National Exams December 2015

04-Geom-A1, Surveying

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.

2. This is a CLOSED BOOK EXAM.
   Any non-communicating calculator is permitted.

3. FIVE (5) questions constitute a complete exam paper.
   The first five questions as they appear in the answer book will be marked.

1. Each question is of equal value.

04-Geom-A1 Surveying

Candidate Name: Signature:

Give answers to any five (5) of the following seven questions (100% total, 20 marks each).

1. The following table represents a differential leveling work. Prepare and complete the necessary filed notes in a table for this work and calculate the elevation of the point BM2 along with a page check.

Station	BS	HI	FS	Elevation (ft)
BM1	2.45			88.00
TP1	5.43		6.53	
TP2	3.18		4.91	
TP3	4.22		7.42	
BM2			6.11	

2. Draw sketches to describe the single-differencing, double-differencing, and triple differencing in GPS surveys. Explain the principle of each differencing method.

3. Given that the radius of a highway circular curve is 900 m, the angle between the back and forward tangents is 14°45', and the station of the point of intersection is 1+948.800 m, use the arc definition to compute (1) the length of the curve and the tangent distance, (2) the external distance and middle ordinate for this curve and the long chord, and (3) the stations of the point of curvature and the point of tangency.

4. A -3.00% grade meets a +5.00% grade at station 62+00, where the elevation is 600.60ft. An equal-tangent parabolic curve 800 ft long has been selected to join the two tangents. Determine (1) the station and elevation of the beginning of vertical curve, (2) the station and elevation of the end of vertical curve, and (c) the elevation of the first full station on the curve.

5. Determine (1) departures and latitudes, (2) the error of closure (or linear misclosure), and (3) relative precision of the following closed polygon.

Course	Length (m)	Azimuth	Departure	Latitude
AB	1,352.562	245°16'24"		
BC	1,999.670	147°06'37"		
CD	1,329.127	95°33'20"		
DE	2,427.328	23°45'21"		
EA	2,163.325	274°01'46"		

6. Draw a sketch with a north arrow for a vacant lot based on the given bearings and measured distances: N20°W, a distance of 294.50 m from Points A to B; S69°W, a distance of 354.50 m from Points B to C; S20°E, a distance of 294.50 m from Points C to D; and N69°E, a distance of 354.50 m from Points D to A (using a 1: 5,000 map scale).

7. Given the bearings of sides AB, BC, CD, and DE, compute (1) the deflection angles and (2) the interior angles at B and D.