**B.Tech Odd Semester (CBCS) Exam.,
December—2016**

(Agricultural Engineering)

SURVEYING AND LEVELLING

(3rd Semester)

Course No. : AECC04

<u>*Full Marks* : 50</u>
Pass Marks : 15

Time : 2 hours

Note : 1. Attempt *any* **five** questions.
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.

1. *(a)* Write down the definition of agricultural surveying. Describe objectives and principle of surveying. 4

(b) Differentiate between *(i)* plan and map, *(ii)* geodetic surveying and plane surveying and *(iii)* surveying and levelling. 6

(2)

2. *(a)* A rectangular plot of ground is acquired by a factory. It measures 50 cm × 30 cm on the village map drawn to a scale of 80 m to 1 cm. What is its area in hectares? What will be its area on a topo sheet (0·5 km to 1 cm)? What is the representative fraction on the village map and also on the topo sheet? 5

(b) Explain the work of the surveyor. 5

3. *(a)* The plan of an old survey plotted to a scale of 50 m to 1 cm was found to have shrunk so that a line originally 20 cm long was 19·6 cm. There was also a note on the plan that the 20 m chain used was 0·1 m too long. If the area of the plan measured by a planimeter is 150·28 cm^2, find the true area of the survey. 5

(b) Describe different obstacles continually met with chaining. 5

4. *(a)* Find out the back bearing, whose fore bearin are *(i)* 40° 15 , *(ii)* 220° 30 , *(iii)* N30° 45 E and *(iv)* S60° 30 W. 4

(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 straight line. *CB* and *BD* were then measured and found to be 156 m and 174 m respectively. Find the length of *AB*. 6

5. *(a)* Define compass surveying and state the types of traverse. 5

(b) The bearing of the side *AB* of a square *ABCD* is 50°. Calculate the bearing of the remaining three sides. 5

6. *(a)* Write short notes on the following : 6

 (i) Magnetic and true meridian

 (ii) Whole circle and reduced bearing

 (iii) Fore bearing and back bearing

(b) Find the angle between the lines *AB* and *BC* if their respective bearings are *(i)* 40°20 , 150°30 and *(ii)* N50°20 E, S19°30 E. 4

7. *(a)* Define plane table surveying and state the equipments and accessories used for plane table surveying. 5

(b) State the advantages and disadvantages of plane table surveying. 5

8. *(a)* Write short notes on the following : ½×8=4

 (i) Benchmark

 (ii) Elevation

 (iii) Backsight

 (iv) Station

 (v) Foresight

 (vi) Height of instruments

 (vii) Change point

 (viii) Datum surface

(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

★ ★ ★