

GANPAT UNIVERSITY

B. Tech. Semester: VI (CIVIL) Engineering

Regular Examination April – June 2016

2CI602 ADVANCED SURVEYING

Time: 3 Hours

Total Marks: 70

- Instruction:** 1. This Question paper has two sections. Attempt each section in separate answer book.
 2. Figures on right indicate marks.
 3. Be precise and to the point in answering the descriptive questions.

Section - I

- Q.1 (A) What are the different methods employed in tacheometric survey? Describe the method most commonly used. 6
- Q.1 (B) Following observations were taken from two traverse stations by means of a tacheometer fitted with an anallactic lens. The constant of the instrument is 100. 6

Inst. Station	Ht. of Inst.	Co-ordinates		Staff Station	Bearing	Vertical Angle	Staff Reading
		N	W				
A	1.38	212.30	186.80	C	226°30'	+10°12'	0.765, 1.595, 2.425
B	1.42	102.80	96.40	D	84°45'	-12°30'	0.820, 1.840, 2.860

Compute the length and gradient of the line CD, if B is 6.5 m higher than A.

OR

- Q.1 (A) The vertical angle to vanes fixed at 0.5 m and 3.5 m above the foot of the staff held vertically at a point were -0°30' and +1°12' respectively. Find the horizontal distance and reduced level of the point, if the level of instrument axis is 125.380 m above datum. 4
- Q.1 (B) Two distances of 20 m and 100 m were accurately measured out and the intercepts on the staff between the outer stadia webs were 0.196 m at the former distance and 0.996 at the latter. Calculate the tacheometric constants. 4
- Q.1 (C) The vertical angles to vanes fixed at 1 m and 3 m above the foot of the staff held vertically at a station A were +2°30' and +5°48' respectively. Find the horizontal distance and the RL of A if the height of instrument determined from observation on to a BM is 438.556 m above the datum. 4
- Q.2 (A) Derive the Distance and Elevation formula for Staff Vertical and Normal Both the position. (Line of sight inclined). 5
- Q.2 (B) Two sets of tacheometric readings were taken from an instrument station A, the reduced level of which was 100.06 m to a staff station B. 6
- (a) Instrument 'P' : K=100; C = 0.06; staff held vertical.
 (b) Instrument 'Q' : K = 90 ; C = 0.06 ; staff held normal to the line of sight.

Inst.	At	To	HI	Vertical Angle	Stadia Readings
P	A	B	1.5 m	26°	0.755, 1.005, 1.255
Q	A	B	1.45 m	26°	?

What should be the stadia readings with instrument Q?

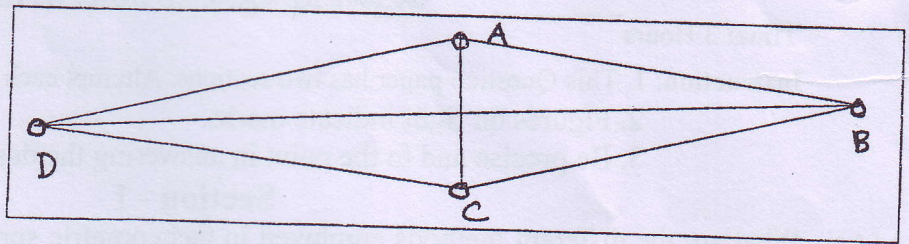
OR

- Q.2 (A) With a tacheometer stationed at P, sights were taken on three points A, B and C as follows. 5

Inst.	At	To	Vertical angle	Stadia Readings	Remarks
P	A		- 4°30'	2.405, 2.705, 3.005	RL of A=107.08. and staff normal
	B		0°00'	0.765, 1.070, 1.375	RL of B=113.41. and staff vertical
	C		+2°30'	0.720, 1.700, 2.680	Staff vertical

The telescope was of the draw tube type and the focal length of the object glass was 25 cm. for the sights to A and B, which was of equal length, the distance of the object glass from the vertical axis, was 12 cm. For sight to C, the distance of object glass from the vertical axis was 11 cm. Calculate (a) the spacing of the cross hairs in the diaphragm and (b) the reduced level at C.

