



Fourth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Advanced Surveying

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw neat sketches wherever necessary.

Module-1

- 1 a. Define :
- Vertical axis
 - Line of collimation
 - Transiting
 - Face left observation with reference to a theodolite. (04 Marks)
- b. Explain the repetition method of measuring a horizontal angle using a theodolite. Write the typical table. (08 Marks)
- c. The top(Q) of a telecommunication tower was sighted from two theodolite stations P and R that were 60 m apart. Determine its RL from the following observations. Apply the check.

Theodolite	BS on BM	Vertical angle to Q	Horizontal angle	Remark
P	1.965 m	10° 12'	QPR = 60° 30'	RL of BM = 116.72 m
R	2.055	10° 48'	QRP = 68° 18'	

(08 Marks)

OR

- 2 a. Define :
- Horizontal axis
 - Swinging
 - Changing face
 - Telescope inverted with reference to a theodolite. (04 Marks)
- b. Describe any FOUR desired relations that should exist between the fundamental lines of a theodolite. Explain their effect. (08 Marks)
- c. The following observations were made to a target Q that was 3 m above the top of a hillock. The theodolite station P was nearer to the hillock and 100 m from the theodolite station R. R, P and Q were in the same vertical plane. Determine the RL of the top of the hillock. Apply the check.

Theodolite at	BS on BM	Vertical angle to Q	Remark
P	1.290 m	28° 42'	RL of BM = 282.36 m
R	2.170 m	18° 06'	

(08 Marks)

Module-2

- 3 a. List any EIGHT specifications of primary triangulation. (04 Marks)
- b. Describe a satellite station. Explain reduction to centre with neat sketches. (08 Marks)
- c. Determine the gradient from A to B with the help and observations tabulated below. The tacheometric constants were 100 and 0, the staff being held vertically.

Instrument at	Staff to	Bearing	Vertical angle	Staff readings, m
P	A	64°	10° 32'	1.360, 1.915, 2.470
P	B	154°	05° 06'	1.065, 1.885, 2.705

(08 Marks)

OR

- 4 a. Describe triangulation with its terminology. (04 Marks)
 b. Describe base line measurement. Discuss the factors to be considered for selecting a site for it. (08 Marks)
 c. The following observations were made to a station A of RL 270.655 m with two tacheometers. Determine the staff readings that would have been obtained with the instrument Q, if those obtained with the instrument P were 0.755, 1.005 and 1.255 m.

Instrument	K and C	HI	Vertical angle	Staff held
P	100, 0.06	1.5 m	26°	Vertical
Q	90, 0.06	1.45 m	26°	Normal

(08 Marks)

Module-3

- 5 a. Discuss the conditions to be satisfied by a transition curve introduced between a straight and a circular curve. (04 Marks)
 b. Tabulate the details to set out a simple curve of radius 100 m by deflection angles. Chainage of the point of intersection is 280.5 m and the external deflection angle is 30°. Peg interval = 10 m. (08 Marks)
 c. A reverse curve consisting of two simple arcs of equal radii connects two parallel straights that are 32 m apart. The straight distance between the tangent points is 160 m. Tabulate the details to set out the curve by ordinates at 10 m intervals from long chord. If the first arc is of radius 250 m, determine the radius of the second. (08 Marks)

OR

- 6 a. Discuss the general features of vertical curves. (04 Marks)
 b. Describe the procedure for setting out a simple curve by deflection distances. (08 Marks)
 c. Two straights AV and VB are intersected by a line MNP. A compound curve consisting of two simple arcs, tangential to the line MNP at N, connects the straights. The radii of the two arcs are 500 m and 300 m respectively. The angles AMP and BPM are 130° and 140° respectively. Determine the chainages of PC, PT and PCC if that of PI is 4653.8 m. (08 Marks)

Module-4

- 7 a. Explain the following with a neat sketch of a tilted photograph :
 i) Nadir point ii) Principal plane iii) Swing. (10 Marks)
 b. A vertical photograph was taken at an altitude of 1200 m above MSL with a camera of focal length 15 cm. Determine the scales of terrains lying at : i) 80 m ii) 300 m. (05 Marks)
 c. A line AB measures 10.16 cm on a photograph and 2.54 cm on a map of RF 1/50,000. The average elevation of the terrain is 200 m above MSL. Determine the altitude from which the photograph was taken with a camera of focal length 16 cm. (05 Marks)

OR

- 8 a. Describe the following with neat sketches : i) Crab ii) Drift. (10 Marks)
 b. Discuss the reasons for keeping overlap in aerial photograph. (05 Marks)
 c. An aerial photograph needs to be taken of an area of average elevation 1500 m. Determine the flying altitude to obtain vertical photographs of scales :
 i) 1 : 800 ii) 1 : 3000. The focal length of the camera is 20 cm. (05 Marks)

Module-5

- 9 a. What is a total station? Explain the three parameters that are measured. (08 Marks)
 b. Explain the features of : i) Scattering ii) Absorption iii) Atmospheric windows. (12 Marks)

OR

- 10 a. Explain the features of GPS and its segments. List the applications, merits and limitations. (10 Marks)
 b. Explain the features of GIS and its working. List the applications, strengths and weaknesses. (10 Marks)