R13

Code No: 113AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February - 2024

SURVEYING

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	What are the key objectives of surveying?	[2]
b)	Distinguish between Whole and Quadrantal bearing system.	[3]
c)	Define 'contour'.	[2]
d)	List the methods of leveling used for determining differences in elevation.	[3]
e)	Name the common types of cross-sections encountered in the field.	[2]
f)	Explain any one method used for computation of areas consisting of irregular boundaries.	[3]
g)	Explain the basic principles of electronic theodolite measurements.	[2]
h)	Discuss the limitations associated with the method of repetitions in theodolite measurements.	[3]
i)	Define the term simple curve in surveying.	[2]
j)	Enumerate two applications of GPS in surveying.	[3]

PART - B

(50 Marks)

2.a) Describe the principles of plane surveying and their application.

b) A surveyor measured a distance of 2000 m using a 30 m chain, assuming it was the correct length. Later, it was found that the chain was 0.1 m too long. Subsequently, another 500 m was measured (total 2500 m), and it was found that the chain was 0.15 m too long. If the initial assumption was correct, what is the actual length of the chain? [5+5]

OR

3.a) Enumerate the errors associated with compass surveying and elucidate the provisional adjustments made in compass surveying.

b) In an anticlockwise traverse ABCA, all sides are equal. The magnetic fore bearing of BC was found to be 184°30'. The magnetic bearing of the sun at local noon was observed to be 210°30'. Calculate the magnetic bearings and true bearings of all sides, tabulate the results, and provide a neat sketch illustrating the bearings. [4+6]

4. Given the following staff readings taken with a level where the instrument was shifted after the 3rd, 8th, and 10th readings: 1.625, 2.190, 3.125, 1.275, 1.020, 2.015, 0.975, 4.010, 1.625, 1.860, and 2.585. The initial reading was on a benchmark at an elevation of 120.875. Organize the readings in the level book form, apply standard checks, and determine the difference in level between the initial and final points. [10]

OR

5. Discuss the applications of contour lines in surveying and mapping. How can contour maps assist in land development and engineering projects? [10]

6. a) A road embankment is 10 m wide at formation level. The center line of the embankment is 2.5 m above the ground surface. If the ground slope is 1 in 20 at angles to the center line, and the side slopes are 2:1, determine the side width and the area of the cross-section.

b) Compute the area between a transverse line and an irregular boundary based on the given perpendicular offsets: 2.50, 3.25, 4.20, 3.90, 5.00, 8.20, 6.80, 4.80, 3.30, at 6 m intervals. [5+5]

OR

7. Determine the reservoir capacity based on the given contour plan for a proposed reservoir with the following data.

Contour (m)	95	90	85	80	75	70	65
Area (ha)	17	22	20	17	14	12	6

Assume the full reservoir level is 95 m, and the reference level (R.L) is 95.00 m. [10]

8. Explain, in detail, the procedure for measuring horizontal angles by repetition with a theodolite. [10]

OR

9. Determine the elevation of the top Q of a signal, observations were made from two instrument stations, A and B, aligned with the signal. The stations A and B are now 90 m apart. The vertical angles to Q observed at A and B were 28°30' and 15°10', respectively. The staff reading on the benchmark of elevation 183.250 was 3.250 m at A and 4.250 m at B. Determine the elevation of the top and foot of the signal, given that the height of the signal above its base is 6 m. [10]

10. Two tangents intersect at the chainage 1100 m, the deflection angle being 40^0. Determine all the data necessary for setting out a curve with a radius of 400 m. Assume the peg interval to be 40 m.

[10]

OR

11.a) Briefly explain the functions of the three segments of the Global Positioning System (GPS).

b) Elaborate on the distance and elevation formulae for the staff's vertical position in stadia Tacheometry.

[5+5]

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