6 CHARTER

Plane Table Surveying

Q.1 The process of determining the location of the instrument station by drawing resectors from the locations of the known stations is called
(a) radiation (b) intersection
(c) resection (d) traversing

Q.2 The methods used for locating the plane table stations are
1. radiation 2. traversing
3. intersection 4. resection
The correct answer is
(a) 1 and 2 (b) 3 and 4
(c) 2 and 4 (d) 1 and 3

Q.3 The fix of a plane table from three known points is good if
(a) the middle station is the nearest
(b) the middle station is father than the other two stations
(c) either of the extreme stations is the nearest
(d) the middle station is close to the great circular

Q.4 The instrument which is used in plane tabling for obtaining horizontal and vertical distances directly without resorting to chaining, is known as
(a) plane alidade
(b) telescopic alidade
(c) clinometer
(d) tachometer

Q.5 One of the Lehmann's rules of plane tabling, is
(a) location of the instrument station is always distant from each of the three rays from the known points in proportion to their distances
(b) when looking in the direction of each of the given points, the instrument station will be on the right side of one and left side of the other ray
(c) when the instrument station is outside the circumscribing circle its location is always on the opposite side of the ray to the most distant point as the intersection of the other two rays
(d) none of these

Q.6 For orientation of a plane table with three points *A*, *B* and *C*, Bessel's drill is
(a) Align *b* through *a* and draw *a* ray towards *c*, align *a* through *b* and draw *a* ray towards *c*, finally align c through the point of intersection of the previously drawn rays
(b) Align *c* through *a* and draw *a* ray towards *b*, align *a* through *c* and draw *a* ray towards *b*, finally align *b* through the point of intersection of the previously drawn rays
(c) Align *c* through *b* and draw *a* ray towards *a*, align *b* through *c* and draw *a* ray towards *a*, finally align *a*, through the point of intersection of the previously, drawn rays
(d) In the first two steps any two of the points may be used and a ray drawn towards the third point, which is sighted through the point of intersection of previously drawn rays in the final step

Q.7 Orientation of a plane table by solving two point problem is only adopted when
(a) Saving of time is a main factor
(b) better accuracy is a main factor
(c) given points are inaccessible
(d) none of these

Q.8 Match List-I (Statement) with List-II (Situation) and select the correct answer using the codes given below the lists:
List-I
A. Accurate centering in plane table surveying is necessary for
B. Exact orientation is more important than accurate centering for
C. The intersection method of plane table surveying is particularly useful for
D. Plane table survey is useful for
List-II
1. Inaccessible points
2. Open country with good intervisibility
3. Large scale maps
4. Small scale maps
5. Hilly regions
Codes:

	A	B	C	D
(a)	3	4	1	2
(b)	4	3	2	5
(c)	5	4	3	1
(d)	3	1	4	2

Q.9 Consider the following statements regarding plane table surveying
1. It is less accurate than chain surveying
2. It is not necessary to do accurate centering of plane table for small scale surveys
3. Compass rule may be made use of for adjusting the plane table traverse
4. From the instrument station, resectors are drawn to plot the position of objects in the field
Which of these statements are correct?
(a) 1, 2 and 4 (b) 2, 3 and 4
(c) 1, 2 and 3 (d) 1, 3 and 4

Q.10 Consider the following steps:
1. Using Lehmann's rule, an improved position of station point is obtained
2. Procedure is repeated till the triangle of error is reduced to a point
3. 'Triangle of error' is obtained
4. The plane table is levelled over the station point
5. Three resection lines are drawn from three well-defined station points
The correct sequence of the "Lehmann's procedure" for solving the "three point problem" is
(a) 4, 5, 3, 1, 2 (b) 1, 2, 4, 3, 5
(c) 5, 4, 2, 3, 1 (d) 4, 1, 3, 2, 5

Q.11 Match List-I with List-II and select the correct answer using the codes given below the lists:
List-I
A. To fix the centre line of piers and abutments of long bridges
B. For preparation of small-scale map
C. The three sides of the triangles are measured
List-II
1. Plane Table survey
2. Triangulation survey
3. Trilateration survey
Codes:

	A	B	C
(a)	3	1	2
(b)	2	3	1
(c)	2	1	3
(d)	3	2	1

Q.12 For locating an inaccessible point with the help of only a plane table, one should use
(a) traversing (b) resection
(c) radiation (d) intersection

Q.13 Three point problem can be solved by
(a) Tracing paper method
(b) Bessel's method
(c) Lehman's method
(d) All of these

Q.14 Consider the following statements pertaining to plane table survey
1. Two point problem is solved by mechanical method
2. Three point problem is solved by Bessel's method
3. In two point problem, auxiliary station is required
Which of these statements is/are correct?
(a) 1 and 2 (b) 1 and 3
(c) 2 and 3 (d) 1, 2 and 3

Q.15 The method of orienting a plane table with two inaccessible points is known as
(a) intersection
(b) resection
(c) back sighting
(d) two-point problem

Q.16 Match List-I (Methods) with List-II (Procedures) and select the correct answer using the codes given below the lists:

List-I

A. Traversing
B. Resection
C. Intersection
D. Radiation

List-II

1. Rays are drawn to locate the station on which the table is set-up
2. At least two rays are drawn from two different stations to the details to be located
3. Rays are drawn in the direction of details through the station point on which the table is set-up
4. Rays are drawn on the map by setting up the table over each of the stations towards the subsequent station

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	2	1	4	3
(c)	4	1	2	3
(d)	2	3	4	1

Q.17 The rejected position of plane-table station from three known position is unreliable if the station lies
(a) with in the great triangle
(b) on circumference of circumscribing circle
(c) outside the great triangle
(d) in the centre of the circumscribing circle

