

B.E (CIVIL ENGG.) 2<sup>nd</sup> YEAR 1<sup>st</sup> SEMESTER EXAMINATION 2019 (OLD)

## SURVEYING - II

Full Marks 100

(50 marks for each part)

Time: Three hours

Use a separate Answer-Script for each part

**Part-I**

Question no. 1 is compulsory

Answer any **two** from the rest*(Assume any data, if required, reasonably)*

1. Write short notes on the following (any four): (4×5) = 20

- I. Chromatic aberration in a theodolite telescope
- II. Relations between the fundamental axes to be a proper condition theodolite
- III. Prove ' $D = k.S + C$ ' (with usual notations) in fixed hair stadia method of tacheometry
- IV. Temporary adjustment in theodolite survey
- V. Least count of a theodolite
- VI. Bowditch method of closing error adjustment of a traverse
- VII. Different parts of a telescope of a theodolite
- VIII. The tangential method of tacheometric survey

2. Below are the particulars of a part of a traverse survey:

Line	Lengths in m	Bearing
AB	170	20 <sup>0</sup>
BC	360	130 <sup>0</sup>
CD	480	210 <sup>0</sup>

Find the distance between a point 'P' on AB, 100 m from 'A' and a point 'R' on CD, 280 m from 'C'. Also compute the bearing of line PR.

3.

Following is the data related to observations made on a vertically held staff with a tacheometer fitted with an anallactic lens. The constant of the instrument was 100.

Inst. Stn.	Height of inst. from G.L.	Staff stn.	W.C.B.	Vertical angle	Staff readings in m.	Remarks
O	1.56 m.	A	15°	00° 00'	1.88, 2.25, 2.62	R.L. of O = 130.25 m
		B	63°	+ 15° 10'	1.83, 2.15, 2.47	

Calculate the distance AB, and the reduced levels of A and B.

15

4.

The bearings of PQ and QR are 20° 33' and 62° 19', respectively. The coordinates of P and R are as follows (in meters)

Point	Northing	Easting
P	300.0	400.0
R	1400.0	1250.0

Compute the length PQ and QR.

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**B.E. CIVIL ENGINEERING 2<sup>nd</sup> YEAR 1<sup>st</sup> SEMESTER EXAMINATION, 2019 (OLD)**(1<sup>st</sup> / 2<sup>nd</sup> Semester / Repeat / **Supplementary** / Annual / Biannual)**SUBJECT: SURVEYING-II**

(Name in full)

Full Marks: 100

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

(50 marks for each part)

**Use a separate Answer-Script for each part**

Question No.	Part-II	Marks
	<b>Answer Question-1 and 2 and any <i>Two</i> questions from the rest</b>	
Q.1) A)	<p><b>Fill in the blanks with appropriate word(s):</b></p> <p>a. The distance between the mid-point of the long chord and the apex of a simple curve is called .....</p> <p>b. A vertical curve of .....configuration is not usually considered for complicity of calculation.</p> <p>c. The angle between the original tangent and the tangent common to both transition and circular curve is called .....</p> <p>d. The sounding stations are located by ..... for deep seas.</p> <p>e. The maximum superelevation recommended under normal condition for narrow gauge railway track is ..... mm.</p> <p>f. In tunnel survey short vertical depths are measured by .....</p>	1*6=6
B)	<p><b>State whether the under-mentioned statements are True or False with necessary justifications:</b></p> <p>a. Reverse curve is not suited for meandering path of hilly areas.</p> <p>b. Direct line method is recommended for locating the sounding stations when they are scattered over the water body.</p> <p>c. Weisbach triangle method is followed for transference of levels in the tunnel.</p>	2*3=6
Q.2)	<p>a) Establish the fundamental expression for computing the deflection angle for <math>n^{\text{th}}</math>. peg on a simple circular curve required for “<b>Double Theodolite Method</b>” of setting out of simple curve.</p>	7

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(Name in full)

Full Marks: 100

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

(50 marks for each part)

**Use a separate Answer-Script for each part**

No. of Question	Part-II	Marks
	c) Deduce the necessary expression for <b>forward tangent length (<math>T_r</math>)</b> of a <b>reverse curve</b> comprising two simple circular arc bending in opposite direction?	7
	c) What are the conditions to be satisfied by a transition curve when inserted at both ends of a circular curve?	4
Q.3)	Calculate the reduced levels (RLs) of various station pegs on a vertical curve connecting two uniform grades of <b>(0.73%)</b> and <b>(-0.55%)</b> . The chainage and the reduced level at the point of intersection are <b>446m</b> and <b>313.57m</b> respectively. Consider the rate of change of grade as <b>0.1% per 30m</b> .	10
Q.4)	An observer taking soundings from a boat ( <b>O</b> ) wished to locate his position and measured with a sextant the angles subtended at ( <b>O</b> ) by three points A, B and C on the shore. The length AB and BC were scaled from the map and found to be <b>227m</b> and <b>239m</b> respectively and the angle $\angle ABC$ was <b>122°36'</b> . The observed angles $\angle AOB$ and $\angle BOC$ were <b>38°45'</b> and <b>39°25'</b> respectively. What are the distances of ( <b>O</b> ) from <b>A, B</b> and <b>C</b> ?	10
Q.5)	a. Describe the " <b>Simm's Method</b> " of transferring the surface centerline underground with the help of pertinent sketch.	5
	b. A vertical shaft was excavated and two plumb wires ( <b>A &amp; B</b> ) were suspended into it at a distance of <b>3.693m</b> . A theodolite was set up at <b>C</b> , within the tunnel, slightly off the line <b>AB</b> at a distance of <b>6.79m</b> from the wire <b>B</b> . The angle <b>ACB</b> was found to be <b>2'40"</b> . Calculate the co-ordinates of the point <b>C</b> with respect to the line <b>AB</b> produced.	5