Total number of printed pages: **Programme(D)/Semester/DCE404**

2024

SURVEYING-II

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) A tacheometer was setup at station A and the following readings were obtained on a vertically held staff: (10)

Station	Staff station	Vertical Angle	Hair Readings	Remarks
A	B.M.	- 2°40′	3.150, 3.378, 3.606	R.L. of B.M. = 154.556 m
	B	+ 5°38′	1.540, 2.432, 3.324	

Calculate the horizontal distance from A to B and the R.L. of B, if the constants of the instrument were 100 and 0.3.

b) Write down the procedure to determine horizontal angles by reiteration method using a vernier theodolite. (5)

c) Differentiate between Trigonometrical levelling and Tacheometric surveying? (5)

2. a) To determine the multiplying constant of a tacheometer, the following observations were taken on a staff held vertically at distance measured from the instrument: (5)

Observation	Horizontal distance in metres	Vertical angle	Staff intercept
1	50	+ 3°40′	0.500 m
2	100	+ 1°10′	1.000 m
3	150	+ 0°40′	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 constant.

b) Write down the procedure to determine vertical angle with a theodolite. (5)

c) What is resection in plane table survey? Write down the procedure to solve three-point problem using plane table. (10)

3. a) Find the elevation of the top of the chimney from the following data: (10)

Inst. station	Reading on B.M.	Angle of elevation	Remarks
A	1.342	8°30′	R.L. of B.M. = 254.224
B	1.231	5°15′	

Station A and B and the top of the chimney are in the same vertical plane.

b) Explain how you would determine the constants of a tacheometer. What are the advantages of an anallactic lens used in a tacheometer? (5)

c) What are the steps followed in setting up of plane table, Explain? (5)

4. a) The angle of elevations to the top of the tower from instrument stations A and B were 2°50′ and 7°46′ respectively. The distance between the two instrument stations was 50.55 m. The horizontal angle at stations A and B were 78°32′ and 65°57′ respectively. If the backsight reading on to a B.M. of R.L. 152.510 m was 2.587 m. Determine the R.L. of the top of the tower if the instrument stations and the object are not in the same vertical plane. (5)

b) Differentiate between Johnson table and cost survey table? (5)

c) For a tacheometric survey derive the distance and elevation formulae for an inclined line of sight at an angle of depression, if the staff was held normal to the line of sight. (10)

5. a) Write down the procedure to determine horizontal angle by repetition method using a vernier theodolite. (5)

b) Explain the principle of stadia method in tacheometry? Explain the field method to determine the constants K and C of a tacheometer. (5)

c) A tacheometer was set up at station O. Determine the gradient from a point P to Q from the following observations made with a fixed hair tacheometer fitted with an anallactic lens, the constant of the instrument being 100. (10)

Sighted to	Bearing	Reading on stadia hair		Reading on axial hair	vertical angle
P	345°	0.750	2.120	1.435	+13°452
Q	75°	0.625	3.050	1.835	+9°372

6. a) What are face-left and face-right observations in theodolite survey? What is the advantage of taking both face-left and face-right observations? (5)

b) What is temporary adjustment? What are the steps followed in temporary adjustment of a theodolite? (5)

c) With the help of a line diagram explain the fundamental lines and their desired relations of a theodolite. (10)

***