

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]  
(2064)

14665

B. Tech 4th Semester Examination

Surveying-II (O.S.)

CE-4005

Time : 3 Hours

Max. Marks : 100

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt Five question in all selecting one question from each of the section A, B, C, and D of the question paper and all the subparts of the question E. Use of non-programmable calculator is allowed.

#### SECTION - A

1. Explain the term axis-signal correction as used in Trigonometric leveling. Derive an expression for the difference in elevation by single observation when the observed angle is one of elevation.  
(20)

2. What is a satellite station? From a satellite station S 14 m from A, angles measured to three triangulation stations are as:

$$\text{Angle CSA} = 32^\circ 45' 48'' \quad \text{Angle BSC} = 68^\circ 26' 36''$$

The lengths of sides AC and AB are 5678 m and 1441 m respectively. Find the angle BAC.  
(20)

#### SECTION - B

3. What is weight of quantity? How would you allocate weights to different quantities? Discuss various laws of weights. Also discuss the various indices of precision for observation of equal and unequal weights.  
(20)

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4. Given the following observation equation, find the most probable values of P, Q, and R.

$$\begin{aligned} P &= 35^\circ 14' 25'', \text{ weight} = 1; & Q &= 24^\circ 18' 14'', \text{ weight} = 2 \\ R &= 55^\circ 13' 22'', \text{ weight} = 3 & P + Q &= 59^\circ 32' 45'', \text{ weight} = 2 \\ Q + R &= 79^\circ 31' 40'', \text{ weight} = 1 & & (20) \end{aligned}$$

### SECTION - C

5. Describe Astronomical Triangle with neat sketches. Give relations to compute the various unknown in Spherical triangle. Determine the hour angle and declination of a star from the following data
- (i) Latitude of the place =  $48^\circ 30' \text{N}$
  - (ii) Azimuth of the star =  $50^\circ \text{W}$
  - (iii) Altitude of the star =  $28^\circ 24'$  (20)
6. Describe the steps of conversion of LST to LMT and vice versa. Find the LST corresponding to 4:45 AM on Jan 26, 1953 at a place in longitude  $68^\circ 12' \text{W}$ , the GST of GMM being 8h 19m 57.53s. (20)

### SECTION - D

7. Define the term parallax. Derive the parallax equation for computing ground coordinates and elevation of a point. Determine the RL of points A and B from following data:
- |                       |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| RL of C               | = 352 m,    | RL of D               | = 416 m,    |
| Parallax reading of C | = 9.96 mm   | Parallax reading of D | = 10.56 mm, |
| Parallax reading of A | = 11.54 mm, | Parallax reading of B | = 8.86 mm   |
- Average base = 96 mm and focal length of camera = 300 mm. (20)

8. (a) What do you understand by GIS? What are the essential functions of GIS? What are the various components of GIS? (10)
- (b) What do you understand by remote sensing? Briefly explain the various components of remote sensing system. (10)

### SECTION - E

9. Attempt all parts:
- (a) What is meant by i) a Sidereal day, ii) Apparent Solar day, iii) Mean Solar day?
- (b) What is meant by Strength of figure?
- (c) Draw the astronomical triangle when the star is at horizon.
- (d) Briefly differentiate between plane and geodetic surveying.
- (e) Explain the objectives and basic principle of triangulation.
- (f) Write a note on Atmospheric Window.
- (g) A base line could not be measured due to some obstructions. A station S by the side was chosen as shown in the figure and angle at that station was measured. Find the length of the base line from the following data:  $a = 858.5$  m;  $b = 1215.8$  m;  $\alpha = 10^\circ 06'$
- (h) How is the refraction correction determined from reciprocal observations?
- (i) Convert 7 h 45 m 50 s mean solar time to sidereal time interval.
- (j) Define the following:  
Principal point, Isocentre, Fiducial mark, Crab  
(2×10=20)