Q.18 Which of the following methods of plane tabling is also known as "graphic triangulation"
(a) Intersection (b) Resection
(c) Traversing (d) Radiation

Q.19 The quick and most accurate method to solve three point problem in resection type of plane tabling is
(a) Mechanical Method
(b) Bosel's Graphical Method
(c) Lehmann's trial and error method
(d) Tracing paper Method

Q.20 The 'fix' of a plane table with three known points is good if the instrument station lies
(a) with in the great triangle
(b) on the circumference of the circumscribing circle
(c) outside the grate circle
(d) outside the great triangle but within the great circle

Q.21 In Plane Table surveying, the operation which must be carried out is
(a) Resection (b) Orientation
(c) Intersection (d) Radiation

Q.22 The method of plane tabling commonly used for establishing the instrument station is
(a) radiation method (b) intersection method
(c) resection method (d) traversing method

Q.23 The accuracy with which the instrument station can be established in plane table survey is known as the
(a) strength of accuracy
(b) strength of solution
(c) strength of fix
(d) None of these

Q.24 Which method would you apply for locating inaccessible points?
(a) Method of radiation
(b) Method of intersection
(c) Both (a) and (b)
(d) None of these

Q.25 In a plane table surveying, three point problem cannot be solved if the plane table is
(a) outside the great circle
(b) on the circumference of the great circle
(c) within the great circle
(d) within the great triangle

Q.26 Offsets are measured with an accuracy of 1 in 40. If the point on the paper from both sources of error (due to angular and measurement errors) is not to exceed 0.05 cm on a scale of 1 km = 20 m, the maximum length of offset should be limited to
(a) 14.14 (b) 200 m
(c) 28.28 m (d) None of these

Q.27 The sensitiveness of a level tube decreases if
(a) radius of curvature of its inner surface is increased
(b) diameter of the tube is increased
(c) length of the vapour bubble is increased
(d) both viscosity and surface tension are increased

Q.28 The desired sensitivity of a bubble tube with 2 mm divisions is 30". The radius of the bubble tube should be
(a) 13.75 m (b) 1375 m
(c) 3.44 m (d) None of these

Q.29 Orientation of a plane table by solving two point problem is only adopted when
(a) saving of time is a main factor
(b) better accuracy is a main factor
(c) given points are inaccessible
(d) None of the above

Q.30 The operation of resection involves the following steps.
1. Rough orientation of the plane table
2. The three lines form a triangle of error
3. Drawing lines back through the free control points
4. Select a point is the triangle of error such that each ray is equally rotated either clockwise or anticlockwise
5. The points obtained by three rays is the correct location.

The correct sequence is
(a) 1, 3, 2, 4, 5 (b) 1, 2, 3, 4, 5
(c) 1, 4, 3, 2, 5 (d) 1, 3, 2, 4, 5

Q.31 For high sensitivity of the bubble tube
(a) a liquid of low viscosity is used
(b) a liquid of low surface tension is used
(c) the bubble space should be long
(d) All of the above

Q.32 Match List-I and List-II and select the correct answer.

List-I

A. Pentagraph
B. Eidograph
C. Tellurometer
D. Clinometer

List-II

1. Angle measuring instrument
2. Microwave instrument
3. Plan enlarging instrument
4. Plan reproducing/reducing instrument

Codes:

	A	B	C	D
(a)	3	4	1	2
(b)	3	4	2	1
(c)	1	2	4	3
(d)	1	2	3	4

Q.33 Which of following survey methodology makes use of instrument 'Alidade'?
(a) Reconnaissance survey
(b) Contour survey
(c) Trigonometry survey
(d) Plane table survey

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Answers Plane Table Surveying

1. (c)	2. (c)	3. (a)	4. (b)	5. (a)	6. (d)	7. (c)	8. (a)	9. (b)	10. (a)
11. (c)	12. (d)	13. (d)	14. (c)	15. (d)	16. (c)	17. (b)	18. (a)	19. (c)	20. (b)
21. (b)	22. (c)	23. (c)	24. (b)	25. (b)	26. (c)	27. (d)	28. (a)	29. (c)	30. (a)
31. (d)	32. (b)	33. (d)							

Explanations Plane Table Surveying

12. (d)
(i) Radiation method is suitable only when the area to be surveyed is small and all the stations are visible and accessible from the instrument station.
(ii) Traversing is most suited when a narrow strip of terrain is to be surveyed e.g. survey of roads, railway etc.
(iii) Intersection method is preferred when the distance between stations is large or the stations are inaccessible or the ground is undulating.
(iv) Resection is used when some important details can be plotted easily by choosing any station other than the triangulation station.

21. (b)
Three must carried out operations are:
1. Fixing the plane table to tripod
2. Setting, levelling, centering and orientation
3. Observations
Hence option (b) is correct.

22. (c)
Resection is the process of determining the plotted position of the station occupied by the plane table, by means of sights taken towards known points, locations of which have been plotted.

26. (c)

$$L = S \times r \times \frac{\text{Error}}{1.414}$$

$$= 20 \times 40 \times \frac{0.05}{1.414} = 28.28 \text{ m}$$

28. (a)

$$\text{Sensitivity} = \frac{[L \times 206265]}{R}$$

$$\Rightarrow \quad R = \frac{\left[2 \times 10^{-3} \times 206265\right]}{30} = 13.75 \text{ m}$$

32. (b)
Pentagraph and Eidograph are both used for enlarging, reproducing and reducing the plans. Telurometer is optical distance measurement instrument.

33. (d)
Alidade is a sighting device for determining directions or measuring angles in plane table survey.

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