

[4]

- Q.6 i. What is sounding in hydrographic survey? Write down the methods for taking soundness. **4**
- ii. Define the following terms used in photography surveying. **6**
- (a) Camera axis (b) Picture plane
(c) Principle point (d) Focal length
(e) Tilted photograph (f) Flying height
- OR iii. Describe the basic principle of photographic surveying. Also describe about photo-theodolite and its parts. **6**

Total No. of Questions: 6

Total No. of Printed Pages: 4

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2022
CE3CO01 Engineering Surveying

Programme: B.Tech.

Branch/Specialisation: CE

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. The sum of internal angles of a closed traverse of sides "n" is- **1**
- (a) $(n+2) 180^\circ$ (b) $(n+3)90^\circ$
(c) $(n+1)90^\circ$ (d) $(n-2)180^\circ$
- ii. Direct ranging is possible only when the end stations are- **1**
- (a) Close to each other
(b) Not more than 100 m apart
(c) Mutually intervisible
(d) Located at highest points in the sea
- iii. If the intercept on a vertical staff is 0.65 m when observed through a tachometer with anallactic lens and horizontal line of sight. The distance between staff and tachometer is- **1**
- (a) 65 cm (b) 6.5 cm (c) 65 m (d) 650 m
- iv. The stadia method of tachometry is used to determine- **1**
- (a) Vertical angles (b) Distance
(c) Horizontal angles (d) Bearing
- v. The length of tangent and long chord of a circular curve of radius R will be equal if angle of deflection is- **1**
- (a) $\pi/3$ (b) $\pi/6$ (c) $2\pi/3$ (d) $\pi/4$
- vi. An ideal transition curve is- **1**
- (a) A clothoid (b) A cubic parabola
(c) A parabola (d) Bernoulli's lemniscate
- vii. How high should a helicopter pilot rise at a point A just to see the horizon at point B if the distance AB is 40 km? **1**
- (a) 101.75 m (b) 110.50 m (c) 107.75 m (d) 105.50 m

P.T.O.

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- viii. Which of the following is the equipment to measure soundness? **1**
 (a) Fathometer (b) Tacheometer
 (c) Both (a) and (b) (d) None of these
- ix. In an aerial photographic survey, the exposure interval is 5 seconds to cover a distance of 200 m on ground. The ground speed of aircraft (in Km/hr) is: **1**
 (a) 1.44 (b) 14.4
 (c) 144 (d) 1440
- x. Hydrographic survey deal with the mapping of **1**
 (a) Large water bodies (b) Mountaineous region
 (c) Movement of clouds (d) Movement of stars
- Q.2 i. What do you mean by balancing of traverse? Write down the methods to balance the traverse. **2**
- ii. What are the different methods of plotting traverse survey? Explain any one method in brief. **3**
- iii. There is signalling tower on the top of the hill. In order to determine the elevation of the tower top Q, observations were made from two stations P and R. Points P, Q and R lie in the same plane. If angles of elevation of the top point Q from P and R are respectively $24^\circ 30'$ and $14^\circ 37'$, determine the elevation of foot of signal, if height of signal is 4m. the staff readings on BM of RL 100 m are 2.085 m and 3.455 m respectively from instrument located at P and R. Distance between P and R is 125 m. **5**
- OR iv. The lengths and bearings of all sides except one are given in table below for a traverse PQRST. Find the length and bearing of missing side. **5**
- | Line | Length (m) | WCB |
|------|------------|-----------------|
| PQ | 89.31 | $45^\circ 10'$ |
| QR | 220.76 | $73^\circ 35'$ |
| RS | 150.28 | $159^\circ 40'$ |
| ST | 162.20 | $229^\circ 37'$ |
| TP | — | — |
- Q.3 i. Write down the characteristics of tacheometer. **2**

