduced level, back sight and bench mark.** (WIN 23 - Q5b, Part of 07 marks)
10. **Explain different types of bench marks used for leveling.** (WIN 23 - Q5b, 04 marks)

11. **Brief outline between Plan and Map.** (WIN 24 - Q3c-OR, 04 marks)
12. **Define: Contour, Fore sight, Axis of telescope.** (SUM 24 - Q3a-OR, 03 marks)
13. **Explain characteristics of contours.** (SUM 24 - Q3b-OR, 04 marks)
14. **Define: Contour interval and horizontal equivalent.** (WIN 23 - Q5b-OR, Part of 07 marks)
15. **Calculate the correction for earth's curvature, refraction and combined correction for a distance of 1500 m.** (4330601 (Summer 2025) - Q3b-OR(2), Part of 04 marks)
16. **The following consecutive readings in meters were observed on staff stations successively with a level, the instrument was moved after 2nd, 5th and 8th readings. The first reading was taken on a B.M. of R.L.100.155 m. Prepare a page of level-book. Calculate R.Ls. of staff stations, apply checks. Use H.I method. 0.875, 2.435, 0.985, 1.985, 2.870, 0.125, 1.925, 2.920, 1.175, 2.230, 3.465** (4330601 (Summer 2025) - Q3c, 07 marks)
17. **The following consecutive readings were taken on a continuously slopping ground at 30 m interval. 0.210, 1.115, 1.700, 2.375, 0.980, 1.435, 1.980, 2.555, 1.125, 2.055, 2.630, 3.315, 3.950. The elevation of first point was 50.000m. Calculate R.L.of all points by H.I. method. Apply usual checks.** (WIN 22 - Q3c-OR, 07 marks)

Unit 5 - Theodolite Traverse

Repeated Questions:

1. **List the fundamental axis of theodolite & give relation between them. / Write a short note on: Fundamental Axis of Theodolite and their Relations.**
   - Appeared in: **WIN 23 (Q3c, 07 marks)**, **WIN 22 (Q4a, 03 marks)**, **SUM 23 (Q5b, 04 marks)**, **WIN 24 (Q5b, 07 marks)**
2. **Explain temporary adjustment of Theodolite.**
   - Appeared in: **WIN 22 (Q5b, 04 marks)**, **WIN 24 (Q3b, 04 marks)**, **SUM 23 (Q4c, 07 marks)**
3. **Explain repetition method to measure horizontal angle with theodolite.**
   - Appeared in: **WIN 23 (Q3c-OR, 07 marks)**, **WIN 22 (Q4c-OR, 07 marks)**, **4330601 (Summer 2025) (Q4b, 04 marks)**
4. **Enlist any four components of theodolite and state their functions. / Give functions of the following parts of the theodolite: Shifting head, tangent screw, upper slow motion screw, lower slow motion screw, telescope, clip screw, vertical circle.**
   - Appeared in: **WIN 22 (Q4a-OR, 03 marks)**, **WIN 23 (Q5c, 07 marks)**, **4330601 (Summer 2025) (Q5c-OR(2), Part of 07 marks)**
5. **Write uses of Theodolite.**
   - Appeared in: **WIN 24 (Q4a, 03 marks)**
6. **Draw a neat sketch of Theodolite and label its all parts.**
   - Appeared in: **WIN 24 (Q4c, 07 marks)**
7. **Give the classification of Theodolite.**
   - Appeared in: **WIN 24 (Q4d, 03 marks)**
8. **Define : Line of collimation, Swinging, Face right observation, Face left Observation.**
   - Appeared in: **WIN 24 (Q4e, 04 marks)**
9. **Write Bowditch rule. / Write short note on: Bowditch's rule.**
   - Appeared in: **WIN 22 (Q5a, 03 marks)**, **SUM 23 (Q5c, Part of 07 marks)**
10. **Define Latitude and Departure. / Write short note on: Latitude and Departure.**
    - Appeared in: **WIN 22 (Q4b, 04 marks)**, **SUM 23 (Q5c, Part of 07 marks)**
11. **The length and bearings of lines of a closed traverse ABCDA/ABCDEA are as under. Calculate latitude, departure and corrected consecutive coordinates of all points.**
    - Appeared in: **SUM 23 (Q4c, 07 marks)**, **4330601 (Summer 2025) (Q4c, 07 marks)**

Other Important Questions:

