(16)  S.E-Sem-IV- CBSGS-Civil_SUR-II                    28/4/12

Time: 3 hours                                           Marks: 80

1. Question **No.1** is compulsory. Attempt any **three** questions out of remaining.
2. Assume suitable data if required, state the same clearly.
3. Figures to the right indicate full marks.
4. Explain answers with neat sketches, wherever necessary

Attempt sub questions in order.

1.     Write short notes on **any four** from following:
   a. Types of horizontal and vertical curves stating application of each in civil (05) engineering
   b. Reverse curve, its necessity, elements of reverse curve.                    (05)
   c. Batter board, boning rod.                                                   (05)
   d. Tacheometry, its principle and advantages of tacheometry                    (05)
   e. EDM, its principle and working.                                             (05)

2. a. List various methods of setting out of curves. Explain setting out of curve by two (06) theodolite method.
   b. Describe various obstacles in laying out of simple curves.                  (08)
   c. Explain procedure for calculating data and setting out of vertical curve by chord (06) gradient method.

3. a. The following readings were taken with a tacheometer fitted with analectic lens. Calculate (10) gradient between station P and Q.

| Investment Station | Staff station | WCB | Vertical angle | Stadia readings | Central hair reading |
|---|---|---|---|---|---|
| O | P | 40° | 10° | 2.050 | 1.40 |
| | Q | 160° | -8° 30' | 1.980 | 1.35 |

   The RL of instrument station is 280.50 m and the height of instrument axis is 1.450m.

   b. Explain how to calculate the R L of top of tower whose base is inaccessible, with (05) two plane method.
   c. Derive an expression for calculating horizontal and vertical distance for line of sight (05) inclined and staff held vertical.

4. a. The bearings of three lines AB = 21°45', BC = 80°30°, CD = 147°15'. Find the radius (08) of curve tangential to three lines. Length BC = 450m. Also determine the tangent lengths.
   b. What is compound curve? What are elements of compound curve                  (06)
   c. Explain setting out procedure of compound curve.                            (06)

5. a. A 8m wide road is to deflect through an angle of 60° with the centre line radius (10) 300m, the chainage of point of intersection being 3600m. A transition curve is to be used at each end of the circular curve of such a length the rate of gain of radial acceleration is 0.5m/s³, when the speed is 50kmph. Find: (1) Length of transition curve. (2) chainages of all the junction points.
   b. Explain setting out of sewer line.                                          (05)
   c. Describe survey project carried out by you at site for tacheometric contouring. (05)

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6  a.  A 3% rising gradient meets 2% down gradient. A vertical curve 200m long is to be    (10)
        used. The pegs are to be fixed at 20m interval. Calculate the RLs of the points on
        the vertical curve using tangent correction method, given that the height of
        collimation is 350m R L of apex is 350m and its chainage is 1000m. Tabulate the
        results.
   b.  Write short note on working of digital planimeter                                   (05)
   c.  Write short note on remote sensing and its applications in civil engineering         (05)

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