18CV45

USN

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Advanced Surveying

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain steps involved in temporary adjustment of setting out theodalite. **(08 Marks)**
   b. In order to ascertain the elevation of top (Q) of the signal on a hill, observations were made from two instrument stations P and R being in line with Q. The angle of elevation of Q at P and R were $28°\ 42'$ and $18°\ 6'$ respectively. The staff readings upon the bench mark of elevation 287.28 were respectively 2.870 and 3.750 when the instrument was at P and R, the telescope being horizontal. Determine the elevation of the foot of the signal if the height of the signal above its base is 3 meters. Do checks. **(12 Marks)**

OR

2 a. Explain the measurement of horizontal angle by repetition method. List the errors eliminated in this method. **(08 Marks)**
   b. To find the elevation of the top(Q) of a hill, a flag staff of 2 m height was erected and observation were made from two stations P and R, 60 m apart. The horizontal angle measured at P between R and top of flag-staff was $60°\ 30'$ and that measured at R between P and top of the flag staff was $60°\ 18'$. The angle of elevation to the top of flag staff P was measured to be $10°\ 12'$ at P. The angle of elevation to the top of flag staff was $10°\ 48'$ at R. Staff readings on B.M., when the instrument was at, (i) P = 1.965, R = 2.055 m. Calculate elevation of the top of the hill if that of BM was 435.065 m. Do checks. **(12 Marks)**

Module-2

3 a. Mention different system of tacheometric survey. Explain any one system. **(10 Marks)**
   b. What are the classifications of triangulation system? Explain any one. **(10 Marks)**

OR

4 a. What are the selection criteria for selecting base line and stations? **(10 Marks)**
   b. A tacheometer was set up at a station A and the readings on a vertically held staff at B were 2.255, 2.605, 2.955, the line of sight being at an inclination of $8°\ 24'$. Another observation on the vertically held staff at BM gave the readings 1.64, 1.920, 2.200 the inclination of the line of sight being $1°\ 6'$. Calculate the horizontal distance between A and B and the elevation of B if RL if BM is 418.685 m. The constants of the instruments were 100 and 0.3. **(10 Marks)**

Module-3

5 a. Explain the following terms :
      (iii)   Back tangent   (ii) Mid-ordinate   (iii) Intersection angle.
      (iv) Left hand curve   (v) Point of tangent   **(10 Marks)**
   b. Calculate the ordinates at 10 m distance for a circular curve having a long chord of 80 m and versed sine of 4 meters. **(10 Marks)**

OR

6 a. With a neat sketch, explain following parts of compound curve :
    (i)   Radius of small curve.
    (ii)   Common tangent
    (iii) Point of compound curvature.
    (iv)   Point of curve
    (v)   Point of intersection   **(10 Marks)**
   b. With a neat sketch, explain various types of vertical curves.   **(10 Marks)**

Module-4

7 a. Define the following terms :
    (i)   Principal point
    (ii)   Camera axis.
    (iii) Tilted photograph.
    (iv)   Flying height.
    (v)   Exposure station   **(10 Marks)**
   b. A camera having focal length of 20 cm is used to take a vertical photograph of terrain having an average elevation of 1500 m. What is the height above sea level at which an aircraft must fly in order to get a scale of 1 : 8000?   **(10 Marks)**

OR

8 a. With a neat sketch, explain scale of a vertical photograph. Also derive a equation for scale of a vertical photograph.   **(10 Marks)**
   b. A section line AB appears to be 10.16 cm on a photograph for which the focal length is 16 cm. The corresponding line measures 2.54 cm on a map, which is to a scale of 1 in 50,000. The terrain has an average elevation of 200 m above MSL. Calculate flying altitude of aircraft above MSL, when the photograph was taken.   **(10 Marks)**

Module-5

9 a. What are the different types of EDM instruments? Explain any one briefly.   **(10 Marks)**
   b. What is GPS? Explain the working principle of GPS and its uses in surveying.   **(10 Marks)**

OR

10 a. What is GIS? List the application of GIS in Civil Engineering.   **(10 Marks)**
   b. Explain the working principle and applications of total station.   **(10 Marks)**

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