

B.E. (Civil Engineering) Sixth Semester (C.B.S.)

Surveying-II

P. Pages : 3

NRT/KS/19/3460

Time : Three Hours



Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Use of non programmable calculator is permitted.

1. a) Explain the theory of stadia tacheometry. 5

b) The following observations were taken using a tacheometer fitted with an anallactic lens, the staff being held vertically. 8

Inst. station	Height of axis	Staff station	Vertical angle	Hair Reading	Remark
P	1.45	BM	-6°12'	0.98, 1.54, 2.10	RL. of BM = 350.0 m
P	1.45	Q	+7°5'	0.83, 1.36, 1.89	
Q	1.57	R	+12°21'	1.89, 2.48, 3.07	

Determine the distance PQ & QR and R.Ls of P, Q and R

OR

2. a) Derive the distance and elevation formulae for line of sight inclined but staff normal to it, when the line of collimation is inclined upward. 5

b) Two points A and B are on opposite sides of summit. The tacheometer was set up at P on top of summit, and the following readings were taken. 8

Inst. Station	Height of Inst.	Staff Station	Vertical angle	Hair Reading	Remark
P	1.500	A	-8° 30'	1.150, 2.050, 2.950	R. L of P = 350.0 m
P	1.500	B	-10° 30'	0.855, 1.605, 2.355	

The tacheometer is fitted with an Anallactic lens, the multiplying constant being 100.

The staff was held normal to the line of sight.

Find:

- a) The distance between A and B.
- b) The gradients of lines PA and PB.

3. a) Explain Rankine's method for setting a simple circular curve. 5

b) Two tangents AB and BC intersect at B. Another line DE intersects AB and BC at D and E such that $\angle ADE = 160^\circ$ and $\angle DEC = 130^\circ$. The radius of first curve is 300m and that of the second is 250m. The chainage of B is 1250m. Calculate all data necessary for setting out the compound curve. 8

OR

4. a) Calculate the R.L. of the various station pegs on a vertical curve connecting two grades of + 0.7% and - 0.7%. The chainage and the R.L. of intersection point are 850m and 225.50m respectively. The rate of change of grade is 0.1% per 30 m. **6**
- b) A reverse curve is to be set out to connect two parallel railway lines 50 m apart. The distance between the tangent points is 200m. both the arcs have the same radius. The curve is to be set out by the method of ordinates from long chord, taking a peg interval of 10m calculate the necessary data for setting the curve. **7**
5. a) Define transition curve. What are the requirement of ideal transition curve? **6**
- b) A road bend which deflects 60° is to be designed for a maximum speed of 110 km/hr, a maximum centrifugal ration of $\frac{1}{4}$ and max. rate of change of acceleration of 30 cm/sec^3 , the curve consisting of a circular arc combined with two cubic spiral. Calculate:
i) Radius of circular arc
ii) The requisite length of transition curve.
iii) Total length of composite curve.
iv) The chainage of the beginning and the end of the transition curve, and of the junctions of the transition curves with the circular arc if the chainage of the P.I. is 5325.0 m. **8**

OR

6. a) What are the various types of transition curve? Explain. **6**
- b) Two straights having total deflection angle $70^\circ 30'$ are connected with circular curve of radius 1500m. It is required to introduce a curve of length 130 m at the beginning and end of the circular curve without altering the total length of the route. The transition curve to be inserted is a cubic spiral, and the chainage of the point of intersection is 6250m. Calculate
i) The distance between the new and the previous tangent point.
ii) The setting out data for transition curve taking peg interval 20m. and
iii) The data for locating the mid point of the new circular curve from the point of intersection. **8**
7. a) State and explain laws of weights. **4**
- b) The altitudes of two proposed stations A and B 120 km apart are respectively 218 m and 1230m. The altitude of the two points C and D on a profile between them are 303 m and 628m respectively. The distance AC = 60 km and AD = 100 km. Determine A & B are indivisible and if necessary find the minimum height of scaffolding at 'B' assuming A as the ground station such that the new line of sight clear the peak by 3.5 M. **9**

OR

8. a) Determine most probable values of the angle A, B, C, D from following data 8
A = $87^{\circ}34'22''$ Wt 2
B = $98^{\circ}42'18''$ Wt 3
C = $102^{\circ}26'9''$ Wt 4
D = $71^{\circ}17'4''$ Wt 1
A+B+C+D = 360°

b) Explain satellite station and reduction to center? 5

9. a) Define relief displacement and derive the equation. 7

b) The scale of the photograph is 1cm = 100m 7
The photograph is 20cm x 20cm. Determine the number of photographs required to cover an area of 180 sq. Km. If the longitudinal overlap is 65% and side overlap is 35%

OR

10. a) In a pair of overlapping vertical photographs the mean distance between two principle points both of which lie on the datum is 6.375 cm. At the time of photographs. the air. craft was 600m above the datum. The camera has a focal length of 150mm. In the common overlap, a tall chimney 120 m high with its base in the datum surface is observed. Determine difference of parallax for the top and bottom of chimney. 7

b) State and explain principle of terrestrial photogrammetry. 7

11. a) Write a short note on EDM. 7

b) Explain GIS and it's components. 6

OR

12. a) What is Raster model. State it's advantages and disadvantages. 7

b) Explain Napier's rule of circular parts. 6
