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Fourth Semester B.E. Degree Examination, June-July 2009
Surveying – II

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions selecting at least TWO questions from each part.

2. Missing data, if any, may be suitably assumed.

PART – A

- 1 a. Differentiate between the following terms
 i) Face left and face right observations
 ii) Pinging and swinging the telescope
 iii) Clamp screw and tangent screw. (06 Marks)
- b. Explain the measurement of a horizontal angle by repetition method. Mention the errors eliminated by this method. (10 Marks)
- c. Explain the method of prolonging a straight line when the instrument is in poor adjustment. (04 Marks)
- 2 a. What are the permanent adjustments of a theodolite? Explain the spire test. (10 Marks)
- b. The following observations were taken during the testing of dumpy level.

	Instrument at		Staff readings at	
	A	B	A	B
A	1.275	2.005		
	1.040	1.660		

Is the instrument in adjustment? To what reading should the line of sight be adjusted, when the instrument is at B? (10 Marks)

- 3 a. Derive the expressions for the horizontal distance, vertical distance and the elevation of an elevated object by double plane method, when the base is inaccessible. (08 Marks)
- b. What are the applications of Total station? (02 Marks)
- c. The following observations were made on a hill top to ascertain its elevation. The height of the target F was 5m. The instrument stations were 100m apart and were in line with F.

(10 Marks)

Instrument station	Staff readings on B.M	Vertical angle	R.L of B.M (m)
A	2.550m	18°6'	345.580
B	1.670m	28°42'	

- 4 a. What is tacheometry? What are different systems of tacheometric measurements? (04 Marks)
- b. A subtense theodolite was used to determine the horizontal distance of a point from the instrument station. The micrometer readings of the drum of the diaphragm were respectively 3.425 and 3.930, when the staff intercept was 3m. The micrometer screw has 100 threads for 10mm. The focal length of the object glass was 225mm. The distance of the instrument axis from the centre of the object glass was measured as 200mm. (06 Marks)
- c. Determine the gradient from a point P to another point Q from the following observations made with a tacheometer fitted with an anallaetic lens. The constant of the instrument was 100 and the staff was held vertical. (10 Marks)

Instrument station	Staff station	Bearing	Vertical angle	Staff readings
R	P	150°	+10°32'	1.255, 1.810 2.365
	Q	240°	+5°06'	1.300, 2.120 2.940

PART – B

- 5 a. Differentiate between the following
 i) Mid – ordinate and apex distance
 ii) Point of curve and point of tangency. (04 Marks)
- b. Determine the ordinates of the points on a circular curve having a long chord of 100m and a versed sine of 5m. The ordinates are to be measured from the long chord at an interval of 10m. (06Marks)
- c. Two straight lines having a deflection angle of $25^{\circ}12'$ are to be connected by a circular curve of radius 500m. If the chainage of the intersection point is 1000.0m Calculate the data for setting out curve by Rankine's deflection angle method. Take the normal chord as 20m. (10 Marks)
- 6 a. The following data refer to a right hand compound curve
 i) Total deflection angle = 80°
 ii) Radius of the first arc = 200m
 iii) Radius of the second arc = 250m
 iv) Chainage of the point of intersection = 1504.80m
 v) Deflection angle of the first arc = 50°
 Determine the chainages of the starting, the point of compound curve and the point of tangency. (10 Marks)
- b. A reverse curve ACB is to be set out between two parallel straights 30m apart. The distance between two tangent points A and B is 120m. Find
 i) The radius R if $R_1 = R_2 = R$
 ii) The radius R_2 if $R_1 = 100m$.
 Also calculate the lengths of both the arcs of reverse curve. (10 Marks)
- 7 a. What is a transition curve? Explain the requirements of a transition curve. (06 Marks)
- b. A road bend which deflects 85° is to be designed for maximum speed of 80km per hour with a curve consisting of a circular arc combined with two cubic parabola. If the maximum centrifugal ratio is $1/4$ and the maximum rate of change of radial acceleration is $0.3m/s^3$. Calculate i) The radius of circular curve and ii) The length of the transition curve. (08 Marks)
- c. With neat sketches explain the types of vertical curves. (06 Marks)
- 8 a. What is zero circle of a planimeter? Explain any one method of finding its area. (06 Marks)
- b. Determine the lengths of the tracing arm and the anchor arm from the following data.
 $M = 100cm^2$, Area of zero circle = $2200cm^2$, diameter of the roller = 2cm. The roller was placed beyond the hinge at a distance of 3cm. (06 Marks)
- c. The areas enclosed by various contours are given below

Contour (m)	100	105	110	115	120	125
Area (ha)	3	8	10	15	20	25

Determine the capacity of the reservoir, if the full reservoir level is 125.0m by both the prismoidal and trapezoidal rule. Ignore the volume below R.L 100.0m. (08 Marks)

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