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18CV45

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022 Advanced Surveying

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitable as applicable.

Module-1

- 1 a. Distinguish between:
- Plunging and swinging of the telescope
 - Plate bubble and altitude level
 - Face left and face right observation
 - The horizontal axis and vertical axis
 - The vertical circle and scale plate
- (10 Marks)
- b. Explain the temporary adjustments of transit theodolite. (10 Marks)

OR

- 2 a. Derive the expression for the horizontal distance, vertical distance and the elevation of an elevated object by double plane method, when the base is inaccessible. (10 Marks)
- b. Find the elevation of the top of a chimney (Q) from the following data:

Inst. Station	Reading on BM	Angle of Elevation	Remarks
A	2.870	28°42'	RL of BM = 421.380
B	3.750	18°06'	Distance AB = 100 m

Station A and B and the top of the chimney are in the same vertical plane. (10 Marks)

Module-2

- 3 a. Explain the different systems of Tacheometric measurement and principles of Tacheometry. (10 Marks)
- b. Determine the gradient from a point A to a point B from the following observations made with a tacheometer fitted with an anallactic lens. The constant of the instrument was 100 and the staff was held vertically.

Instrument Station	Staff Point	Bearing	Vertical angle	Staff readings
P	A	134°	+10°32'	1.360, 1.915, 2.470
	B	224°	+5°6'	1.065, 1.885, 2.705

(10 Marks)

OR

- 4 a. Mention the points to be considered in the selection of triangulation stations. (08 Marks)
- b. 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 station S and C are to the opposite sides at the line AB, calculate the correct angle ABC, if the lengths of AB and BC are 5286.5 and 4932.2 m respectively. (12 Marks)

Module-3

- 5 a. What are the elements of simple circular curve? (03 Marks)
- b. A 10° curve is introduced between two straights at an intersection angle of $32^\circ 30'$, compute:
(i) Radius of the curve (ii) Length of the curve (iii) Tangent length
(iv) Long chord (v) Apex distance (07 Marks)
- c. Two straights AB and BC are intersected by a line D_1D_2 . The angles BD_1D_2 and BD_2D_1 are $40^\circ 30'$ and $36^\circ 24'$ respectively. The radius of the first arc is 600 mts and that of the second arc is 800 mts. If the chainage of intersection point B is 8248.1 mts, find the chainages of the tangent points and the point of compound curvature. (10 Marks)

OR

- 6 a. Distinguish between transition and vertical curve. Explain the requirements of a transition curve. (10 Marks)
- b. 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 both the radii 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)

Module-4

- 7 a. Define the following terms:
(i) Oblique photograph (ii) Exposure station (iii) Nadir point
(iv) Azimuth of principle plane (v) Principal point (10 Marks)
- b. A vertical photograph was taken at an altitude of 1200 mts above mean sea level. Determine the scale of the photograph for terrain lying at elevations of 80 mts and 300 mts, if the focal length of the camera is 15 cm. (10 Marks)

OR

- 8 a. List the reasons for keeping overlap in photographs and describe how mozaic differ from a map. (10 Marks)
- b. A pair of photographs was taken with an aerial camera from an altitude of 5000 m above m.s.l. The mean principle base measured is equal to 90 mm. The difference in parallax between the two points is 1.48 mm if the elevation of the lower point is 500 m above datum. What will be the difference in elevation, if the parallax difference is 15.5 mm. (10 Marks)

Module-5

- 9 a. Explain the working of remote sensing equipment. (10 Marks)
- b. Explain the working of total station. (10 Marks)

OR

- 10 a. Explain the civil engineering applications in GIS and remote sensing. (10 Marks)
- b. Write a note on various types of sensors used for remote sensing in India. (10 Marks)

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