Seat No.: _____

Enrolment No._

GUJARAT TECHNOLOGICAL UNIVERSITY PDDC - SEMESTER-II EXAMINATION - WINTER 2015

Subject Code: X20601 Subject Name: Advanced Surveying Time: 02:30pm to 05:00pm **Instructions:**

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) What stands for DDM, ODM and EDM? Discuss techniques of distance 7 measurement in EDM.
 - (b) Discuss the types of Total stations.
- Explain in detail, field procedure of tacheometric survey which you have carried 7 **(a)** Q. 2 out into the field with respect to horizontal and vertical control.
 - The following readings refer to a tacheometer by holding the levelling staff 7 **(b)** vertical. R.L. of the B.M. is 200 m. Calculate the R.L. of P, Q and R, if multiplying and additive constants of the tacheometer were 100 and 0 respectively.

1 7					
Instrument	H.I.	Staff	Vertical	Staff	Central Hair
At	(M)	At	Angle	Intercept	Reading
Р	1.48	B.M.	6 ⁰ 12'	1.12	1.54
Р	1.48	Q	7 ⁰ 15'	1.06	1.36
Q	1.42	R	$12^{0} 21'$	1.18	2.48
			OR		

The following readings refer to a tachometer by holding the levelling staff 7 **(b)** vertical. Multiplying and additive constants of the tacheometer were 100 and 0 respectively.

ST	H.I.	Staff	Vertical	Staff Readings
	(M)	STn.	Angle	Т С В
Р	1.51	Q	-7°	1.25 1.86 2.46
		R	+9°	1.30 1.88 2.47

Calculate the gradient of line QR, if RL of P is 430m. Also Bearing of PQ is 30° and Bearing of PR is 80°.

- Derive formula to compute ground coordinates from photo coordinates for 7 **Q.3** (a) vertical aerial photograph. Also give formula to compute ground length.
 - The proposed scale to prepare map from aerial photogrammetry is 1 cm = 150 m 7 **(b)** and photograph size is 23 cm x 23 cm. Determine the number of photographs required to cover an area of 15 km x 12 km if longitudinal lap is 60% and side lap is 30%.

OR

Q.3 (a) Discuss various photo interpretation keys by giving example for each key that 7 how it is useful for differentiation of objects.

Date:22/12/2015

Total Marks: 70

7

- (b) A tower was photographed from an elevation of 1 km above the datum. The 7 radial distances of the top and bottom of the tower from the principal point is 112.2 mm and 81.6 mm, respectively. If the bottom of the tower has elevation of 350 m, determine the height of the tower above its bottom.
- Q.4 (a) Define remote sensing. Enlist types of remote sensing. Discuss an ideal remote 7 sensing system.
 - (b) Discuss the spatial and attribute data input and management in GIS.

OR

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- Q.4 (a) Discuss various types of GPS receivers. Specify the category of GPS receiver 7 inbuilt in latest smart phones.
 - (b) Define: (i) Azimuth, (ii) Nadir, (iii) Zenith, (iv) Latitude, (v) Longitude, 7 (vi) Sidereal time and (vii) Standard time.
- Q.5 (a) Discuss the order of triangulation with respect to accuracy for horizontal control. 7
 - (b) The following observations were recorded for angle under identical conditions: 7 82° 20' 20'' 82° 21' 20'' 82° 21' 40'' 82° 20' 40'' 82° 19' 40'' 82° 21' 20''
 If the maximum allowable error is 1' (one minute) from mean, apply outlier rejection criteria to find out precise set of observations. For precise set of observations calculate:

 i) Probable error of a single observation
 ii) Probable error of the mean, and

iii) MPV of the angles.

OR

- Q.5 (a) By giving suitable example justify that "Mistake" is the major source of the 7 error. Also define the following terms: i) Accuracy, ii) Precision and iii) MPV.
 - (b) Two triangulation stations A & B were 100 km apart having elevations of 400 m 7 & 441 m respectively. The intervening peak located exactly at midway i.e. 50 km from A, having elevation of 255 m. Check intervisibility of stations A & B, and compute height of scaffolding if clearance required to clear line of sight at peak is 3m.