Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/B.Tech(CE)/SEM-3/CE-303/2010-11
2010-11
SURVEYING - I

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

    $10 \times 1 = 10$

    i)   The readings from a level are accurate if the line of collimation is .... to the axis of the bubble tube.

        a)   perpendicular   b)   parallel

        c)   normal   d)   none of these.

    ii) The surface of still water is considered to be

        a)   level   b)   horizontal

        c)   smooth   d)   none of these.

iii) The staff reading taken on a point of known elevation is termed as

a) FS reading

b) BS reading

c) IS reading

d) none of these.

iv) The operation of levelling from the finishing point to the starting point at the end of the day's work is known as

a) longitudinal levelling

b) check levelling

c) reciprocal levelling

d) cross-sectional levelling.

v) The principle of plane table surveying is

a) parallelism

b) triangulation

c) traversing

d) none of these.
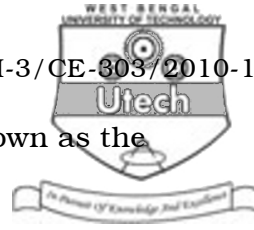
vi) The working edge of the alidade is known as the

a) fiducial edge   b) bevelled edge

c) parallel edge   d) none of these.

vii) Inaccessible points may be located by the

a) resection method   b) intersection method

c) radiation method   d) none of these.

viii) The imaginary line of joining points of equal elevation is known as

a) horizontal line   b) contour line

c) level line   d) none of these.

ix) The countour interval is inversely proportional to the

a) steepness of the area   b) extent of the area

c) scale of the map   d) none of these.

x) A triangle is said to be well conditioned when its angles should lie between

    a) 30° and 120°   b) 20° and 150°

    c) 15° and 135°   d) none of these.

xi) The working principle of the optical square is based on
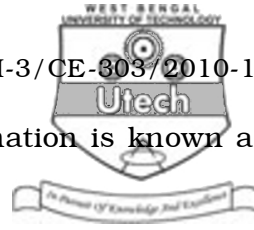
    a) reflection   b) refraction

    c) double reflection   d) double refraction.

xii) The curvature of the earth is taken into account when the extent of area is more than

    a) 50 km^2 b) 100 km^2

    c) 250 km^2 d) 350 km^2.

xiii) The sum of interior angles of a closed traverse is

    a) $(2n - 4) \propto 90°$ b) $(2n + 4) \propto 90°$

    c) $(n - 4) \propto 90°$ d) none of these.

xiv) The line passing through 'zero' declination is known as the

    a)   Isogonic line   b)   Agonic line

    c)   Contour line   d)   None of these.

xv) In a surveyor's compass, the ring is graduated

    a)   from 0° to 360°   b)   from 0° to 90°

    c)   in any way   d)   none of these.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following. $3 \times 5 = 15$

2.   What is contour line ? Define the terms 'contour interval' and 'horizontal equivalent'.

3.   What is the principle of levelling ? How can the term 'radiation' in case of plane table surveying be described ?

4.   What are the different accessories of plane table surveying ? What is the fundamental difference between surveying and levelling ?

5.   Write short note on Sensitiveness of bubble tube.

6.   Write short note on Permanent adjustment of dumpy level.

7.   Write on Errors and mistakes in chain surveying and their limitations.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following. 3 × 15 = 45

8. a) 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 temperature of 30°C and under a pull of P kg. The cross - sectional area of the tape is $0 \cdot 22$ cm^2 and its total weight is 400 gm. The Young's Modulus and coefficient of linear expansion of steel are $2 \cdot 1 \propto 10^6$ kg/cm^2 and $11 \propto 10^{-6}$ /°C respectively. Find the correct horizontal distance if P is equal to 10 kg.　　　　10

   b) The distance between two stations was 1200 m when measured with a 20 m chain. The same distance when measured with 30 m chain was found to be 1195 m. If the 20 m chain was $0 \cdot 05$ m too long, what was the error in the 30 m chain ?　　　　5

9. The following are the bearings observed in traversing with a compass in an area where local attraction was suspected. Calculate the interior angles of the traverse and correct them if necessary.

Line	Fore bearing	Back bearing
AB	150° 0 '	330° 0 '
BC	230° 30 '	48° 0 '
CD	306° 15 '	127° 45 '
DE	298° 0 '	120° 0 '
EA	49° 30 '	229° 30 '

10. The following consecutive readings were taken with a leveling instrument at intervals of 20 m :

2·375 m, 1·73 m, 0·615 m, 3·45 m, 2·835 m, 2·07 m, 1·835 m, 0·985 m, 0·435 m, 1·63 m, 2·255 m and 3·63 m. The instrument was shifted after the fourth and eighth readings. The last reading was taken on BM of RL 110·2 m. Find the RL's of all the points.

11. Describe following processes in plane table survey with relative merits and demerits :

 a) Orientation by magnetic needle and by back sighting.   6

 b) Method of plane tabling by radiation and intersection.   9

12. Write short notes on any *five* of the following : 5×3

 a) Levelling staff

 b) Compensating and cumulative error in chaining

 c) Optical square

 d) Fly levelling

 e) Isogonic and agonic lines

 f) Sensitiveness of a bubble tube

 g) Reconnaissance survey

 h) Local attraction

 i) Merits and demerits of plane table survey

 j) Mass haul diagram.