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

Surveying – II

P. Pages : 3 | KNT/KW/16/7376

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. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) What is the principle of Tacheometry? Describe method of determining the constants of Tacheometer from field measurement. **6**

b) A tacheometer is setup at an intermediate point a traverse course PQ and following observations are made by vertically held staff. **7**

Staff Stn	Vertical Angle	Staff intercept	Axial hair Reading
P	+9º30'	2.250 m	2.105 m
Q	+6º00'	2.055 m	1.875 m

The instrument is fitted with an analytic lens and the multiplying constant is 100. Compute the length PQ and reduced level of Q. RL of P is 350.50 m.

OR

2. a) Derive the expression for horizontal and vertical distances by the tangential method when both angles measured are those depression. **5**

b) In a Tacheometric survey made with staff normal to the line of sight and the constants are 100 and 1.0 Two sets of reading to staff station A and B are as follows. **8**

Inst. Stn.	Height of Instrument	Staff Stn.	Azimuth	Vertical Angle	Staff Reading
P	1.80 m	A	45º	+6º 0'	1.0, 1.850, 2.500
P	1.80 m	B	130º	+6º 30'	1.0, 1.900, 3.100

If the reduced level P is 325.50 m. Calculate.

i) The horizontal distance AB,

ii) Gradient between A & B.

iii) Reduced Level of A & B.

3. a) Define vertical curve. What are its various types? Derive the expression for its Various elements. **7**

b) A Reverse curve is to be set out between two parallel tangents 30 m apart. The line Joining the two tangent points is 300 m. apart. The two arc of the curve have same radius. Calculate the necessary data to set the curve of the field by offset from Long chord at the interval of 20 m. from common tangent point. **7**

OR

4 a) Define tangential angle and deflection angle. Derive the equation $S = \frac{1718.9C}{R}$ where S, C and R arc tangential angle. chord length and radius of circular curve respectively. **6**

b) A parabolic vertical curve is to be set out connecting two uniform level grades of + 0.8% and – 0.9%. The chainage and reduced level of point of intersection are 1664 meter and 238.55 meter respectively. The rate of change of grade is 0.05% per chain of 20 m. Calculate the reduced levels of the various station pegs. **8**

5. a) A composite curve is to be set out with the following data. Deflection angle = 60° **8**
maximum speed of vehicle = 80 km/hr
centrifugal ratio = 1/8, Rate of change of
radial acceleration = 0.3 m/sec^3
chainage of intersection point = 1150 m.
Calculate
1) Radius of circular curve.
2) Length of transition curve.
3) Chainage of tangent point and junction of transition curve with circular curve.
4) Total Length of the composite curve.

b) Derive an expression for shift of transition curve. **5**

OR

6. a) State the different methods of calculating the length of transition curve. **5**

b) Two straights AB and BC intersect at chainage 1530.685 m. the total deflection angle 33°08'. It is proposed to insert a circular curve of 1000 m. radius and transition curve for a rate of change of radial acceleration of 0.3 m/s^3 and velocity of 108 km/hr. Determine setting out data using theodolite and tape for the transition curve at 15 m interval and the circular curve at 30 m interval. **8**

7. a) What is phase correction? Derive the expression to find the phase correction when line of sight is towards the bright portion of signal? **7**

b) The following are mean values observed in the measurement of three angles. **7**
α, β & γ at one station.
$\alpha = 76^\circ 42' 46.2''$ with weight 4
$\alpha + \beta = 134^\circ 36' 32.6''$ with weight 3
$\beta + \gamma = 185^\circ 35' 24.8''$ with weight 3
$\alpha + \beta + \gamma = 262^\circ 18' 10.4''$ with weight 1
Calculate the most probable value of each angle.

OR

8. a) The altitude of two proposed station A and B 130 km apart are respectively 220 m and 1160 m. The altitude of the two point C and D on a profile between them are respectively 308 m and 632 m. The distance AC = 50 km and AD = 90 km.
Determine wheather A and B are intervisible and if necessary find the minimum height of scaffolding at B. Assuming A as the ground station such that new line of sight clears the peak by 3 m . **8**

b) Enlist and describe brief the various corrections to be applied to the baseline measurement with formulae. **6**

9. a) Derive the expression for relief displacement in vertical photogrammetry with figure. **6**

b) The scale of an aerial photograph is 1 cm = 100 m. The photograph size 20 cm x 20 cm. Determine the number of photographs required to cover an area of 100 sq. km. If the longitudinal lap is 60 % and side lap is 30 %. **7**

OR

10. a) Obtain an expression for the number of photograph required for a given area of length and width for such a survey. **5**

b) Two points A and B having elevation of 650 m. and 350 m. respectively above datum appear on the vertical photograph having focal length of 20 and flying altitude of 2500 m. above datum. Their corrected photographic Co-ordinates are as follows. Determine the length of the ground line AB. **8**

Point	Photograph x cm	Co-ordinates Y cm
A	+2.65	+1.36
B	-1.92	+3.65

11 a) Explain in brief about GIS and its application. **7**

b) Write a note on Napier's rules of circular parts. **6**

OR

12. a) Explain the process of energy interaction in the atmosphere in remote sensing. **7**

b) Explain the various Co-ordinate systems used in astronomy. **6**

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