

5E5064

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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015

**Civil Engineering
5CE4A Surveying-II**

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

Q.1 (a) Derive an expression to find out the level difference by trigonometrical leveling between two station 'A' and 'B' by single observation of angle of depression from 'A' to 'B'. Apply following for correction in your expression- [8]

- (i) Correction for curvature
- (ii) Correction for refraction
- (iii) Correction for axis signal.

(b) Two observation were made on the top P of a flag PQ on a hill from two stations A and B, 100m apart, the stations A and B being in the same line with P. The angle of elevations of P at A and B were $31^{\circ}05'$ and $16^{\circ}42'$ respectively. The staff reading on the B.M. (R.L. = 242.23m), were respectively 2.530 and 3.615m when the instrument was at A and B, the telescope being horizontal. Determine the R.L. of the foot of the signal if PQ is 4.5m. [8]

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[10220]

OR

Q.1 The following reciprocal observations were made from two points P and Q: [16]

Horizontal distance = 16440m

Angle of depression of Q at P = $0^{\circ}3'45''$

Angle of depression of P at Q = $0^{\circ}2'6''$

Height of signal at P = 4.07m

Height of signal at Q = 3.87m

Height of instrument at P = 1.27m

Height of instrument at Q = 1.48m

Determine (a) R.L. of Q, if the of P is 326.39m and (b) the average coefficient of refraction at the time of observation.

Take $R \sin 1'' = 30.88\text{m}$

UNIT-II

Q.2 (a) Explain the function of following curves: [2×4=8]

(i) Simple circular curve

(ii) Compound curve

(iii) Reverse curve

(iv) Transition curve.

(b) Describe the method of setting out a simple circular curve by deflection angles using a tape and a theodolite. [8]

OR

Q.2 (a) What is a transition curve? Derive an equation for an ideal transition curve. [8]

(b) A reverse curve AB is to be set out between two parallel railways lines, 30m apart. If the two arcs of the curve are to have same radius and the distance between the tangent points A and B is 180m, calculate the radius. The curve is to be set out from AB at 10m intervals along it. Compute the length of the off sets. [8]

UNIT-III

- Q.3 (a) What is triangulation? How is it different from traversing and trilateration? [8]
- (b) Two triangulation stations A and B are 40 km apart and have elevations of 178m and 175m, respectively. Find the minimum height of signal required at B so that line of sight may not pass nearer the ground than 3m. The intervening ground may be assumed to have a uniform elevation of 150m. [8]

OR

- Q.3 (a) What is meant by extension of a base line? Explain with neat sketch how a base line is extended in the field. [8]
- (b) From a satellite station S, 15m from a triangulation station A, the angles measured to three stations B, C and A are as follows:

$$\angle CSA=35^{\circ}12'55''; \angle BSC=60^{\circ}38'40''$$

The length of sides AC and AB are 5815m and 1673m respectively. Calculate the angle BAC. [8]

UNIT-IV

- Q.4 (a) Discuss types of errors in surveying. State laws of accidental errors. [8]
- (b) Find the most probable values of the angles A, B and A+B from the following observations. [8]

A=42°20'30.4"	Weight =3
B=36°18'25.2"	Weight =2
A+B=78°38'50.3"	Weight =4

OR

Q.4 The following eight angles of a braced quadrilaterals ABCD were observed and adjusted for the closing errors at four stations A, B, C and D. Adjust the angles by approximate methods. [16]

$$\theta_1 = 44^\circ 31' 35''$$

$$\theta_2 = 43^\circ 38' 07''$$

$$\theta_3 = 37^\circ 46' 36''$$

$$\theta_4 = 54^\circ 05' 09''$$

$$\theta_5 = 47^\circ 04' 31''$$

$$\theta_6 = 41^\circ 05' 15''$$

$$\theta_7 = 50^\circ 29' 37''$$

$$\theta_8 = 41^\circ 21' 28''$$

UNIT-V

Q.5 (a) What is a spherical triangle? Discuss its properties. [8]

(b) What are different methods of determination of azimuth of a star? Discuss ex-meridian observation system. [8]

OR

Q.5 (a) Make a neat sketch and explain following - [8]

(i) Observer's meridian.

(ii) Ecliptic

(iii) Declination circle

(iv) Solstices

(b) Discuss briefly the preparations required for measurements with total stations. [8]