Q.6 i. What is Sounding in hydrographic survey? Write down the methods for taking soundness. **3**

ii. Three points A, B and C were photographed on a horizontal photograph **7**

Point	x	y
A	-36.50	25.50
B	10.50	-20.20
C	56.80	30.10

Focal length of the camera is 125 mm. If bearing of line OA is 340^o and horizontal distance of A from O is 216 m. Calculate the bearing of other lines and height of point A.

OR iii. What do you mean by active and passive remote sensing? Also write down the applications of remote sensing. **7**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2017

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^o (b) (n+3) 90^o

(c) (n+1) 90^o (d) (n-2) 180^o

ii. The number of ordinates for calculation of area by Simpson's rule should be _____ **1**

(a) Even (b) A fraction (c) Odd (d) None of these

iii. If the intercept on a vertical staff is 0.65 m when observed through a tacheometer with horizontal line of sight. The distance between staff and tacheometer is: **1**

(a) 65 cm (b) 6.5 cm (c) 65 m (d) 650 m

iv. The stadia method of tacheometry is used to determine: **1**

(a) Vertical angles (b) Horizontal distance

(c) Horizontal angles (d) Horizontal and vertical distances

v. The length of tangent and long chord of a circular curve od 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) Bernoullis lemniscate

vii. For the distance of 42 km in triangulation, which type of signal is used? **1**

(a) Heliotrope (b) Heliograph (c) Beacon (d) All of these

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

P.T.O.

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 $24^o\,30'$ and $14^o\,37'$, determine the elevation of foot of signal tower height 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 expect 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	$45^o\,10'$
QR	220.76	$73^o\,35'$
RS	150.28	$159^o\,40'$
ST	162.20	$229^o\,37'$
TP	___	___

Q.3 i. Write down the characteristics of Tacheometer. **2**

ii. Explain : **8**
(a) Stadia system (b) Tangential 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^o 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:

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^o. Find the length of the curve, tangent length, length of long chord, apex distance and mid ordinate. **5**

iii. A transition curve is required for a circular curve of 200 m radius, the gauge being 1.5 m and maximum super elevation restricted to 15 cm. The transition is to be designed for the velocity such that no lateral pressure is imposed on the rail and the rate of gain of radial acceleration is 30 cm/sec^3. Calculate the required length of transition curve and design speed. **5**

Q.5 Attempt any two

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^o C at a pull of 100 N. The measured length of base line was 1543 m. The field temperature was 31.5^o 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 $2.5\text{x}10^{-6o}\text{C}^{-1}$ and E = $2\text{x}10^5$ N/mm^2. **5**

CE3CO01 Engineering Surveying

Marking Scheme

Q.1	i.	(d) $(n-2)180^o$	**1**
	ii.	(c) Odd	**1**
	iii.	(c) 65 m	**1**
	iv.	(d) Horizontal and vertical distances	**1**
	v.	(c) $2\pi/3$	**1**
	vi.	(a) a clothoid	**1**
	vii.	(d) All of these	**1**
	viii.	(a) Fathometer	**1**
	ix.	(c) 144	**1**
	x.	(a) large water bodies	**1**
Q.2	i.	Definition of balancing of traverse (1 mark) Methods to balance the traverse- any two (1 mark)	**2**
	ii.	Methods of plotting traverse survey- any two (1 mark) Brief explanation of any method (2 mark)	**3**
	iii.	For correct answer = 177.495 (1 marks) For procedure (2 marks) For formula and calculation (2 marks)	**5**
OR	iv.	For calculation of latitude(1 mark) For calculation of departure(1 mark) For Formation of equation(1 mark) For value of x=236.81m (1 mark) For value of $\theta=300.63^o$(1 mark)	**5**
Q.3	i.	characteristics of Tacheometer ,any four.(2 marks)	**2**
	ii.	Two method each of 4 marks	**8**
OR	iii.	For instrument constant K=106.842 (1 marks) For instrument constant C=13.184 (1 marks) Procedure (2 marks) Horizontal Distance D=203.77 m (1 marks) Vertical Distance V1=203.77 m (1 marks) Vercical Distance V2=30.45(1 marks) R.L. of Q=403.955m(1 marks)	**8**
Q.4	i.	Write short note on vertical curve(1 marks) Explain the types of vertical curve (4 marks)	**5**
	ii.	One mark for each length of the curve=305.43m tangent length=175.05m length of long chord=286.79m apex distance=55.19m mid ordinate=45.21m	**5**
OR	iii.	Formula and solving length of transition curve = 2 marks Applied equation for no lateral pressure on a super elevation= 2marks L=46m (1 marks)	**5**
Q.5	i.	Write down the key points for selection of triangulation stations (5 marks)	
	ii.	What do you mean by Base line(1 marks) Write down the factors accounted for, while selecting the site for base line (4 marks)	**5**
OR	iii.	Temperature correction=0.04436 m(1 marks) Pull correction=0.115725m(1 marks) Total correction=0.16m(1 marks) Actual length of Base line=1543.16m(1 marks) Procedure(1 marks)	**5**
Q.6		Attempt any two:	
	i.	What is Sounding in hydrographic survey?(1 mark) Write down the methods for taking soundness. (2 marks)	**5**
	ii.	3 Angles for 3 marks(1 mark each) Bearing of 3 lines (1 mark each) Height of point A=42.30(1 mark	**5**
	iii.	active remote sensing (2 marks) Passive remote sensing(2 marks) applications of remote sensing(3 marks)	**5**

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