

B.Tech 4th Semester Exam., 2015

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 :

2×7=14

- ~~a)~~ What is the main principle of surveying?
- ~~b)~~ What do you mean by RF?
- ~~c)~~ What is the difference between plain scale and diagonal scale?
- ~~d)~~ What do you mean by triangulation?
- ~~e)~~ Why does the field book open lengthwise?
- (f) What do you mean by azimuth?
- (g) What do you mean by GTS?

(h) What are the different types of BM that you know?

(i) What is the relation between line of collimation and axis of telescope?

(j) What is a transit theodolite?

2. (a) The record of a closed traverse is given below, with two distances missing :

Line	Length (m)	Bearing
AB	100.5	N 30° 30' E
BC	?	S 45° 0' E
CD	75.0	S 40° 30' W
DE	50.5	S 60° 0' W
EA	?	N 40° 15' W

Calculate the lengths of BC and EA. 7

(b) Explain closing error and its limitations. 7

(a) The following observations were made during the testing of a dumpy level :

Instrument at	Staff reading	
	A	B
A	1.725	2.245
B	2.145	3.045

Distance between A and B = 200 m

RL of A = 450.000 m

(i) Is the instrument in adjustment?

(ii) What should be the staff reading on A during the second setup of the instrument for the line of collimation to be exactly horizontal?

(iii) What should be the RL of B? 7

(b) Explain the sources of errors in levelling. 7

4. (a) The following records refer to an operation in colouring reciprocal levelling :

Instrument at	Staff readings on		Remarks
	A	B	
A	1.155	2.595	Distance AB = 500 m
B	0.985	2.415	RL of A = 525.500 m

Find—

(i) the true RL of B;

(ii) the combined correction for curvature and refraction;

(iii) the collimation error;

(iv) whether the line of collimation is inclined upwards or downwards. 7

(b) What are the different types of level? Explain. 7

5. (a) Explain the sources of errors in compass. 7
- (b) The following are the observed bearings of the lines of a traverse *ABCDEA* with a compass in a place where local attraction was suspected :

Line	FB	BB
AB	191° 45'	13°
BC	39° 30'	222° 30'
CD	22° 15'	200° 30'
DE	242° 45'	62° 45'
EA	330° 15'	147° 45'

Find the correct bearings of the lines. 7

6. (a) What is local attraction? What are the methods of application of correction? 7
- (b) A traverse *ABCD* is made in the form of a square taking in clockwise order. If the bearing of *AB* is $120^{\circ}30'$, find the bearing of the order sides. 7
7. (a) What do you understand by field book? How many types of field book are used? Explain. 7
- (b) An offset was laid out 5° from its true direction and the scale of map was 20 m to 1 cm. Find the maximum length of offset for the displacement of a point on a paper not to exceed 0.03 cm. 7

8. (a) A plan represents an area of 93750 m^2 and measures $6.00 \text{ cm} \times 6.25 \text{ cm}$. Find the scale of the plot and indicate through a sketch how suitable scale can be constructed to read up to 1 m in the plan. 7
- (b) A line was measured by a 20 m chain which was accurate before starting the day's work. After chaining 900 m, the chain was found to be 6 cm too long. After chaining a total distance of 1575 m, the chain was found to be 14 cm too long. Find the true distance of the line. 7
9. (a) Explain the various tape corrections used in chaining/tape. 7
- (b) An old map was plotted to a scale of 40 cm to 1 cm. Over the years, this map has been shrinking, and the line originally 20 cm long is only 19.5 cm long at present. Again the 20 cm chain was 5 cm too long. If the present area of the map measured by planimeter is 125.50 cm^2 , find the true area of the land surveyed. 7

III
