Total number of printed pages:02 **Programme(D)/IV-Semester/DCE404**

2023

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) Define: (8)
   (i) Plane table surveying
   (ii) Theodolite surveying
   (iii) Trigonometrical levelling
   (iv) Tacheometric surveying

   b) Enlist and explain briefly the different methods of plane table surveying. (8)

   c) Two distances of 50 m and 100 m were measured out and the intercepts on the staff between the outer stadia webs were 0.156 m at the former distance and 0.986 m at the latter. Calculate the tacheometric constants. (4)

2. a) What are the advantages and disadvantages of plane table surveying? (6)

   b) A tacheometer was set up at station P and the readings on a vertically held staff at Q were 1.355, 1.705 and 2.055, the line of sight being at an inclination on +6°20′. Another observation on the vertically held staff at B.M. gave the readings 1.620, 1.900 and 2.180, the inclination of the line of sight being +1°40′. Calculate the horizontal distance between P and Q, and the elevation of Q if the R.L. of B.M. is 100.456 m. The constants of the instruments were 100 and 0.4. (8)

   c) Explain the repetition method to measure horizontal angle with a theodolite. Prepare the observation table. (6)

3. a) What are the fundamental lines of a theodolite? Explain briefly the desired relations between these lines and the effect if such relations are not maintained. (6)

   b) A flag staff of 2 m height was placed on the top of a building. Observations were made to the flag staff from two instrument stations A and B at a horizontal distance of 100 m apart, the two stations were in line with the flag staff. The angles of elevations to the flag staff from A and B were 24°18′ and 16°20′ respectively. The back sight reading on a B.M. of R.L. 128.820 m were 1.870 and 2.560 m from A and B respectively with horizontal line of sight. Determine the (8)

elevation of the foot of the flag staff.

c) Explain the step-by-step procedure of setting up of plane table before taking any observation. (6)

4. a) What are temporary adjustments of an instrument? Explain the steps followed in temporary adjustment of a theodolite. (6)

b) To find the elevation of the top of a hill, a flag staff of 3 m height was erected and observations were made from two stations P and R, 80 m apart. The horizontal angles at P and R were 56°20′ and 65°30′ respectively. The angle of elevation to the top of flag staff from P and R were 8°16′ and 9°18′ respectively. Backsight readings on B.M. of R.L. 52.225 m were 1.865 and 1.688 m from P and R respectively. Calculate the elevation of the top of the flag staff. (5)

c) What are the different systems of tacheometry? Explain the principle of stadia method. (6)

d) Define: (3)

i) Stadia hairs

ii) Stadia interval

iii) Staff intercept

5. a) What is a two-point problem? Explain the procedure to solve it with a plane table. (6)

b) The vertical angles to vanes fixed at 2 m and 3 m above the foot of the staff held vertically at a station A were +2°16′ and +3°46′ respectively. Find the horizontal distance and reduced level of A if the height of the instrument was determined from observation on to a bench mark of R.L. 105.456 m. (5)

c) Write down the procedure to determine the vertical angle with a theodolite also prepare an observation table. (5)

d) What are the different sources of errors in theodolite survey? Explain them. (4)

6. a) Enlist all the accessories of plane table survey and explain their functions. (6)

b) Derive the distance and elevation formulae for a fixed hair method if the line of sight is at an angle of elevation and the staff was held vertically. (7)

c) Derive the distance and elevation formulae for trigonometrical levelling if the base of the object is inaccessible and the instruments axes are at different levels. The instrument and staff stations are in the same vertical plane. (7)

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