

Fourth Semester B.E. Degree Examination, July/August 2022
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 the procedure of measuring horizontal angle by Repetition and Reiteration method. (08 Marks)
- b. Define the following terms:
 - (i) Centring (ii) Transiting (iii) Changing face
 - (iv) Swinging (v) Line of collimation (06 Marks)
- c. Write the short notes on step by step procedure for obtaining permanent adjustment of transit theodolite. (06 Marks)

OR

- 2 a. To find the elevation of the top (Q) of a hill, a flag staff of 2 m height was erected and observations were made from 2 stations P and R, 60 m apart. The horizontal angle measured at P between R and the top of the flag staff was $60^{\circ}30'$ and that measured at R between the top of the flag staff and P was $68^{\circ}18'$. The angle of elevation to the top of the flag staff was measured to be $10^{\circ}12'$ at P. The angle of elevation to the top of the flag staff was measured to be $10^{\circ}48'$ at R. Staff readings on B.M. when the instrument was at P = 1.965 m and that with the instrument at R = 2.055 m. Calculate the elevation of the top of the hill if that of B.M. was 435.065 m. (10 Marks)
- b. Derive expression for determining the distance and elevation of an inaccessible object by single plane method. Assume instrument axes at the same level and different level. (10 Marks)

Module-2

- 3 a. Derive distance and elevation formulae for stadia tachometry, when staff held normal to the line of sight, for both an angle of elevation and angle of depression. (10 Marks)
- b. Determine the gradient from point A to a point B from the following observations made with a tachometer fitted with an anallactic lens. The constant of the instrument was 100 and the staff was held vertically.

Inst Station	Staff point	Bearing	Vertical angle	Staff readings
P	A	134°	$+10^{\circ}32'$	1.360, 1.915, 2.470
	B	224°	$+5^{\circ}36'$	1.065, 1.885, 2.705

(10 Marks)

OR

- 4 a. List the various factors that are to be considered in the selection of site for baseline in triangulation survey. (04 Marks)
- b. Write the objectives of Geodetic Triangulation and briefly explain the various triangulation figures adopted in triangulation survey with neat sketch. (10 Marks)
- c. From an eccentric station S, 12.25 m to the west of the main station B, the following angles were measured $\angle BSC = 76^{\circ}25'32''$, $\angle CSA = 54^{\circ}32'20''$. The stations S and C are to the opposite sides of the line AB. Calculate the correct angle ABC if the lengths AB and BC are 5286.5 m and 4932.2 m respectively. (06 Marks)

Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. With the help of neat sketch of a simple circular curve, explain (i) point of curve (ii) deflection angle (iii) tangent length (iv) length of the long chord (v) Apex distance (vi) Mid ordinate (06 Marks)
- b. Two tangents AB and BC intersect at a point B at chainage 2760 m. Calculate all the necessary data for setting out a curve of 573 m radius and deflection angle 30° by the method of ordinates from long chord at 30 m interval. (08 Marks)
- c. Two straights AB and BC are intersected by a line D_1D_2 . The angles AD_1D_2 and CD_2D_1 are $139^\circ 30'$ and $143^\circ 36'$ respectively. The radius of the first arc is 600 m and that of the second arc is 800 m. If the chainage of the second arc is 800 m. If the chainage of Intersection point B is 8248.1. Find the chainage of the tangent points and the Point of Compound Curvature (P.C.C). (06 Marks)

OR

- 6 a. Two parallel railway lines are to be connected by a reverse curve, each section having the same radius. If the lines are 12 m apart and the maximum distance between tangent points measured parallel to the straights is 48 m, find the maximum allowable radius. If however, both the radius are to be different, calculate the radius of the second branch if that of the first branch is 60 m. Also calculate the length of both the branches. (10 Marks)
- b. What are the requirements of an essential transition curve? (06 Marks)
- c. With a neat sketch, list any four vertical curves. (04 Marks)

Module-4

- 7 a. A vertical photograph was taken at an altitude of 1200 m above mean sea level. Determine the scale of the photograph for terrain lying at elevations of 80 m and 300 m if the focal length of the camera is 15 cm. (08 Marks)
- b. Derive the expression for relief displacement on a vertical photograph. (06 Marks)
- c. List the reasons for keeping overlap in photographs. (06 Marks)

OR

- 8 a. Define (i) Vertical photograph (ii) Tilted photograph (iii) Oblique photograph. (06 Marks)
- b. Write short note on : (i) Stereoscope (ii) Parallax Bar (iii) Mosaics (08 Marks)
- c. The scale of an aerial photograph is 1 cm = 160 m and the size of the photograph is 20 cm \times 20 cm. If the longitudinal lap is 65% and side lap is 35%, determine the number of photographs required to cover an area of 232 sq.km. (06 Marks)

Module-5

- 9 a. Mention the advantages of total station and describe its working principle. (08 Marks)
- b. With neat sketch, explain the electromagnetic spectrum. (06 Marks)
- c. Explain the interaction of electromagnetic waves with atmosphere. (06 Marks)

OR

- 10 a. Define Remote Sensing? Explain the stages of idealized remote sensing system. (08 Marks)
- b. With a neat sketch, explain the components of GIS. (06 Marks)
- c. List out the application of GIS and Remote Sensing. (06 Marks)
