# Diploma in Civil Engineering

# Term-End Examination

# June, 2007

## 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. Select the most appropriate answer for each of the following multiple choice objective type questions :     7×2=14

   (a)   The end of the curve where the alignment changes from a curve to tangent is called

   (i)   Point of Tangency

   (ii)   Point of Curve

   (iii)   Point of Intersection

   (b)   In a closed traverse, the algebraic sum of departure and latitude must be

   (i)   90

   (ii)   180

   (iii)   0

(c)  The subtense bar is used to measure

    (i)  Vertical distance

    (ii)  Horizontal distance

    (iii)  Elevation

(d)  The length of the long chord is given by the expression

    (i)  $L = 2R \sin \dfrac{\phi}{2}$

    (ii)  $L = 2R \tan \dfrac{\phi}{2}$

    (iii)  $L = 2R \cos \dfrac{\phi}{2}$

(e)  A vertical curve is considered as a

    (i)  Elliptical curve

    (ii)  Parabolic curve

    (iii)  Circular curve

(f)  WGS-84 and GDOP are associated with

    (i)  Electronic distance measurements

    (ii)  Total survey station

    (iii)  Global positioning system

(g)  An anallatic lens is provided to make the additive constant

    (i)  100

    (ii)  0

    (iii)  90

2. (a) What are different adjustments required for a theodolite ? Describe temporary adjustments. 8

   (b) Define close and open traverse. Describe various methods of balancing a traverse. 6

3. (a) What are the constants of a tacheometer and how are they determined ? 6

   (b) Two distances of 20 and 100 metres were accurately measured out and the intercepts on the staff between the outer stadia webs were 0·196 m at the former distance and 0·996 at the latter. Calculate the tacheometric constant. 8

4. (a) Why are curves provided in highways and railways ? Discuss elements of a simple circular curve with neat sketch. 6

   (b) A transition curve is to be introduced between a straight and a circular curve of 300 m radius. The gauge of the railway track is 1·5 m and the maximum super-elevation allowed is 10 cm. The transition curve is to be designed for a velocity so that no lateral pressure is imposed on the rails. The rate of change of radial acceleration is 0·3 m/sec$^2$/sec. Determine the required length of transition curve and the design speed. 8

5. (a) What are different types of vertical curves ? What is the use of having a vertical curve as a parabola ? Describe. 6

(b) Describe method of finding length of a transition curve using rate of change of radial acceleration method. *8*

**6.** (a) Give the full form of the following abbreviations : NAVSTAR, WGS-84, GPS, AS, SA, GDOP. *6*

(b) Describe principle and working of EDM. *8*

**7.** (a) What is a project survey ? Describe various steps involved in project survey. *6*

(b) Describe in brief about *8*

  (i) Astronomical surveying

  (ii) Photogrammetry

  (iii) Underground survey

  (iv) Hydrographic survey