- Q.2 (B) Describe the tangential method of tacheometric system with all three cases.
- Q.3 (A) Write down the theory of strength of figure and criterion of strength of figure.
- Q.3 (B) Compute the strength of the figure ABCD. For each of the routes by which the length BD can be computed from the known side AC. All The stations were occupied. Angles are as follows. $\angle ABD = 28^\circ$, $\angle CBD = 36^\circ$, $\angle CDB = 32^\circ$, $\angle ADB = 23^\circ$, $\angle BAC = 62^\circ$, $\angle DAC = 67^\circ$.



Section - II

- Q.4 (A) Define weight of an observation. How is reliability of the observation related to weight of the observation?
- Q.4 (B) If angle A has a weight of 3 and angle B has a weight of 2,
 i) What will be the weight of angle 2A?
 ii) What will be the weight of angle B/3?
- Q.4 (C) Angles were measured on a station and the observations were recorded as follows. Find the most probable values of the angles A, B and C using Normal equation method

Angle	Values	Weight
A	$40^\circ 20' 20''$	2
B	$55^\circ 30' 35''$	1
C	$60^\circ 30' 0''$	3
A+B	$95^\circ 50' 45''$	1
B+C	$116^\circ 0' 20''$	2
A+B+C	$156^\circ 20' 30''$	3

OR

- Q.4 (A) What if the difference between true error and residual error?
- Q.4 (B) Following observations were made for horizontal angles of a triangle.

$$\angle A = 20^\circ 20' \pm 0.2$$

$$\angle B = 100^\circ 40' \pm 0.1$$

$$\angle C = 59^\circ 10' \pm 0.2$$

- Determine the probable error of its summation, $\angle A + \angle B + \angle C$
- Q.4 (C) Following angles were measured at a triangle. Perform triangulation adjustment

Angle	Values
ABC	$34^\circ 22' 13''$, $34^\circ 22' 12''$, $34^\circ 22' 16''$, $34^\circ 22' 17''$, $34^\circ 22' 11''$, $34^\circ 22' 9''$
CAB	$69^\circ 32' 48''$, $69^\circ 32' 44''$, $69^\circ 32' 45''$, $69^\circ 32' 49''$, $69^\circ 32' 46''$
BCA	$76^\circ 03' 18''$, $76^\circ 03' 22''$, $76^\circ 03' 21''$, $76^\circ 03' 17''$

- Q.5 (A) Define:

(i) Principal point, (ii) Exposure station

- Q.5 (B) A camera having focal length of 20 cm is used to take a vertical photograph to a terrain having an average elevation of 1000 meters. What is the height above mean sea level at which an aircraft must fly in order to get the scale of 1:10000?
- Q.5 (C) What are the factors to be considered while designing the air flights? Explain each briefly.

OR

- Q.5 (A) Name the different types of platforms used for surveying.

- Q.5 (B) A line 2350 m long lying at an elevation of 500 m measures 10.5 cm on a vertical photograph. The focal length of the camera used is 20 cm. determine the scale of the photograph for an area having an elevation of 1200 m.

- 5 (C) The scale of a vertical photograph 25 cm X 25 cm is 1km=10m. Determine the number of photographs required to cover an area of 30 km X 20 km, if the longitudinal overlap is 60% and the side lap is 30%. 6
- Q.6 (A) Name Four remote sensing satellites and Four communication satellites launched by India. 4
- Q.6 (B) If the standard time at a place in India is 18 hours 18 minutes 18 seconds, Find the local mean time for the places whose meridians are 4
- i) 80° E
- ii) 48° W
- Q.6 (C) What is GPS? Briefly explain the Three interfaces in GPS. 4

END OF PAPER