

5E3154-P

Roll No. : _____

Total Printed Pages : **4****5E3154-P****B.Tech. (Sem. V) (Main/Back) Examination, Dec. - 2011**
Civil Engg.
5CE4 Surveying - II

Time : 3 Hours]

[Maximum Marks : 80
[Min. Passing Marks : 24**Instructions to Candidates :**

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) Derive an expression to find out the level difference by trigonometric levelling between two stations P and Q, by single observation of angle of elevation from P to Q. The expression derived above should include effect of curvature and refraction, also the axis signal correction.

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- (b) Find out the corrected angle from the given data -
Distance between P and Q = 4050 m
Angle of elevation from P to Q = 2° 37' 13"
Height of instrument at P = 1.45 m
Height of signal at Q = 3.56 m
Coefficient of refraction $m = 0.07$
Radius of earth (R) = 6370 km.

4**OR**

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[Contd...

- 1 (a) Following observations were taken to determine the reduced level of the top of an overhead tank (O) from two stations P and Q being in different planes with respect to object :

Angle of elevation from P to object (α_1) - $6^\circ 13' 20''$

Horizontal angle (θ_1) at P - $85^\circ 30' 20''$

Reading on level staff from P - 1.45 m

Angle of elevation from Q to object (α_2) - $6^\circ 7' 40''$

Horizontal angle (θ_2) at Q - $80^\circ 32' 40''$

Reading on level staff from Q - 1.56 m

Distance between P and Q is 44.5 m, staff is placed on 8.N.

Make a neat sketch of the problem and determine the R.L. of the top of the overhead tank (O) if R.L. of bench mark is 258.70 m.

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- (b) Make a neat sketch and explain, what do you understand by axis-signal correction.

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UNIT - II

- 2 (a) Two straights AV and VB intersect at a chainage 1190m, the deflection angle being 36° . Calculate all necessary data for setting out a simple circular curve by Rankine's tangential angle method if radius of curve is 250m and peg interval is 20m. The least count of the theodolite used is $20''$.

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OR

- (a) In a compound curve radius of the arcs of two curves are R_1 and R_2 respectively, the total deflection angle for the curve is ' Δ ' and total distance between point of curve (T_1) and point of intersection V is ' T_S ' are known, get the expressions for computation of T_2 (distance between point intersection and point of tangency), deflection angles Δ_1 and Δ_2 .

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- (b) Two straights intersect at an angle Δ . The common tangent of the two curves of equal radius L as a length 380m. The angles between the tangents and the straight lines is $138^{\circ}30'$ at the first tangent point and $130^{\circ}45'$ at the second tangent point. Find the common radius of arcs. If the chainage of the first tangent point is 980m, find the chainages of the common point of the arcs and the second tangent point.

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UNIT - III

- 3 (a) What do you understand by a well conditioned triangle ? What is the importance of well conditional triangle in triangulation survey. Derive the condition for base angles for well conditioned triangle.

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- (b) Compute the phase of signal correction from the following data :

Distance between two stations 5 km, diameter of signal 20 cm and sun rays make an angle 60° with line AB. Compute correction if observations were made (a) on the bright portion (b) on the bright line.

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OR

- 3 (a) Two stations A and B are 100 km apart. The elevation of A is 185 m and B is 885 m. In the line of sight between A and B there are two intervening points C and D. C is 42 km from A and D is 81 km from A. The elevations of peak C and D are 318 m and 750 m respectively. Check whether two stations A and B are intervisible or not. With a minimum clearance of 3m above ground level. Determine height of signal at B for intervisibility.

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- (b) Write four important criterion for selection of site for base line measurement.

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UNIT - IV

- 4 (a) Explain with examples the difference between mistakes and systematic errors.

4

- (b) What do you understand by weight of a quantity? What are the rules for assigning the weight to a quantity? Also explain laws of weights with examples.

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OR

- 4 In a quadrilateral PQRS, the angles measured were as follows

$$\angle 1 = 59^{\circ}27'16.8'', \quad \angle 2 = 40^{\circ}17'47.6'', \quad \angle 3 = 35^{\circ}16'12.8'',$$

$$\angle 4 = 44^{\circ}58'48.8'', \quad \angle 5 = 45^{\circ}23'28.6'', \quad \angle 6 = 54^{\circ}21'27.9'',$$

$\angle 7 = 41^{\circ}17'15.5'', \angle 8 = 38^{\circ}57'54.8''$, odd angles are left angles and even angles are right angles. Adjust the angles using method of least square.

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UNIT - V

- 5 (a) Explain following with the help of neat sketch (i) plane of Ecliptic (ii) variation of declination of sun with salient dates and features.

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- (b) Show the spherical triangles when star is at (i) prime vertical (ii) star of elongation. Explain how would you compute hour angle, declination and azimuth of the star.

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OR

- 5 Calculate the sun's azimuth and hour angle at a place in latitude $42^{\circ}30'N$, when its declination is (a) $22^{\circ}12'N$ and (b) $22^{\circ}12'S$.

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