Student Exam No._____

# GANPAT UNIVERSITY

## B. Tech. Semester: 6th Civil Engineering

## Regular Examination May 2014

## 2CI602 ADVANCED SURVEYING

**Time:** 3 Hours **Total Marks: 70**

**Instruction:** 1 All Questions are Compulsory.
2 Figure to the Right indicates Full Marks
3 Assume Suitable Data if necessary.

## Section - I

**Que. – 1** **(A)** Derive the formula for horizontal distance of tacheometric survey for staff vertical: inclined sight. **6**

**(B)** Two sets of tacheometric readings were taken from an instrument station A, the reduced level of which was 15.05 ft to a staff station B. **6**

(a) Instrument P – K=100, C= 14.4, staff held vertical

(b) Instrument Q – K=95, C= 15.5, staff held normal to the line of sight.

| Instrument | At | To | Ht.of instrument | Vertical angle | Stadia readings |
|---|---|---|---|---|---|
| P | A | B | 4.52 | 30° | 2.350, 3.310, 4.270 |
| Q | A | B | 4.47 | 30° | ? |

What should be the stadia readings with instrument Q?

**OR**

**Que. – 1** **(A)** Explain principle of stadia method. **6**

**(B)** To determine the multiplying constant of a tacheometer, the following observations were taken on a staff held vertically at distance, measured from the instrument. **6**

| Observation | Hori. Dist. In m | Vertical angle | Staff intercept |
|---|---|---|---|
| 1 | 50 | +3°48' | 0.500 m |
| 2 | 100 | +1°06' | 1.000 m |
| 3 | 150 | +0°36' | 1.500 m |

The focal length of the object glass is 20 cm and the distance from the object glass to trunnion axis is 10 cm. The staff is held vertically at all these points. Find the multiplying constants.

**Que. – 2** **(A)** Determine the gradient from a point A to a point B from the following observations made with a tacheometer fitted with an anallactic lens. The constant of the instrument was 100 and the staff was held vertically. **5**

| Inst. Station | Staff point | Bearing | Vertical Angle | Staff readings |
|---|---|---|---|---|
| P | A | 134° | +10°32' | 1.360, 1.915, 2.470 |
| | B | 224° | +5°6' | 1.065, 1.885, 2.705 |

(B) To determine the distance between two point C and D, and their elevations, the following observation were taken upon a vertically held staff from two traverse station A and B. The tacheometer was fitted with an anallactic lens, the constant of the instrument being 100 : 6

| Inst. Station | Staff Station | H.I | Bearing | Vertical Angle | Staff readings |
|---|---|---|---|---|---|
| A | C | 1.40 | 310°30' | +9°19' | 1.255,1.860,2.465 |
| B | D | 1.45 | 29°46' | +7°34' | 1.300,1.885,2.470 |

Co-ordinates of station A 215.20 N 154.80 E

Co-ordinates of station B 508.20 N 209.40 E

Calculate the distance CD, the RL's of C and D, if those of A and B were 454.660 m and 466.785 m respectively. And The gradient from C to D.

**OR**

**Que. – 2** (A) Describe the tangential method. 5

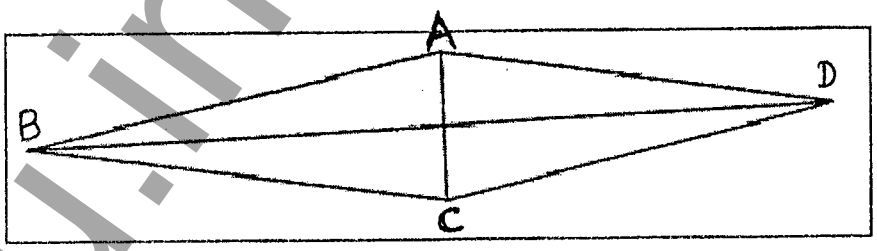
(B) The elevation of a point A is to be determined by observations from two adjacent stations of a tacheometric survey. The staff was held vertically upon the point, and the instrument is fitted within an anallactic lens, the constants of the instrument being 100. Compute the elevation of the point P from the following data, both the observations as equally trustworthy. 6

| Inst.Stn. | Ht. of axis | Staff point | Vertical angle | Staff readings | Elevation of station |
|---|---|---|---|---|---|
| P | 1.52 | A | +2°48' | 1.230, 2.055, 2.880 | 77.750 m |
| Q | 1.36 | A | -2°36' | 0.785, 1.800, 2.815 | 97.135 m |

Also, calculate the distance of P and Q from A.

**Que. – 3** (A) Classification of triangulation system. 6

(B) 6




Compute the strength of the figure ABCD. For each of the routesby Which the length BD can be computed from the known side AC. All The stations were occupied. Angles are as follows. ABD= 28°, CBD=36°, CDB=32°, ADB=23°, BAC=62°, DAC=67° BCA=54°, DCA=58°.

## Section – II

**Que. – 4** **(A)** Find the most probable values of A, B, C from the following observations. **6**

A = 45° 15' 20"

B = 35° 20' 27"

C = 55 °40' 38"

A+B = 80° 35' 52" and , B+C = 91° 01' 08"

**(B)** Adjust the following angles closing the horizon: **6**

| | |
|---|---|
| A = 112°20'46" | wt. 2 |
| B = 90° 30' 14" | wt. 3 |
| C = 58°12' 04" | wt. 1 |
| D = 98° 57' 00" | wt. 4 |

**OR**

**Que. – 4** **(A)** Following angles were measured at a station. Find their most probable values by method of correlates. **6**

| Angle | Values | Weight |
|---|---|---|
| AOB | 105°40' 20" | 3 |
| BOC | 178° 30' 30" | 3 |
| COA | 75° 50' 20" | 3 |

**(B)** The following observations were recorded for an angle under identical condition: 162°20' 40", 162°19' 40", 162°20' 20", 162°20' 00", 162°21' 00", 162°19' 20" **6**

Calculate the (I) probable error of a single observation,

(II) probable error of the mean

**Que. – 5** **(A)** What are the systems of co-ordinates employed to locate position of heavenly body? Explain briefly. **6**

**(B)** A straight length of highway AB appears to be 12.5cm on a vertical air photograph of 15cm focal length. The corresponding distance of the highway on a 1: 50000 topographical maps is 6.25 cm. assuming the average elevation of the terrain as 1250 m above M.S.L. calculate the flying height of the camera above mean sea level. **5**

**OR**

**Que. – 5** **(A)** Explain flight planning for aerial photography. How do you determine the number of photographs necessary to cover a given area in an aerial survey? **5**

**(B)** Find the local mean time of observation of the sun at a place in longitude 72° 36'E, corresponding to local apparent time 9h 29m 56s. The equation of time at G.M.N. is 4m 34.22s additive to mean time and increases at the rate of 0.24s per hour. **6**

**Que. – 6** **(A)** What is Total Station? Write down its application in construction. **4**

**(B)** What do you mean by GIS? As a Civil Engineer write down its importance in surveying. **4**

**(C)** What is Remote Sensing? Due to which scattering sky appears blue in the day. Explain it briefly. **4**

END OF PAPER