B 2102

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fourth Semester

Civil Engineering

CE 239 — SURVEYING – II

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

Explain the following :

1. Plane and geodetic surveying.

2. Subtense bar.

3. Precise levelling.

4. Traverse adjustment.

5. Correction needed for sun observation.

6. Accuracy requirement of azimuth determination.

7. Error propagation in levelling and level nets.

8. Least squares principle in survey adjustment.

9. Sextant.

10. Electronic distance measurement and its accuracy standards.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain step-by-step method to measure the base line for triangulation survey. (4)

(ii) A base line was measured with a steel tape, which was exactly 30 m at 20°C, and a pull of 6 kg and the measured length was 459.242 m. Temperature during measurement was 30°C and the pull applied was 10 kg. The tape was uniformly supported during the measurement. Find the true length of the line if the cross-sectional area of the tape was 0.02 cm^2 the coefficient of expansion per 1° C = 0.0000035, and the modulus of elasticity = 2.1×10^6 kg/cm^2 .(12)

Or

(b) (i) What is meant by satellite station? When do we resort to a satellite station? (4)

(ii) From an eccentric station E, 13.8 m from station A, the angle measured to three trigonometrical stations A, B and C are as follows, the stations C and E being opposite sides of the line AB :

$\angle BEC = 68°26'36''$; $\angle CEA = 32°45'48''$

The length of AC and AB are 5588.4 m and 4371.0 m respectively. Calculate the angle $\angle BAC$. (12)

12. (a) Suppose the angles in a triangle ABC were each measured by the same observer using the same instruments, but the number of repetitions for each angle varied. The results were $A = 45°15'25''$, $n = 4$, $B = 83°37'22''$, $n = 8$, and $C = 51°07'39''$, $n = 6$. Adjust the angles. (16)

Or

(b) While measuring angles at a station, closing the horizon, the following measurements and their standard deviations were obtained.

No.	Angle	S
a_1	134°38'56"	±6".7
a_2	83°17'35"	±9".9
a_3	142°03'14"	±4".3

Find the most probable values of the observed angles. (16)

13. (a) (i) Explain the uses of Total station. (8)

(ii) Explain the Photogrammetric adjustment for map making. (8)

Or

(b) (i) Explain three point problem and strength of fix in hydrographic surveying. (8)

(ii) Explain modern cadastral procedure. (8)

14. (a) (i) Explain the celestial sphere and star constellation. (8)

(ii) What is meant by nautical almanac? (8)

Or

(b) Explain field observation procedure and calculation for azimuthal determination using observation to sun. (16)

15. (a) Explain the principles which various methods of determining distance with the help of tangential tacheometry and derive the formulae for each case. (16)

Or

(b) A tacheometer fitted with an anallactic lens was used to observe the following :

From	To	Bearing	Vertical angle	Hair reading		
C	*A*	320°	+12°	0.905	1.725	2.550
C	*B*	50°	+10°	0.745	2.200	3.655

The value of the constant was 100 and the staff was held vertically. Determine the length and gradient of *AB*. (16)