Question Paper

Exam Date & Time: 01-Dec-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. ENGG. END SEMESTER EXAMINATION - NOV./ DEC. 2018
Surveying [CE 246]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) List and explain the applications of contour maps. (10)

A)

B) Two strights intersect at a chainage of 567m. The angle of intersection being 168^{o}. it is proposed to introduce a circular curve of radius of 300m. calculate all the data necessary to set out a curve by Rankine's method using 10m chain and tabulate with check. (10)

2) What is surveying? What are the principles of surveying? With neat sketch explain level surface and level line. (10)

A)

B) Define the following terminologies w.r.t levelling. (10)
a) MSL, b) BM, c) BS, d) Station e) Datum.

3) The following observations were taken in reciprocal levelling : (10)

A)

Instrument at	Staff reading on		Remark
	A	B	
A	1.545	2.565	Distance: AB=1500m
B	0.725	1.935	RL of A= 200m

Find True RL of B, the combined correction for curvature and refraction,

B) What is correction due to curvature and refraction in levelling? With neat sketch derive an expression for correction due to curvature and refraction. (10)

4) With neat sketch derive an expression for distance and elevation for horizontal line of sight and staff held vertical to the line of sight for movable hair method. (10)

A)

B) The stadia readings by means of movable hair instrument where staff held normal to the line of sight are 1.805, 2.330, and 2.855. The angle of elevation was $6^{o}12'$, the number of revolutions recorded was 15nos and the instrument constants are 1000 and 0.5. What would be the staff intercept and RL of staff station on a fixed hair instrument at the same station where staff held vertically on the same point, the vertical angle in this case being $6^{o}28'$ and instrument constants are 100 and 0.05, RL of line of collimation of instrument was 250.583m, HI=1.42m and r = 2.50m. (10)

5) The following observations were taken with dumpy level and four meter (10)

A) leveling staff. The sixth reading was taken on a bench mark whose RL is 10.045m. Prepare a page of level book and calculate RLs of all the points. The observations were taken at every 30m interval. Also find out the gradient between first and last point. Use H.I. method. Observations are: 0.385, 1.250, 1.675, 3.695, 0.125, 2.345, 3.245, 0.500, 1.785, and 2.535m.

B) Two straights AB and BC are intersected by a line D_1D_2. The angles BD_1D_2 and BD_2D_1 are $40^o30'$ and $36^o24'$ respectively. The radius of the first arc is 800 metres and that of the second arc is 600 metres. If the chainage of intersection point B is 8200 metres, find the chainages of tangent points and the point of compound curvature. (10)

6) Tangential angle of a non-parallel straights Δ_1 and Δ_2 and length of common tangent (T_1T_2) are given. Find out the common radius R and central angle if $R=R_1=R_2$. (10)

A)

B) The center line of a new railway is to be set out along a valley the first straight AI bears 75^o, while the connecting straight IB bears 120^o. Due to site condition it has been decided to Join the straights with a compound curve.The first curve of 500m radius commences at T1, situated 300m from I on straight AI, and deflects through an angle of 25^o before joining the second curve. Calculate the radius of the second curve and the distance of tangent point T2 from I on the straight IB (10)

7) Two sets of reading were taken in tangential method. The readings were taken from instrument station P to staff station A & B are shown below (10)

A)

Instrument station	Staff station	Vertical angles		Staff intercept (s) in m	"r" in m [lower hair reading above the ground]
		Θ1	Θ2		
P	A	5°	2°48'	2	1
	B	1°12'	-1°30'	2	0.45

The RL of line of collimation of instrument station is200.00m and Distance between A and B is 152.8m. Find the gradient between staff stations A and B.

B) With neat sketch explain elements of simple circular curve. (10)

8) A compound curve, consisting of two simple circular curve of radii 350m and 500m, Is to be laid out between two straights. The angle of intersection between the tangents of two straights are 55^o and 25^o calculate the various elements of compound curve. (10)

A)

B) What is plainimeter? And write a short note on Computing distance from the phase difference method in EDM. (10)

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