

**B.Tech Odd Semester (CBCS) Exam.,
December—2017**

AGRICULTURAL ENGINEERING

(3rd Semester)

Course No. : AE-305 (C)

(Surveying and Levelling)

Full Marks : 75
Pass Marks : 30

Time : 3 hours

- Note :
1. Attempt **one** question from each Unit.
 2. Begin each answer in a new page.
 3. Answer parts of a question at a place.
 4. Assume reasonable data wherever required.
 5. The figures in the margin indicate full marks for the questions.

UNIT—1

1. (a) Differentiate between geodetic surveying and plane surveying. 4+4=8
- (b) Define scale and explain the principle of construction of plane and diagonal scale. 2+5=7

2. (a) Construct a scale 1 cm = 5 metre to read metres and decimetres. Represent 47.3 m on the scale. 7
- (b) List and describe the different types of tapes used for measuring distances and surveying. 8

UNIT—2

3. (a) Describe the different kinds of chains commonly used in surveying, stating the special advantage of each. 8
- (b) A 20 m chain was found to be 0.05 m too long after chaining 1400 m. It was found to be 0.1 m too long after chaining 2200 m. If the chain was correct before commencement of the work, find the true distance. 7
4. (a) Describe the different obstacles continually met with chaining. 8
- (b) To continue a survey line past an obstacle in the form of a pond, stations A and B on the main line were taken on opposite sides of the pond. A line AC 315 m long was laid down on the left of AB and a second line AD 270 m long was laid down on the right of AB, the points C, B and D being in the same

(3)

straight line. CB and BD were then measured and found to be 156 m and 174 m respectively. Find the length of AB . 7

UNIT—3

5. (a) Define compass surveying and state the types of traverse. 3+4=7
- (b) The bearing of the side AB of a square $ABCD$ is 50° . Calculate the bearing of the remaining three sides. 8
6. (a) Write short notes on the following : $2 \times 4 = 8$
- (i) Magnetic and true meridian
 - (ii) Whole circle and reduced bearing
 - (iii) Forebearing and back bearing
 - (iv) Local attraction
- (b) Find the angle between the lines AB and BC if their respective bearing is
- (i) 40 20 150 30
 - (ii) N50 20 E S19 30 E
 - (iii) 30 45 140 15 7

(4)

UNIT—4

7. (a) Define plane-table surveying and state the equipments and accessories used for plane-table surveying. 3+5=8
- (b) How do you set up the plane table and orient it? 7
8. State the advantages and disadvantages of plane-table surveying. $7\frac{1}{2} + 7\frac{1}{2} = 15$

UNIT—5

9. (a) Name the different types of levels used in levelling. Explain their relative advantages and disadvantages. 6
- (b) The following consecutive readings were taken with a level and 3-metre levelling staff on continuously sloping ground at a common interval of 20 metres :
- 0.602, 1.234, 1.860, 2.574, 0.238,
0.914, 1.936, 2.872, 0.568, 1.824,
2.722
- The reduced level of the first point was 12.122. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points and also the gradient of the line joining the first and the last points. $6 + 2 + 1 = 9$

10. (a) Write short notes on the following : $1 \times 6 = 6$

(i) Elevation

(ii) Bench mark

(iii) Foresight

(iv) Backsight

(v) Turning point

(vi) Height of instruments

(b) The following consecutive readings were taken with the help of a dumpy level :

1.905, 2.652, 3.245, 4.125, 1.854,
1.750, 1.550, 1.350, 1.815, 2.050,
3.145, 1.725

The instrument was shifted after 4th and 7th readings. The first readings were taken on the staff held on the BM of RL 100 m. Rule out a page of level book. Enter above readings thereon. Calculate the RLs of the points by line of collimation method and apply the arithmetic check. $6+2+1=9$

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