Diploma in Civil Engineering / Diploma in Electrical & Mechanical Engineering

Term-End Examination

June, 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) Angular Error in closed traverse

(b) Line of sight

(c) Collimation test

(d) Subtense bar

(e) Multiplying constant in tacheometry

(f) Stadia Rods

(g) Super-elevation

(h) Vertical curve

(i) GPS

(j) Total Station

2. (a) Discuss permanent adjustments of a theodolite. 7

(b) Describe how traverse computations are carried out. Also discuss about the checks and balances imposed in traversing. 7

3. (a) Write down the advantages and disadvantages of tangential method of tacheometry over the stadia method. 4

(b) Determine the distance between the points P and Q from the following data : 10

R.L. of the tacheometer axis at P = 185·300 m

Vertical angle at P = — 4° 35′

Staff reading at Q = 1·440, 0·900, 0·360

Also determine the R.L. of Q. The staff at Q was held vertical, and k = 100 and C = 0·00 m.

4. In order to ascertain the elevation of the top (Q) of the signal on a hill, observations were made from two instrument stations P and R being in the line with Q. The angles of elevation of Q at P and R were 28° 42′ and 18° 6′ respectively. The staff reading upon the bench mark of elevation 287·28 m were respectively 2·870 and 3·750 m when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3 m. 14

5. (a) What is a transition curve ? Why and when is it used ? 4

(b) Two straights T_1I and IT_2 of a road curve meet at an angle of 80°. Find the radius of the curve which will pass through a fixed point P, 30 m from point of intersection (I), the angle T_1IP being 30°. 10

6. (a) Describe about micro-optic and electronic theodolites. Also discuss their working. 7

(b) Describe about Navstar GPS along with its working principle. 7

7. Write brief notes on the following : $3\frac{1}{2}\times4=14$

(i) Elements of simple circular curve

(ii) Methods of surveying with GPS

(iii) Basic principles of Stadia Method

(iv) Reciprocal levelling