

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV(NEW) – EXAMINATION – SUMMER 2019
Subject Code:2140601
Date:17/05/2019
Subject Name: Advanced Surveying
Time:02:30 PM TO 05:00 PM
Total Marks: 70
Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS																
Q.1	(a) Describe with examples any three laws of weight	03																
	(b) Explain the functions of main parts of theodolite	04																
	(c) Which error is removed by taking face left and faces right reading in theodolite? Derive the distance and elevation formulae used in theodolite for staff held vertical and line of sight horizontal.	07																
Q.2	(a) What are analytic lens? Why these lenses are fitted in the theodolite	03																
	(b) Define (i) Principal point (ii) Nadir (iii) Zenith (iv) Overlap	04																
	(c) What are different types of triangulation systems? Describe the criteria for selection of triangulation stations.	07																
OR																		
	(c) What is photo theodolite? Determine number of photographs required to cover an area of 120 sq. km if longitudinal lap is 60% and side lap is 30%. Scale of an aerial photograph is 1 cm= 100 m and photograph size is 20 cm x 20 cm.	07																
Q.3	(a) Define (i) vertical circle (ii) celestial horizon (iii) terrestrial equator	03																
	(b) What is importance of base line? How is it extended?	04																
	(c) Compute the horizontal distance PA and RL of point A for staff held vertically for below observations taken by theodolite. BM=50 m , K=100 and C=0	07																
	<table><tr><td>Inst.</td><td>Staff</td><td>Vertical</td><td>Staff</td></tr><tr><td>Station</td><td>point</td><td>angle</td><td>readings</td></tr><tr><td>P</td><td>BM</td><td>-4°</td><td>1.460, 1.915, 2.570</td></tr><tr><td></td><td>A</td><td>+5°</td><td>1.200, 1.885, 2.840</td></tr></table>	Inst.	Staff	Vertical	Staff	Station	point	angle	readings	P	BM	-4°	1.460, 1.915, 2.570		A	+5°	1.200, 1.885, 2.840	
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Q.3	(a) Define (i) Drift (ii) Azimuth (iii) Isocenter	03																
	(b) What is scale of photograph? Derive the equation for it	04																
	(c) Following readings are taken by theodolite	07																
	<table><tr><td>Angle</td><td>Weight</td><td>Angle</td><td>Weight</td><td>Angle</td><td>Weight</td></tr><tr><td>60° 40' 20"</td><td>2</td><td>60° 40' 18"</td><td>2</td><td>60° 40' 19"</td><td>3</td></tr></table>	Angle	Weight	Angle	Weight	Angle	Weight	60° 40' 20"	2	60° 40' 18"	2	60° 40' 19"	3					
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60° 40' 20"	2	60° 40' 18"	2	60° 40' 19"	3													
	Calculate (i) Probable error for single measurement for unit weight (ii) Probable error for single observation of weight 3 (iii) Probable error of weighted arithmetic mean																	
Q.4	(a) Differentiate systematic errors and accidental errors	03																
	(b) Differentiate (i) Luminous and non- luminous signals (ii) Cumulative errors and random errors	04																
	(c) What is the principle of least square? Prove it mathematically	07																

- Q.4** (a) Derive equation for scale of vertical photograph **03**
(b) Describe briefly main types of EDM instruments **04**
(c) What is remote sensing? Describe the energy interaction with earth surface features. **07**
- Q.5** (a) Give the classification of sensors **03**
(b) State the application of GIS and GPS in civil engineering **04**
(c) Compare different elements of visual image interpretation and manual image interpretation **07**

OR

- Q.5** (a) Define GPS and explain the working principle of GPS. **03**
(b) How total station is different from theodolite? Give salient features of total station. **04**
(c) List out different GIS software currently used and discuss all components of GIS. **07**

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