15CV46

USN

Fourth Semester B.E. Degree Examination, June/July 2023
Advanced Surveying

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Give the classification of curves. **(04 Marks)**
   b. List out different method to set the simple circular curves. **(04 Marks)**
   c. Two tangents are intersected by a line D_1D_2. The angles BD_1D_2 and BD_2D_1 are 45° 30′ and 40° respectively. The radius of the first arc is 500 meters and that of the second are is 700 meters. If changing of point of intersection is 8200 meters, find the chainages of the tangent points and point of captained curvature. **(08 Marks)**

OR

2 a. What are the conditions required to be fulfilled by the transition curve? **(04 Marks)**
   b. Derive expressions for various elements of a simple circular curve. **(04 Marks)**
   c. Two parallel railway lines are to be connected by a reverse curve each section having same radius. IF the lines are 14 meters apart and maximum distance between tangent points measured parallel to the straights is 56 meters, find maximum allowable radius. If however both the radii are to be different, calculate the radius of the second arc if that of the first arc is 80 meters. Also calculate the lengths of both the branches. **(08 Marks)**

Module-2

3 a. Explain the classification of triangulation system. **(04 Marks)**
   b. List the laws of weights. **(04 Marks)**
   c. From a satellite station 'S', 5.8 meters from the main triangulation 'A' the following directions were observed.

   To – A – 0° 0′ 0″
   To – B – 132° 18′ 30″
   To – C – 232° 24′ 06″

   The lengths of AB and AC are 3265.5m and 4022.2 meters respectively. Determine directions AB and AC. **(08 Marks)**

OR

4 a. What are the different factors to be considered in selection of a triangulation stations? **(04 Marks)**
   b. Explain general principles of least square. **(04 Marks)**
   c. Adjust the following angles closing the horizon.
   A = 110° 20′ 48″ wt. 4
   B = 92° 30′ 12″ wt. 1
   C = 56° 12′ 00″ wt. 2
   D = 100° 57′ 04″ wt. 3. **(08 Marks)**

Module-3

5 a. Explain the following terms : i) Vertical circle ii) Hour circle iii) Elliptic **(03 Marks)**
   b. Explain astronomical triangle with a neat sketch. **(05 Marks)**
   c. Calculate distance in kilometer between two points A and B along the parallel of latitude, given that,
      i) Latitude of A, 20° 42′ N longitude of A, 30° 12′ W
         Latitude of B, 20° 42′ N longitude of B, 46° 24′ W

      ii) Latitude of A, 10° 36′ S longitude of A, 110° 6′ W
         Latitude of B, 10° 36′ S longitude of A, 145° 24′ E. **(08 Marks)**

OR

6 a. Define the following :
      i) The Zenith and Nadir
      ii) The terrestrial poles and equator. **(04 Marks)**
   b. What is a spherical triangle? Explain its properties. **(06 Marks)**
   c. Find the shortest distance between two points A and B given that,
      Latitude of A and B are 15° 10′ N and of 12° 10′ N
      Latitude of A and B are 50° 10′ E and of 54° 10′ E
      respectively. Given that radius of earth is 6370kms. **(06 Marks)**

Module-4

7 a. Define the following :
      Picture plane
      Focal plane
      Principal plane. **(03 Marks)**
   b. Mention the reasons for keeping the overlap in photographs. **(05 Marks)**
   c. Determine the number of photographs required to cover an area of 150 square km if longitudinal lap is 60% and side lap is 30%. Given that scale of an aerial photo graph is 1cm = 100 meters and photograph size is 20cm × 20cm. **(08 Marks)**

OR

8 a. Define the following terms :
      i) Vertical photograph
      ii) Tilted photograph
      iii) Oblique photograph. **(03 Marks)**
   b. Write a note on scale of a vertical photograph. **(07 Marks)**
   c. A vertical photograph was taken at an altitude of 1500 meters above mean sea level. Determine the scale of the photograph for terrain lying at elevation of 100 meters and 300 meters, if the focal length of the camera is 15cm. **(06 Marks)**

Module-5

9 a. With a neat sketch explain the principles of remote sensing. **(08 Marks)**
   b. Explain the components of GIS. **(08 Marks)**

OR

10 a. Explain the application of remote sensing and GIS in civil engineering. **(08 Marks)**
   b. What is GPS? Explain its working principle. **(08 Marks)**

* * * * *