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5E3154

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B. Tech. (Sem. V) (Main/Back) Examination, December - 2013
Civil Engg.
5CE4 Surveying - II

Time : **3 Hours**]   [Total Marks : **80**
                                                       [Min. Passing Marks : **24**

Attempt any five questions. Selecting one question from each unit.
All questions carry equal marks. Schematic diagrams must be
shown wherever necessary. Any data you feel missing suitably
be assumed and stated clearly. Units of quantities used /
calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. _____ NIL _____   2. _____ NIL _____

UNIT - I

1   (a)   Explain the method of determining the R.L. of top of the
          tower by trigonometric leveling. The object is inaccessible and
          two instrument positions are in same vertical plane of object.
          Derive the expression for the same.

                                                                    10

    (b)   Find the reduced level of station P from the given data.
          Distance between P&Q is 3650 m
          Angle of depression from Q to P = $2°$ 47' 37"
          Height of instrument at Q = 1.54 m
          Height of signal at P = 3.84 m
          Co-efficient of retraction m = 0.07
          Radius of earth (R) = 6370 km and RL of Q is 1230 m above
          mean sea level.

                                                                    6

OR

1   (a)   What are the essential corrections are required when level
          difference between two stations is found by trigonometric
          leveling. Also explain with neat sketch the magnitude of
          these corrections.

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(b) To determine the elevation of the top of a chimney, following observations were made.

Inst. Stations	Angle of Elevation	Ready on BM	Remark
A	10° 48' 20"	1.206	RL of BM
B	7° 12' 40"	1.086	248.362 m

Station A and B and the top of the chimney are in the same vertical plane. The distance between stations A and B is 50 m.

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UNIT - II

2 (a) Enumerate the methods of setting out simple circular curve. Explain the method successive bisection of arcs of chords in detail.

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(b) Following data are given for setting out simple, circular curve by perpendicular offset from long chord.
Radius of curve – 220 m, Deflection angle 55°
Compute curve length, mid ordinate, length of long chord and offsets at 20 m interval from the centre of long chord. Put your answer in tabular form.

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OR

2 (a) What do you understand by super elevation ? How it is important in the design of highways and railway ? Explain how will you calculate super elevation for highways and railways.

8

(b) Compute the necessary data for setting out simple circular curve by Rankine's tangentral angle method if radius of curve is 240 m, deflection angle is 50° and chainage of point of intersection is 1290 m. Assume length of normal chord as 20 m.

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UNIT - III

3 (a) Explain the different guide lines for selecting the triangulation stations.

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(b) The elevations of two stations A and B, 120 km apart are 220 m and 1000 m above mean sea level. The elevation of an intervening peak P, 80 km from A is 540 m. Check whether the two stations are intervisible or not ? Find the height of signal at B if the two stations are not intervisible.

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OR

3   (a) Explain what do you understand by strength of figure, its importance in triangulation and how it is computed.

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(b) Directions were measured from a satellite station S, 62.18 m from station C. Following were the observations $\angle A = 0°$ 0' 0" $\angle B = 71° 54' 32"$ $\angle C = 296° 12' 2"$. The approximate lengths of AC and BC were 8240.6 m and 10863.6 m respectively. Calculate the angle ACB. Make a neat sketch of problem.

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UNIT - IV

4   (a) Explain the followings with suitable examples :
(i)   Accidental Errors
(ii) Systematic Errors
(iii) Weight of an observation
(iv) Station Adjustment.

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(b) Following observations were taken in closed circuit leveling ABCDA from A and found that B was 6.71 m above A, C was 5.59 m above B, D was 3.48 m above C, D was 13.72 m above A. All observation are taken with equal accuracy. Determine the probable heights of B, C and D above by the method of correlates.

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OR

4   What do you understand by figure adjustment ? If you have to adjust any figure by method based on principle of least square, write condition equations in terms of correction and number of correlates to be assumed for following figures.
(a) Braced Quadrilateral
(b) Triangle with central station
(c) Quadrilateral with central station.

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UNIT - V

5   (a)   Explain following astronomical terms with neat sketch :
    (i)   Vertical Angle
    (ii) Azimuth
    (iii) Declination
    (iv) Hour Angle
    (v)   Right Ascension
    (vi) Celestical Horizon
    (vii) Prime Vertical Circle
    (viii) Observer Meridian.

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    (b)   Explain the Napler's Rule. How it can be used to obtain various astronomical quantities.

8

OR

5   (a)   What are the different astronomical coordinate systems ? Explain independent coordinate system with the help of a neat sketch.   rtuonline.com

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    (b)   In order to determine the Azimuth of sun following observations were made

          Average corrected altitude of sun – 24° 25' 30"

          Average horizontal angle with reference – 100° 27' 20"

          The declination at the time of observation (δ) 22° 17' 16.7" N

          The latitude of place is 25° 10' N

          Compute the Azimuth of sun and reference line.

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