- ii. Explain any two in detail- **8**
 (a) Stadia system
 (b) Tangential system
 (c) Subtense bar system
- OR iii. A levelling staff is held vertical at distance of 104 m and 307 m from the tacheometer axis and staff intercepts for horizontal sights are 0.850 m and 2.750 m respectively. Find the instrument constants. **8**
 When instrument was set up at P and staff at Q, the telescope was depressed at an angle of 8.5° with the horizontal and the staff readings were 2.780 m, 1.845 m and 0.955 m. Find the R.L. of Q and its horizontal distance from P. The height of instrument at P is 1.25 m and R.L. of P is 435 m.
- Q.4 Attempt any two: **5**
- i. Write short note on vertical curve? Write down the types of vertical curve and explain. **5**
- ii. A circular curve of radius 250 m is to be inserted between two straight lines meeting at a deflection angle of 70° . Find the length of the curve, tangent length, length of long chord, apex distance and mid ordinate. **5**
- iii. Explain the types of curve and their functions with neat sketch. **5**
- Q.5 Attempt any two: **5**
- i. Write down the key points for selection of triangulation stations. **5**
- ii. What do you mean by base line? Write down the factors accounted for, while selecting the site for base line. **5**
- iii. A base line was measured with a steel tape of designated length 30 m at 20°C at a pull of 100 N. The measured length of base line was 1543 m. The field temperature was 31.5°C and the pull applied was 130 N. Find the correct length of base line. The cross sectional area of tape is 2 mm^2 , the coefficient of thermal expansion of steel is $2.5 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$ and $E = 2 \times 10^5 \text{ N/mm}^2$. **5**

P.T.O.

Marking Scheme
CE3CO01 Engineering Surveying

Q.1	i.	The sum of internal angles of a closed traverse of sides “n” is- (d) $(n-2)180^\circ$	1
	ii.	Direct ranging is possible only when the end stations are- (c) Mutually intervisible	1
	iii.	If the intercept on a vertical staff is 0.65 m when observed through a tacheometer with anallactic lens and horizontal line of sight. The distance between staff and tacheometer is- (c) 65 m	1
	iv.	The stadia method of tacheometry is used to determine- (b) Distance	1
	v.	The length of tangent and long chord of a circular curve of radius R will be equal if angle of deflection is- (c) $2\pi/3$	1
	vi.	An ideal transition curve is- (a) A clothoid	1
	vii.	How high should a helicopter pilot rise at a point A just to see the horizon at point B if the distance AB is 40 km? (c) 107.75 m	1
	viii.	Which of the following is the equipment to measure soundness? (a) Fathometer	1
	ix.	In an aerial photographic survey, the exposure interval is 5 seconds to cover a distance of 200 m on ground. The ground speed of aircraft (in Km/hr) is: (c) 144	1
	x.	Hydrographic survey deal with the mapping of (a) Large water bodies	1
Q.2	i.	Definition of balancing of traverse Methods to balance the traverse.	2
	ii.	Methods of plotting traverse survey (any two) Explanation of any one method	3
	iii.	For correct answer = 177.495 For procedure	5

		For formula and calculation	2 marks	
OR	iv.	Find the length and bearing of missing side. For calculation of latitude For calculation of departure For Formation of departure For value of $x = 236.81\text{m}$ For value of $\theta = 300.63^\circ$	1 mark 1 mark 1 mark 1 mark 1 mark	5
Q.3	i.	Any four characteristics of tacheometer.		2
	ii.	Explain any two in detail- Two methods 4 marks for each	(4 marks * 2)	8
OR	iii.	For instrument constant $K = 106.842$ For instrument constant $C = 13.184$ Procedure Horizontal distance $D = 203.77\text{ m}$ Vertical Distance $V1 = 30.45$ R.L. of Q = 403.955 m	1 mark 1 mark 2 marks 1 mark 2 marks 1 mark	8
Q.4		Attempt any two:		
	i.	Vertical curve Types of vertical curve	1 mark 4 marks	5
	ii.	Find the length of the curve = 305.3 Tangent length = 175.05 m Length of long chord = 286.79 m Apex distance = 55.19 m Mid ordinate = 45.21 m	1 mark 1 mark 1 mark 1 mark 1 mark	5
	iii.	Types of curve and their functions Sketch.	3 marks 2 marks	5
Q.5		Attempt any two:		
	i.	Key points for selection of triangulation stations.		5
	ii.	Base line Factors accounted for, while selecting the site	1 mark 4 marks	5
	iii.	Temperature correction = 0.04436 m Pull correction = 0.115725 m Total correction = 0.16 m	1 mark 1 mark 1 mark	5

		Actual length of base line = 1543.16 m	1 mark	
		Procedure	1 mark	
Q.6	i.	Sounding in hydrographic survey	1 mark	4
		Methods for taking soundness	3 marks	
	ii.	Define the following terms used in photography surveying.		6
		1 mark for each term	(1 mark * 6)	
OR	iii.	Basic principle of photographic surveying	3 marks	6
		Photo-theodolite and its parts	3 marks	
