

B.E.(CIVIL ENGG.) 1st YEAR 2nd SEMESTER EXAMINATION, 2019(1st / 2nd Semester / Repeat / Supplementary / Annual / Biannual)

SUBJECT: SURVEYING-II

(Name in full)

Time: Two hours/Three hours/Four hours/ Six hours

Full Marks: 100

(50 marks for each part)

Use a separate Answer-Script for each part

Question No.	Part-I	Marks
	<p style="text-align: center;">Answer Question-1 and 2 and any <i>Two</i> questions from the rest</p> <p>Q.1) A) Fill in the blanks with appropriate word(s):</p> <p>a) The tangential angle of the long chord is called</p> <p>b) Rate of change in radial acceleration is expressed in unit.</p> <p>c) is the form of an ideal transition curve.</p> <p>d) Gurley's Current Meter is required for measurement of of any water body.</p> <p>e) In small-scale hydrographic survey primary horizontal control is usually established by virtue of</p> <p>g) In tunnel survey short vertical depths are measured by</p> <p>B) State whether the under-mentioned statements are True or False with necessary justifications:</p> <p>a) Vertical curve of circular configuration is normally recommended for roadways.</p> <p>b) Cross Rope method is recommended for locating the sounding stations when they are scattered over the water body.</p> <p>c) Simm's method is followed for transference of tunnel centreline underground.</p> <p>Q.2) a) Establish the fundamental expression for computing the ordinate from the long chord for the method of setting out of simple curve based on linear measurements only.</p>	<p style="text-align: center;">1*6=6</p> <p style="text-align: center;">2*3=6</p> <p style="text-align: center;">6</p>

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No. of Question	Part-I	Marks
	b) Deduce the necessary expression for forward tangent length (T_f) of a reverse curve comprising only two simple circular arcs bending in opposite direction. c) Describe the "Weisbach Triangle Method" of transferring the surface centerline underground eliminating the chances of inaccurate bisection.	7 (2+3)
Q.3)	Calculate the reduced levels (RLs) of various station pegs on a vertical curve connecting two uniform grades of (0.73%) and (-0.55%). The chainage and the reduced level at the point of intersection are 446m and 313.57m respectively. Consider the rate of change of grade as 0.1% per 30m.	10
Q.4)	A transition curve is to be inserted between a tangent and the circular curve in connection with the construction of a highway. The following data are provided for setting out of the curve. i. Deflection Angle (Δ)= $64^{\circ}36'$ ii. Maximum speed of the vehicle= 87 Kmph iii. Centrifugal Ratio= 0.25 iv. Chainage of the Vertex= 2424 m v. Maximum rate of change in radial acceleration= 0.3 m/sec^3 Calculate: i) Radius of the circular curve ii) Length of the transition curve iii) Shift of the circular curve iv) Total tangent length v) Chainages of different salient points	10
Q.5)	An observer, taking soundings from a boat (O) wished to locate his position and measured with a sextant the angles subtended at (O) by three points A, B and C on the shore. The length AB and BC were scaled from the map and found to be 239m and 257m respectively and the angle $\angle ABC$ was $125^{\circ}58'$. The observed angles $\angle AOB$ and $\angle BOC$ were $39^{\circ}42'$ and $42^{\circ}39'$ respectively. What are the distances of (O) from A, B and C?	10

B.E. (CIVIL ENGINEERING) 1st YEAR 2nd SEM. EXAMINATION 2019

SURVEYING- II

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

Part-II

Question no. 1 is compulsory
 Answer any two from the rest
 (Assume any data, if required, reasonably)

Q.1. Write short notes on the following (any four):

(4×4) = 16

- I. Requirement and description of 'spire test' in theodolite
- II. The Subtense bar method in tacheometric survey
- III. Satellite stations in triangulation survey
- IV. Method of 'equal shift' for adjustment of traverse in triangulation survey
- V. Variation of additive constant 'C' in different types of tacheometric telescope
- VI. Setting out of a horizontal angle of $58^{\circ} 34' 17''$ with a $20''$ least count theodolite
- VII. Deflection angle method of theodolite traversing

Q.2.

- a) In fixed hair stadia method of tacheometric survey, find out the distance elevation formula when line of sight inclined, staff held vertically and both angles are in depression.
- b) Following are the lengths and bearings of the sides of a traverse BCDEA. The bearing of BC and CD are missing. Compute the bearing of BC and CD.

Line	Length in m	Bearing
BC	318	?
CD	375	?
DE	284	S $55^{\circ} 18'$ W
EA	173	S $02^{\circ} 40'$ W
AB	218	S $59^{\circ} 45'$ E

Q.3.

- a) What is the correction to any side for the 'Axis method' of closing error adjustment of a traverse? Why 'Axis method' is favoured for the adjustment of closing error in theodolite traverse? 6
- b) Compute the value of the correction to angle AOB for the phase error of cylindrical signals. The observed angle at A is $19^{\circ} 18' 53''$, at B is $56^{\circ} 38' 14''$ and at the sun is $76^{\circ} 28' 04''$ from an instrument station O, with respect to a reference line. The diameter of the cylindrical signals both at A and B is 400mm. Distances of station A and B from O are 16500m and 27500m respectively. The pointings are made on the bright line. Also determine the corrected value of angle AOB. 11

Q.4.

- a) What is the significance of using 'braced quadrilateral' in triangulation network? Discuss and justify/prove the necessary and sufficient conditions of a closed 'braced quadrilateral'. 8
- b) Find the horizontal distance PQ, levels at P and Q and the gradient from P to Q. The instrument constants were 100 and 0.3. Horizontal angle PAQ = $65^{\circ} 30'$. Staff held vertically and R.L. of horizontal line of sight = 0 m.

Instrument at	Staff at	Vertical angle	Cross hair readings
A	P	$6^{\circ} 50'$	1.835, 2.58, 3.325
A	Q	$-3^{\circ} 30'$	1.455, 2.22, 2.985

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