

Code : 011404

B.Tech 4th Semester Exam., 2016

FIELD MEASUREMENT (SURVEYING)

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.*
- (ii) There are **NINE** questions in this paper.*
- (iii) Attempt **FIVE** questions in all.*
- (iv) Question No. 1 is compulsory.*

1. Answer any *seven* of the following questions : 14

- (a)* What is the main principle of surveying?
- (b)* What is the fundamental difference between surveying and leveling?
- (c)* What is reconnaissance survey?
- (d)* In a chaining operation, who is the leader and who is the follower?
- (e)* What is change point?
- (f)* What is transiting?

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(Turn Over)

- (g) What is baseline of survey?
 - (h) What is tacheometry?
 - (i) What is the principle of tacheometry?
2. (a) Construct a diagonal scale representing 1 cm = 2.5 m and show a distance of 42.7 m on it. 6
- (b) A 20 m steel tape was standardized on flat ground at a temperature of 20 °C and under a pull of 15 kg. The tape was used in catenary at a temperature of 30 °C and under a pull of P kg. The cross-sectional area of the tape is 0.22 cm² and its total weight is 400 g. The Young's modulus and coefficient of linear expansion of steel are 2.1×10^6 kg/cm² and 11×10^{-6} per °C respectively. Find the correct horizontal distance, if P is equal to 10 kg. 8
3. (a) Describe briefly how plane surveying differs from geodetic surveying. 6
- (b) A chain line ABC crosses a river, B and C being on the near and distant banks respectively. A line BD of length 60 m is set out at right angles to the chain line at B. If the bearings at D to the stations C and B were 65°30' and 110°30' respectively, find the width of the river. 8

4. (a) Define the following : 5
- (i) Whole-circle bearing and reduced bearing
 - (ii) True meridian and magnetic meridian
- (b) The bearings of the sides of a traverse ABCDE are as follows :

Side	Fore bearing	Back bearing
AB	12°00'	192°00'
BC	271°30'	91°30'
CD	189°15'	9°15'
DE	124°45'	304°45'
EA	97°15'	277°15'

- Calculate the interior angles of the traverse and check it. 9
5. (a) What is the principle of plane table survey? Name the different instruments and accessories used in it. 7
- (b) What is a two-point problem? Explain with a neat sketch the procedure of solving a two-point problem in plane table surveying. 7
6. (a) Name the different types of levelling operations and explain any one. 5

- (b) The following readings are successively taken with a level :
 0.255, 0.457, 0.760, 1.750, 1.985, 2.530, 1.980, 0.845, 0.680 and 2.535

The position of the instrument was changed after the third and eighth readings. Prepare a level book and calculate the RLs of different points. The RL of first point is 105.750. Apply the usual checks.

9

7. (a) Define the terms 'contour line', 'contour interval' and 'horizontal equivalent'.

6

- (b) While measuring a chain line AB, the following offsets are taken :

(i) A telegraph post is 10 m perpendicularly from 2.5 m chainage to the right of the chain line

(ii) A road crosses obliquely from left to right at 10 m and 14 m chainage. Perpendicular offsets are 2 m and 3 m to the side of the road from 5 m and 20 m chainage respectively

(iii) A tube well is 5 m perpendicularly from 30 m chainage to the left of the chain line

(iv) Total chainage of AB is 45 m

How would you enter the field book? 8

8. (a) What is the temporary adjustment of a theodolite? Describe the process of such adjustment. 6

- (b) A tachometer was set up at a station P and the following readings were obtained on a staff vertically held :

Inst station	Staff station	Vertical angle	Hair readings	Remarks
P	BM	-4° 20'	1.40, 1.60, 2.35	RL of BM =
P	Q	+7° 12'	0.65, 1.40, 2.15	720.50 m

Calculate the horizontal distance PQ and RL of Q, when the constants of instrument are 100 and 0.15.

8

9. Write short notes on any three of the following : 14

- (a) Leveling staff
 (b) Optical square
 (c) EDM
 (d) Dumpy level

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