Ref No. -EX/CE/5/T/106/2018

B.CIVIL ENGG. (PART TIME) 1st YEAR 2nd SEM. EXAMINATION 2018

SURVEYING - II

Time: Three hours

Full Marks 100
(50 marks for each part)

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)

Q.1. Write short notes on the following (any four): (4×4) = 16

I. Sequential field works to be done in triangulation survey

II. Tangential method of tacheometric survey

III. Draw a neat sketch to show the formation of enlarged inverted virtual image in Keplerian telescope

IV. Method of 'equal shift' for adjustment of traverse in triangulation survey

V. Test and adjustment: plate level axis is not perpendicular to vertical axis in theodolite

VI. Variation of additive constant '*C*' in different types of tacheometric telescope

VII. Least count of a theodolite in retrograde vernier

Q.2.

a) In fixed hair stadia method of tacheometric survey, prove that "$D = K.S + C$" with usual notations. 5

b) In conducting a traverse *ABCDEA*, the length of the line *CD* and the bearing of the line *EA* could not be measured. Find the length of the line *CD* and the bearing of the line *EA* from remaining data given below.

Line	*AB*	*BC*	*CD*	*DE*	*EA*
Length (m)	178	228	Missing	126	238
Bearing	S 52^0 36' E	N 48^0 40' E	N 18^0 20' W	S 78^0 34' W	Missing

12

Q.3.

a) Discuss the problem and its remedy (with prove) in theodolite survey due to the eccentricity of 'upper plate' and 'lower plate' axes.

6

b) Directions were observed from a satellite station *S*, 2.5m from triangulation station *A*. The following observations were recorded

Station	Observed Direction	Distance from A (in m)
A	00° 00'	--
B	37° 15'	1988.70
C	90° 53'	1753.20

What would have been the value of the observed angle *CAB* if the instrument had been set up at *A*? Also compute the length *BC*.

11

Q.4.

a) In triangulation survey for a hexagon *ABCDEFA* with a central station *O*, prove that "the sum of the log sine of the right hand angles = the sum of the log sine of the left hand angles".

6

b) A tacheometer is set up at an intermediate point on a traverse course *AB* and the following observations are taken on a staff held vertically.

Staff stn.	W.C.B.	Vertical angle	Staff intercept (in m)	Axial hair reading (in m)	Remarks
A	$40^0\ 30'$	$-\ 04^0\ 20'$	2.172	1.962	R.L. of *A*
B	$220^0\ 30'$	$-\ 05^0\ 10'$	1.986	1.866	= 350.75 m

The tacheometer is fitted with an anallactic lens, and the multiplying constant is100. Calculate the length of *AB* and the reduced level of *B*.

11

Form A: Paper –Setting Blank

Ref No.: Ex/CE/5/T/106/2018

B.E. (Civil Engineering) (Part Time) 1st Year 2nd Semester Examination, 2018

(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-II	Marks
Q.1) A)	**Answer Question-1 and 2 and any *Two* questions from the rest** **Fill in the blanks with appropriate word(s):** a) The tangential angle of the long chord is called ..... b) A vertical curve of .....configuration is not usually considered for complicacy of calculation. c) The angle between the original tangent and the tangent common to both transition and circular curve is called ..... d) A pitot tube is required for measurement of ..... of any waterbody. e) The sounding stations are located by ..... for deep seas. f) In tunnel survey the very first step of field work comprises	1*6=6
B)	**State whether the under-mentioned statements are True or False with necessary justifications:** a) Along the length of the transition curve the **radius of curvature** gradually increases. b) **Cross Rope method** is recommended for locating the sounding stations when they are scattered over the water body. c) **Simm's method** is followed for transference of levels in the tunnel.	2*3=6
Q.2)	a) Establish the fundamental expression for computing the ordinate from the long chord required for setting out of a simple circular curve.	6
	b) Deduce the necessary expression for **forward tangent length (T_f)** of a reverse curve comprising two simple circular arcs bending in opposite direction.	6

Form A: Paper –Setting Blank

Ref No.: Ex/CE/5/T/106/2018

B.E. (Civil Engineering) (Part Time) 1st Year 2nd Semester Examination, 2018

(1st / 2nd Semester ~~/ Repeat /~~ ~~Supplementary~~ / ~~Annual~~ / ~~Biannual~~)

SUBJECT: SURVEYING-II

Full Marks: 100

Time: ~~Two hours~~/Three hours/~~Four hours~~/ ~~Six hours~~ (50 marks for each part)

No. of Question	Part-II	Marks
	d) Deduce the necessary expression for calculating **shift** of a circular curve.	6
Q.3)	Calculate the reduced levels (RLs) of various station pegs on a vertical curve connecting two uniform grades of **(0.74%)** and **(-0.57%)**. The chainage and the reduced level at the point of intersection are **436m** and **303.52m** respectively. Consider the rate of change of grade as **0.1%** per **30m**.	10
Q.4)	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 **207m** and **242m** respectively and the angle ∟**ABC** was **127°48′**. The observed angles ∟**AOB** and ∟**BOC** were **31°52′** and **43°37′** respectively. What are the distances of **(O)** from **A, B** and **C**?	10
Q.5)	a) Deduce the necessary expression for computing elevation of a vertical control point on the earth surface with respect to the known elevation of another control station by the method of **"Reciprocal Levelling"**.	6
	b) Describe the **"Weisbach Triangle Method"** of transferring the surface centerline underground eliminating the chances of inaccurate bisection.	4