Mid-West University

Examinations Management Office

End Semester Examinations 2081

Bachelor level/ B.E. Hydropower/ 4th Semester   Full Marks: 50

Time: 3 hours   Pass Marks: 25

Subject: Surveying II (HE442/HE207)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. a) Write the principle of tacheometry and derived the expression for horizontal and vertical distance formula when line of sight is inclined and staff held vertical.   [1+3]

   b) The following observation were taken from an anallactic lens fitted with a tachometer having instrument constant 100.

Inst. Station	Staff station	Zenithal Angle	Bearing	Staff readings(m)
P	A	65°25'40"	N40°25'W	1.90, 2.60, 3.30
	B	88°50'00"	N10°15'E	***, 2.105, ***

   Top and bottom readings at stations B could not be read due to obstacles, but the distance between P and B was measured as 195m. Find the gradient and bearing of line BA.   [6]

2. a) In a trigonometrical levelling a hill station P was sighted from two instrument stations A and B which were at very different level but with same line of sight to that of target and following information were noted;

Inst. Station	H.I(m)	Target	Zenithal angle		Distance
			FL	FR	
A	1.500	P	65°20'	295°40'	AB=155m
B	1.426	P	69°52'	290°10'	
A	1.500	B	102°30'	257°05'	

   Determine the R.L of P, If RL of B was 315.450m and vane height while sighting from A to B was 2.5m above foot of the vane.   [5]

   b) Define contour interval and contour gradient. Describe the methods of locating contour.   [1+4]

3. a) The coordinates of three stations A, B and C are given and a point O is set up in the respected field and observation were made. Calculate the coordinate of station.

Station	Easting	Northing	Angle
A	24078.31	29236.48	< BOA = 141°45'45"
B	26266.48	31493.20	< COB = 93°12'15"
C	28377.67	29661.04	< AOC = 123°03'00"

                    [6]

   b) Explain the importance of construction survey. Write the steps of setting out the bridge on ground.   [2+2]

4. a) Calculate the radius of an 877 m simple circular curve deflecting right if the bearings of its back tangent and long chord are 60°30' end 100°45' respectively. Also, layout the simple circular curve by Deflection angle method. Take Peg interval = 100m.   [5]

b) Two straights AB and BC intersect at the chainage 1400.00 meter, the deflection angle being 40°. It is proposed to insert a right-handed circular curve 400 meter radius with a cubic parabola of 90-meter length at each end. The circular curve is to be set out with pegs at 20-meter intervals and the transition curve with pegs at 10-meter intervals of through chainage.

   i. Find the chainage at the beginning and at the end of the combined curve and at the junctions of the transition curves with the circular arc.

   ii. Tangential angles for the first two points on the first transition curve.

   iii. Tangential angles for the first two points on the circular curve.   **[5]**

5. a) Describe the types of photogrammetry and its limitation. Derived the expression for relief displacement. Write the application of remote sensing?   **[3+2+1]**

  b) Sketch a diagram of a total station with their parts.

    [2+2]

The End