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Diploma in Civil Engineering

Term-End Examination

December, 2006

BCE-031 : ADVANCED SURVEY

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is **compulsory**. Attempt any **four** from the rest of the questions. Use of calculator is allowed.*

1. Define/describe in brief any ***seven*** of the following : *2×7=14*

(a) Line of Collimation

(b) Closed Traverse

(c) Latitude and Departure

(d) Tacheometric constants

(e) Advantages of Tacheometry

(f) Trigonometric levelling

(g) Transition curve

(h) Mid-ordinate of circular curve

(i) GPS

(j) GDOP

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2. The lengths and bearings of the lines of a traverse ABCDE, are given in the table. The length and bearing of EA has been omitted. Calculate the length and bearing of line EA. *14*

Line	Length (m)	Bearing
AB	204·0	87° 30′
BC	226·0	20° 20′
CD	187·0	280° 0′
DE	192·0	210° 80′
EA	?	?

3. (a) Discuss basic principle of Stadia method of tacheometry. *4*

(b) The following tacheometric observations were made on two points P and Q from Station A :

Staff at	Vertical angle	Staff reading		
		Upper	Middle	Lower
P	— 5° 12′	1·388	0·978	0·610
Q	+ 27° 35′	1·604	1·286	0·997

The height of the tacheometer at A above the ground was 1·55 m. Determine the elevations of P and Q if the elevation of A is 75·5 m. The stadia constant k and c are respectively 100 and 0·0 m. *10*

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4. (a) If the base of a tower is accessible, how would you determine the difference of elevation between instrument station and top of the tower using trigonometrical levelling ? *4*

(b) The observations were made on the top A of a flag AB on a hill, from two instrument stations P and Q, 100 m apart, the stations P and Q being in the line with A. The angles of elevations of A at P and Q were 30° 05′, and 17° 52′ respectively. The staff reading upon the B.M. (R.L. = 311·29 m), were respectively, 2·690 and 3·815 when the instrument was at P and Q, the telescope being horizontal. Determine the elevation of the foot of the flag if AB is 3·5 m. *10*

5. (a) What are different methods of designating a curve ? Derive a relationship between the degree of curve and its radius. *6*

(b) The chainage of the intersection point of two straights is 1060 m and the angle of intersection is 120°. If the radius of a circular curve is 570 m and peg interval is 30 m, find : tangent length, length of long chord, chainage at the beginning and end of the curve. *8*

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6. (a) Describe the principle on which the working of an EDM is based. Also explain the basic steps of working with an EDM. 7

(b) Explain the basic principle of a GPS. Also describe three segments of GPS. 7

7. Write brief notes on the following : $3\frac{1}{2}\times 4=14$

(i) Collimation test of theodolite

(ii) Setting of circular curve from point of intersection

(iii) Methods of Surveying with GPS

(iv) Tangential method used in tacheometric surveying

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