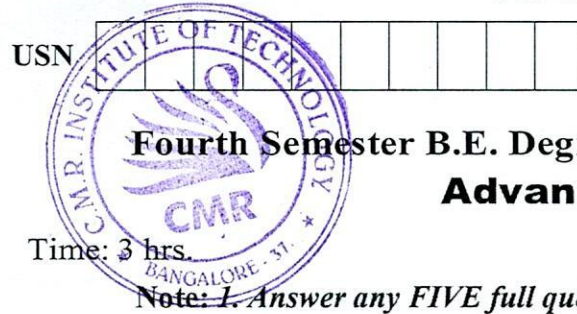


USN

18CV45



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)

1 of 2

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 :
- Nadir point
 - Principal plane
 - 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)

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- 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)

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