B.E. Civil Engineering Fifth Semester **CE506 - Surveying-II**

P. Pages: 3

Time : Three Hours

* 1 2 6 4 *

GUG/W/18/1605

Max. Marks: 80

Notes : 1. All questions carry equal marks.

- 2. Due credit will be given to neatness and adequate dimensions.
- 3. Assume suitable data wherever necessary.
- 4. Illustrate your answers wherever necessary with the help of neat sketches.
- 1. a) Derive the distance and elevation formula for staff held normal when the line of collimation **6** is inclined upward.
 - b) To determine the distance between two point C and D and their elevations the following observations were taken upon a vertically held staff from two transverse station A and B the tacheometer was fitted with an anallactic lens the constant of Instrument being 100.

Station	Height of Axis	Co-ordinate		Staff Station	Bearing	Vertical	Staff Reading
						Angle	
Α	1.45	218.3	164.7	C	296° 46°	+10° 19	0.765
							1.590
							2.425
В	1.52	518.2	207.6	D	48° 29°	-13° 21'	0.820
							1.840
							2.860

OR

- **2.** a) Differentiate between fixed hair method and movable hair method of tacheometry.
 - b) Derive the distance and elevation formula for staff normal when the line of collimation is 4 inclined downward.
 - b) The following is the data relative to observations made on a vertically held staft with techeometer fitted with an anallactic lens. The constant of instrument was 100.

Instrument	Hf of Axis	Staff	Vertical	WCB	Staff
Station		Stations	Angle		Reading
		А	-5° 30'		1.800
					2.210
Р	1.50				2.620
		В	+10° 30'		1.800
					2.100
					2.400

- 3. a) What is phase connection? Derive the expression to find the phase correction when line of 8 sight is toward the bright portion of signal.
 - b) Explain with neat sketch triangulation figure.

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- **4.** a) What is satellite station and reduction to center. Derive expression for reducing the angle **8** measured of satellite station at center.
 - b) The following are mean value observed in the measurement of three angles a, b and g at one station $\alpha = 76^{\circ} 42' 46'' \cdot 2$ with weight $4 \alpha + \beta = 134^{\circ} 36' 32 \cdot 6''$ with weight 3 $\beta + \gamma = 185^{\circ} 35' 34 \cdot 8''$ with weight $-2 \alpha + \beta + \gamma = 262^{\circ} 18' 10 \cdot 4''$ with weight (1). Calculate most probable value of each angle.
- a) Define the following.
 i) Transition curve
 ii) Spiral angle
 iii) Centrifugal ratio
 - b) Show that shift = $L^2/24R$ where L is length of transition curve and R is Radius of circular curve.
 - c) Two straight AB & BC intersect at chainage 1642.50m. The deflⁿ angle being 48° 24'. It is proposed to insert a circular curve of 300m radius. With 90m long cubic parabola transition curve at each end. The circular curve is to be set out with peg at 30m interval and transition curve with peg at 15m interval through chainage. Make all necessary calculation for setting out first three point on one side of cubic parabola and first three point on circular curve.

OR

- 6. a) What is simple curve? Explain with sketch the various notation used in connection with 6 circular curve derive the relationship.
 - b) Two straights AB and BC meet in an inaccessible point B and are to be connected by simple 10 curve of 600m radius. Two point P & Q were selected on AB and BC respectively and the following data was obtained $\angle APQ = 150^{\circ} \angle CQP = 160^{\circ} PQ = 150m$. Make necessary calculation for setting out the curve by the method of tangential angles given the chainage of P = 1600 meter take unit chord of 30m length.
- 7. a) Explain the different system of co-ordinate in the astronomy why is it essential to have all 8 of them together.
 - b) An observation was made on a star lying west of the meridian at a place in latitude of 40°
 20' 36" N to determine the azimuth of the survey line AB. The mean observed altitude was 42° 10' 24" and the clockwise horizontal angle from AB to the star was 108° 18' 48". The declination of the star was 24° 54' 35". Find the azimuth of the survey line AB.

OR

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- **8.** a) Write a short note on.
 - i) Napier Rule of Circular Parts.
 - ii) Altitude and Azimuth system.

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b) Define:

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- i) Zenith and Nadir.
- ii) Prime vertical.
- iii) Hour Angle.
- iv) Equatorial coordinates.
- 9. a) Obtain an expression for no of photograph required for a given area of length and width for such a survey.
 - b) A scale of an aerial photography is 1cm = 100m. The photograph size is 20cm × 20cm.
 8 Determine the no of photographs required to cover an area 10Km × 10Km if longitudinal lap is 60° and side lap 30%.

OR

- **10.** Write a short note on **any four.**
 - i) Photo Theodolite.
 - ii) Functional Element of GIS.
 - iii) Application of Remote Sensing.
 - iv) Sounding Methods.
 - v) Cartography.

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