

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV (New) EXAMINATION – WINTER 2019

Subject Code: 2140601

Date: 13/12/2019

Subject Name: Advanced Surveying

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

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

- Q.1** (a) Explain principle of tachometry. **03**
 (b) What do you mean by strength of figure in triangulation work? **04**
 (c) Describe various applications of remote sensing in field civil engineering. **07**

- Q.2** (a) What is an analytical lens? In which telescope it is used? **03**
 (b) Differentiate between fixed hair method and movable hair method of tacheometry. **04**
 (c) To determine elevation of station Q in tacheometry survey the following observations were made with the staff held vertically. **07**

Inst Station	H.I (m)	Staff station	Vertical Angle	Staff Readings (m)			Remarks
P	1.45	B.M	- 06° 00'	1.335	1.895	2.460	R.L.of
P	1.45	C.P	+ 08° 30'	0.780	1.265	1.745	B.M is
Q	1.40	C.P	- 06° 30'	1.155	1.615	2.075	50.00 m

C.P. is the change point.

The instrument was fitted with analytical lens having multiplying constant 100 and additive constant 0, find R.L. of station Q.

OR

- (c) Derive the expression for horizontal and vertical distances by the fixed hair method when the staff is held vertically & the measured angle is that of elevation **07**
- Q.3** (a) Define the term probable value and probable error. **03**
 (b) Discuss the rules to be applied for the distribution of errors to the field observations. **04**
 (c) Two stations A and B at 95 km apart have elevation of 190 m and 980 m, respectively. If the elevation of peak P at distance 37 KM from A is 280 m, show that Station A and B are inter visible. Use any method. **07**

OR

- Q.3** (a) What is meant by a satellite station? Why it is required? **03**
 (b) Describe the different aspect of field work in triangulation **04**
 (c) Find the probable values of X, Y and Z given that **07**
 $X = 46^{\circ} 12' 34''$,
 $Y = 22^{\circ} 18' 36''$, and
 $Z = X + Y = 68^{\circ} 31' 13''$

- Q.4** (a) Define Azimuth, altitude and Celestial sphere. **03**
 (b) How terrestrial latitudes and longitudes are determined. **04**
 (c) Find the azimuth and altitude of star from following data. **07**
 Latitude of observer = $48^{\circ} N$
 Hour angle of the star = 43°
 Declination of star = $18^{\circ} 20' N$

OR

- Q.4** (a) Discuss longitudinal overlap and side overlap in aerial photography. **03**
(b) Explain scale of vertical photograph. **04**
(c) Two points P and Q have elevations of 600 m and 300m respectively. The photograph was taken with a camera having focal length of 210 mm and from an altitude of 2500 m. The corrected photo coordinates of p and q are as: **07**

Point	Photo Co-ordinates	
	x(mm)	Y (mm)
p	35	25
q	20	50

Find length of line PQ on ground.

- Q.5** (a) Explain basic Principle of EDM. **03**
(b) What is GIS? Discuss component of GIS. **04**
(c) What do you mean by image interpretation? Explain various elements of visual image interpretation. **07**

OR

- Q.5** (a) Discuss active remote sensing and passive remote sensing. **03**
(b) Explain electromagnetic energy interaction with features on the earth surface. **04**
(c) What is total station? Describe uses of total station in field of civil engineering. **07**

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