

TCE-403

328

Printed Pages :4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

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B.Tech. (IV - Sem.)

Even Semester Examination - 2016

ADVANCED SURVEYING*[Time : 3 Hours]**[Maximum Marks :100]***Note :** Attempt **all** questionsQ1. Attempt **any four** parts. (5x4=20)

- (a) What are the essential requirements for selection of triangulation stations?
- (b) What are satellite stations?
- (c) Two triangulation stations A and B are 60 Km apart and have elevations 240 m and 280 m respectively. Find the minimum height of a signal required at B so that the line of sight may not pass near the ground than 2 m. the intervening ground may be assumed to have a uniform elevation of 200 m.
- (d) Explain the terms hour angle and right ascension.

TCE-403/1940

(1)

[P.T.O.]

- (e) What is photogrammetry? Discuss its limitations.

Q2. Attempt **any four** parts. (5x4=20)

- (a) What is a vertical curve? Give classification.
- (b) What are hydrographic surveys?
- (c) Explain the meaning of random error and systematic error.
- (d) Explain standard error and weight of an observation.
- (e) Explain how the normal equations are used for finding the most probable values of unknowns.

Q3. Attempt **any four** parts. (5x4=20)

- (a) The straight lines ABI and CDI are tangents to a proposed circular curve of radius 1600 m. the lengths AB and CD are each 1200 m. The intersection point is inaccessible so that it is not possible directly to measure the deflection angle, but the angles at B and D are measured as: angle ABD = 123 degree 18 min, angle BDC = 126 degree 12 min and the length BD = 1485 m.
- (b) What are the various methods of setting out the simple circular curve?

- (c) A transition curve is required for circular curve of 200 m radius, the gauge being 1.5 m and maximum super elevation restricted to 15 cm. The transition is to be designed for a velocity such that no lateral pressure is imposed on the rails and the rate of gain of radial acceleration is 30 cm/sec^3 . Calculate the required length of the transition curve and the design speed.
- (d) What are the different laws of weights? Explain.
- (e) Find the correct angle a, b and c from the following observation using least square method.

$$a = 35^\circ 14' 15.3''$$

$$b = 25^\circ 15' 26.4''$$

$$c = 45^\circ 18' 18.4''$$

$$a+b = 60^\circ 29' 45.2''$$

$$b+c = 70^\circ 33' 48.3''$$

Q4. Attempt any two parts. (10x2=20)

- (a) The angles of a triangle XYZ were recorded as follows:

Angle	Measure	Weight
X	86° 35' 11.1"	2
Y	42° 15' 17"	1
Z	51° 9' 34"	3

Find the best estimate of angles X, Y and Z by method of correlates.

- (b) Explain in detail celestial sphere and celestial equator.
- (c) Write short notes on the following
 - (i) Principle of hydrographic surveying
 - (ii) Preliminary survey for highways

Q5. Attempt **any two** parts. (10x2=20)

- (a) What are remote sensing satellites? What are different types of data products supplied by NRSA in India?
- (b) What is GPS? Define applications of GPS in surveying.
- (c) Discuss the effects of phase in sighting a sun signal and derive formulae for the correction to be applied to cylindrical signal when the bright portion is bisected.

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