



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : CE-302

SURVEYING

Time Allotted: 3 Hours

Full Marks: 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Group – A

(Multiple Choice Type Questions)

- 1. Choose the correct alternatives for any ten of the following:** **1×10=10**
- (i) The process of determining the location of the station (on the map) occupied by the plane table is known as <http://www.makaut.com>
- (a) intersection (b) three point problem
(c) traversing (d) resection
- (ii) In a closed traverse with five sides, the error found from the fore bearing and back bearing of the last line is $+2^\circ$, the correction to the third line will be
- (a) $0^\circ 24'$ (b) $0^\circ 48'$
(c) $0^\circ 12'$ (d) $1^\circ 36'$
- (iii) The multiplication constant for the tacheometer is
- (a) f/i (b) i/f
(c) f/d (d) $f + d$
- (iv) At the equator the dip of the needle is
- (a) 0° (b) 90°
(c) 45° (d) 180°
- (v) The face left position is also called <http://www.makaut.com>
- (a) telescope upward (b) telescope downward
(c) telescope normal (d) telescope inverted

- (vi) The radius of a one-degree curve is
(a) 1719 m (b) 1760 m
(c) 2000 m (d) 2719 m
- (vii) The stadia diaphragm is provided for measuring <http://www.makaut.com>
(a) elevation (b) reduced bearing
(c) horizontal distance (d) WCB
- (viii) A theodolite in which the telescope can be revolved through a complete revolution in a vertical plane is known as a
(a) transit theodolite (b) non-transit theodolite
(c) tilting theodolite (d) moving theodolite
- (ix) Working edge of an alidade is known as
(a) fiducial edge (b) bevelled edge
(c) parallel edge (d) graduated edge
- (x) The principle of chain surveying is
(a) traversing (b) triangulation
(c) parallelism (d) None of these
- (xi) Which of the following marks the end of a chain line?
(a) Arrow (b) Peg
(c) Ranging rod (d) Cross staff
- (xii) When higher values are inside the loop, it indicates
(a) hill (b) pond
(c) sloping ground (d) depression

Group – B

(Short Answer Type Questions)

Answer any three of the following.

5×3=15

2. What is orientation? Describe any one method of orientation. <http://www.makaut.com>
3. The fore and back bearing of a line AB were observed to be N48°45'E and S58°12'E. If the magnetic declination at the place is known to be 1°55'W, find the true bearing of the lines in whole circle bearing system.

4. Mention the distance formulae for finding distances using a theodolite for a horizontal line of sight? Find the stadia constants K and C from the following data where the line of sight was horizontal in both cases:

Instrument at	Observation to	Distance	Staff readings
O	A	70 m	1.454, 1.623, 1.789
O	B	150 m	1.272, 1.735, 2.157

5. A 30 m chain was tested before the commencement of the day's work and found to be correct. After chaining 940 m the chain was found to be 0.07 m too long. At the end of day's work, after chaining a total distance of 1376 m the chain was found to be 0.12 m too long. What was the true distance chained?
6. The following perpendicular offsets were taken from a chain line to an irregular boundary:

Chainage (m)	0	10	20	30	40	50	60
Offset (m)	3.1	3.7	5.1	5.65	6.2	6.35	7.10

Find the area by Trapezoidal method and Simpson's Method. <http://www.makaut.com>

Group – C

(Long Answer Type Questions)

Answer any three of the following.

15×3=45

7. (a) The following are the bearings taken on a closed compass traverse. Compute the internal angles and correct them for observational errors. Also find out the corrected bearings of the lines applying the correction for local attraction:

Line	F.B.	B.B.
AB	80°10'	259°00'
BC	120°20'	301°50'
CD	170°50'	350°30'
DE	230°10'	49°30'
EA	310°20'	130°15'

- (b) What is 'closing error' in a traverse? Explain the Bowditch's rule to eliminate closing error in a traverse with proper diagram. <http://www.makaut.com>

10+5=15

8. (a) Briefly mention the fundamental adjustments of a theodolite.
- (b) In a tacheometric survey the following observations were taken where the staff was held vertically upon the point and the instrument is fitted with an analytical lens and the constant of the instrument being 100. Compute the RL of Q and the distance between P and Q:

Instrument Station	Height of Instrument	Staff Station	Vertical Angle	Staff readings (m)	Remark
A	1.45	BM	$-4^{\circ}20'$	1.315, 1.775, 2.225	RL of BM = 220 m
B	1.45	P	$6^{\circ}30'$	0.865, 1.680, 2.350	
Q	1.40	P	$-7^{\circ}24'$	1.615, 2.335, 2.715	

5+10=15

9. (a) Derive the relation between radius and degree of curve? <http://www.makaut.com>
- (b) A two lane pavement on a National Highway has a curve of radius 235 m, where two tangents intersect at a chainage of 1.350 m. The angle of intersection is 160° and peg intervals were taken as 20 m. Calculate all the necessary data for setting out the curve by preparing a setting out table when the least count of the vernier is $20''$.

5+10=15

10. Write short notes for the followings (*any five*):

3×5=15

- (a) Well conditioned triangle
- (b) Local attraction
- (c) Plane and geodetic survey
- (d) Contour interval
- (e) Latitude and departure
- (f) Errors in tacheometry
- (g) Transition curve <http://www.makaut.com>

11. (a) The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings: 2.225, 1.605, 0.995, 2.090, 2.865, 1.265, 0.600, 1.985, 1.045, 2.685 m. Enter the above readings in a page of level book and calculate the reduced levels of all the points if the first reading was taken with a staff held on benchmark of 135.75 m.

- (b) What do you mean by face left and face right observation? Why both the observations are required?

10+(2+3)=15