

II B. Tech I Semester Regular/Supplementary Examinations, January - 2023
SURVEYING AND GEOMETRICS
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks

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UNIT-I

- 1 a) Write the classifications and principles of surveying. [7M]  
b) Convert the whole circle bearing into reduced bearing:  $50^\circ$ ,  $176^\circ$ ,  $210^\circ$ ,  $232^\circ$ ,  $150^\circ$ ,  $76^\circ$ ,  $310^\circ$ ,  $242^\circ$ . [7M]

OR

- 2 a) What is Ranging? Explain different types of ranging. [7M]  
b) The magnetic bearing of a line is S  $280^\circ 30'$  E. Calculate the true bearing if the magnetic declinations are  $50^\circ 38'$  East and  $50^\circ 38'$  West. [7M]

UNIT-II

- 3 a) Write the temporary adjustments of a leveling instrument. [7M]  
b) State and determine the error due to curvature of the earth. Consider diameter of the Earth as 12,742 km. [7M]

OR

- 4 a) Explain the effects of curvature and refraction in levelling. [7M]  
b) Explain how the error due to curvature, refraction and collimation are eliminated in reciprocal levelling. [7M]

UNIT-III

- 5 a) Draw Theodolite and mention parts. [7M]  
b) What are the types of Theodolites? Explain any one type in detail. [7M]

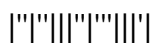
OR

- 6 a) Name the methods of measuring horizontal angles using a theodolite. Discuss any one method in detail. [7M]  
b) How measurement of vertical angle is carried out in theodolite surveying? [7M]

UNIT-IV

- 7 a) With a neat sketch show the different parts of a simple circular curve. [7M]  
b) Given that the intersection angle of a two-degree curve is  $120^\circ$ , Compute the various elements of a simple curve. [7M]

OR



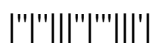
- 8 a) What are the common difficulties in setting out simple curves? [7M]  
b) Calculate the ordinates from the long chord at 7.5 m intervals to set out a simple circular curve of 100. The length of the long chord is 100m. [7M]

UNIT-V

- 9 a) Explain about Radial triangulation. [7M]  
b) What are the various methods employed in photographic mapping? [7M]

OR

- 10 a) Discuss about terrestrial photogrammetry. [7M]  
b) Write a note on flight planning and stereoscopy. [7M]



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UNIT-I

- 1 a) Define the true bearing and magnetic bearing. [7M]
b) What do you mean by orientation? Explain different methods of orienting the plane table with the help of neat sketches. [7M]

OR

- 2 a) What are different tape corrections? [7M]
b) A 30m tape standardized in the catenary as 29.990m at 100 N is used in the field with a tension of 80 N in the catenary. Calculate the sag correction if the mass of the tape is 0.33 kg per m. [7M]

UNIT-II

- 3 a) Describe the process of contouring and state the characteristics and methods of locating the contours. [7M]
b) Write the characteristics of contours. [7M]

OR

- 4 a) Derive the expression for the trapezoidal formula for volume. [7M]
b) Explain the method of determination of areas for Irregular boundry. [7M]

UNIT-III

- 5 a) Explain the trigonometrical levelling of heights and distances. [7M]
b) What is transit theodolite and what are the temporary adjustments in theodolite? [7M]

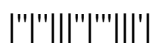
OR

- 6 a) Discuss about Omitted measurements in traversing. [7M]
b) Explain the horizontal angle measurement by repetition method. [7M]

UNIT-IV

- 7 a) Write about the elements of simple curve. [7M]
b) Explain the principles of electro-optical EDM. [7M]

OR



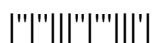
- 8 a) State the advantages of tachometric surveying. [7M]
b) Discuss in detail the advantages and disadvantages of total Station surveying over traditional methods of surveying. [7M]

UNIT-V

- 9 a) Write about relief and tilt displacements. [7M]
b) Explain in detail aerial photogrammetry. [7M]