1. **Define: Telescope inverted, Vertical axis, Latitude.** (4330601 (Summer 2025) - Q4a, 03 marks)
2. **Define: Face right, Horizontal axis, transiting.** (4330601 (Summer 2025) - Q4a-OR, 03 marks)
3. **Define (i) Face left (ii)Transiting (iii)Horizontal axis.** (SUM 24 - Q4a, 03 marks)
4. **Define (i) Face right (ii)Vertical axis (iii)Swinging.** (SUM 24 - Q4a-OR, 03 marks)
5. **Explain sources of errors in theodolite traversing.** (WIN 22 - Q4b-OR, 04 marks)
6. **Write procedure to measure the bearing of a line using a theodolite.** (WIN 22 - Q5b-OR, 04 marks)
7. **Explain procedure to measure deflection angle with the theodolite.** (SUM 23 - Q5b-OR, 04 marks)
8. **Describe the procedure to measure the following using a theodolite . (i) Vertical angle (ii)Deflection angle.** (SUM 24 - Q4c-OR, 07 marks)
9. **Explain transit vernier theodolite with sketch.** (SUM 23 - Q5c, 07 marks)
10. **Write short note on: "Gale's table".** (WIN 22 - Q4c, 07 marks)
11. **Explain: Bowditch rule and Transit rule.** (4330601 (Summer 2025) - Q5c-OR(2), Part of 07 marks)

12. **For following closed traverse, calculate corrected latitudes and departures by Transit Rule / Bowditch Rule.** (SUM 24 - Q3c, 07 marks)
13. **The co-ordinate of two points A and B are as follows. Find length and bearing of line AB. Point A: N 345.50, E 210.40; Point B: N 150.40, E 480.30** (4330601 (Summer 2025) - Q4c-OR(1), Part of 07 marks)
14. **In a closed traverse ABCDA corrected consecutive co-ordinates are as follows. Assuming independent co-ordinate of station A as +250 and +150, calculate independent co-ordinates of other stations. Line AB: Lat +140, Dep +185; BC: Lat -160, Dep +125; CD: Lat -125, Dep -180; DA: Lat +145, Dep -130** (4330601 (Summer 2025) - Q4c-OR(2), Part of 07 marks)

Unit 6 - Trigonometric Survey

Repeated Questions:

1. **Define trigonometric leveling and describe it. / Write a short note on: Trigonometric levelling.**
   - Appeared in: **WIN 23 (Q5a-OR, Part of 07 marks)**, **WIN 24 (Q4b, 04 marks)**
2. **Derive the formula in trigonometric leveling when base of the object is inaccessible, instrument station and object are in the same vertical plane and instrument axes are at same level.**
   - Appeared in: **WIN 23 (Q5a, Part of 07 marks)**, **SUM 23 (Q2c, 07 marks)**
3. **Derive an equation for horizontal distance and height when base of Object is accessible in trigonometric leveling.**
   - Appeared in: **4330601 (Summer 2025) (Q5a, 03 marks)**
4. **Derive the formula to determine the height of object when object is not accessible and instrument stations and object are in same vertical plane.**
   - Appeared in: **WIN 22 (Q5c-OR, 07 marks)**
5. **In trigonometrical leveling following readings were taken. Find out R.L. on top of the tower...**
   - Appeared in: **WIN 22 (Q5c, 07 marks)**, **SUM 23 (Q2c-OR, 07 marks)**, **SUM 24 (Q5b-OR, 04 marks)**, **4330601 (Summer 2025) (Q5b, 04 marks)**

Other Important Questions:

1. **Explain direct method in trigonometric leveling.** (WIN 23 - Q5a-OR, Part of 07 marks)
2. **Explain direct method of observation of trigonometric surveying.** (4330601 (Summer 2025) - Q5a-OR, 03 marks)
3. **A theodolite is placed 100 m distance from tower. Readings for vertical top angle is 15° and bottom angle is 2°. Calculate height of tower.** (WIN 23 - Q5a, 03 marks)
4. **In trigonometric levelling, if base of an object is not accessible and both instrument axes are at different levels, derive equation for finding RL of top of the object. It is given that the instrument axis of the instrument station nearer to the object is lower than the instrument axis of the farther instrument station.** (SUM 24 - Q5b, 04 marks)
5. **Following reading were taken to find out R.L. of top of a tower.** (4330601 (Summer 2025) - Q5b-OR, Part of 07 marks)

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