OR

- 10 a) What are the basic concepts of photogrammetry surveying? [7M]
b) Define celestial horizon, hour angle, Zenith, Nadir, and the celestial equator. [7M]



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UNIT-I

- 1 a) Classify and explain in detail the method of surveying based on the instruments used. [7M]
 b) What are the essential differences between the chain survey and the compass survey? [7M]

OR

- 2 a) Define and distinguish between magnetic dip and magnetic declination. [7M]
 b) A 20 m chain was found to be 15 cm too long after chaining a distance of 1600 m. It was found to be 30 cm too long at the end of the day's work after chaining a total distance of 3200 m. Determine the correct distance if the chain was correct before the commencement of the work. [7M]

UNIT-II

- 3 a) Explain how to calculate the capacity of reservoir. [7M]
 b) The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line: 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65. Calculate the area enclosed between the survey line, the irregular boundary line and the first and last offsets by Simpson's method. [7M]

OR

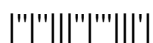
- 4 a) What is Simpson's rule? Derive an expression for it [7M]
 b) Write about (i) Back sight (ii) Intermediate sight (iii) Fore sight [7M]

UNIT-III

- 5 a) What are face left and face right observations? Why is it necessary to take both observations? [7M]
 b) Write the difference between reiteration and repetition method. [7M]

OR

- 6 a) Define the terms i) face left and face right observations. ii) swinging and transiting the telescope [7M]
 b) What is declination? What are the different types of variations in declination? [7M]



UNIT-IV

- 7 a) Derive the relationship between the degree of a curve and its radius. [7M]
b) What are the fundamental parameters required in Total Station surveying? [7M]

OR

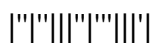
- 8 a) Discuss briefly about the elements of a compound curve. [7M]
b) Define the term vertical curve and explain its various types with help of a neat sketch. [7M]

UNIT-V

- 9 a) What do you understand by image classification? [7M]
b) How mapping is done by paper prints? [7M]

OR

- 10 a) What are object and field-based models? Differentiate between vector and raster data formats. [7M]
b) Explain aerial triangulation surveying. [7M]



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UNIT-I

- 1 a) Explain the working and use of open cross-staff, french cross-staff, optical square and prism square. [7M]  
b) What factors should be considered in deciding the stations of a chain survey? [7M]

OR

- 2 a) What are the possible errors in chaining? [7M]  
b) Explain plane and geodetic Surveying. [7M]

UNIT-II

- 3 a) What is the trapezoidal Rule? Derive an expression for it. [7M]  
b) What is meant by the reduction of levels? Explain briefly the different methods of leveling. [7M]

OR

- 4 a) Explain the process of profile levelling and cross-sectioning levelling. [7M]  
b) Define Orientation. What are the different methods of orientation adopted in the graphical method of surveying? [7M]

UNIT-III

- 5 a) Write any two methods of traversing. [7M]  
b) Discuss briefly about the various types of theodolites with advantage and disadvantages. [7M]

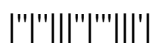
OR

- 6 a) Distinguish between closed traverse and open traverse. [7M]  
b) What are the various permanent adjustments of Theodolite? Explain in detail. [7M]

UNIT-IV

- 7 a) What are the principles of tachometric surveying? [7M]  
b) Explain the necessity of the transition curve and derive the intrinsic equation for the ideal transition curve. [7M]

OR



- 8 a) Explain the difference between tangential and stadia tacheometry. How the stadia constants are determined? [7M]  
b) Explain the possible errors in total station surveying. [7M]

**UNIT-V**

- 9 a) Discuss briefly about active and passive sensors. [7M]  
b) How many minimum numbers of satellites are required to obtain a position of a point on earth? [7M]

**OR**

- 10 a) Explain the process of mapping by stereo plotting instruments. [7M]  
b) Discuss briefly about the terrestrial photogrammetry. [7M]

