2016

SURVEYING – I

Paper : CE 301

Full Marks : 100

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

*Answer **any five** questions.*

1. *(a)* To determine the elevation of the top of
a flag-staff, the following observations
were made :

Inst. Station	Reading on B.M. (m)	Angle of elevation	Remarks
A	1·266	10°48'	RL of
B	1·086	7°12'	B.M.=245·360m

Stations A and B and top of the flag
staff are in the same vertical plane.
Find the elevation of the top of the flag-
staff, if the horizontal distance between
A and B is 60m. 5

(b) A cross-staff survey was carried out as shown in the figure. 5
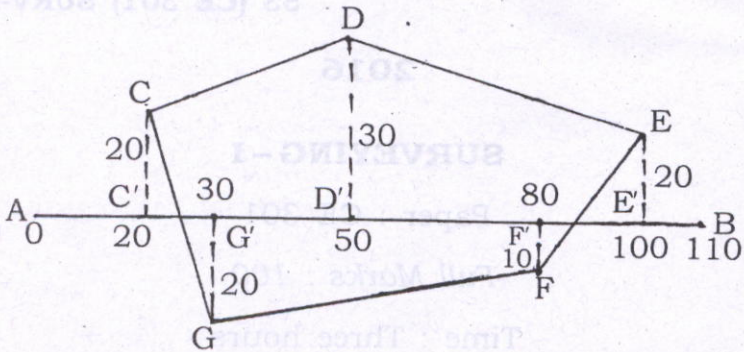
Enter the readings in the observation table and determine the area of CDEFGC. All dimensions in *meter*.

(c) Differentiate between : 5×2

(i) B. M. and Datum

(ii) Magnetic Dip and Declination

(iii) Accuracy and Precision in surveying

(iv) Contour internal and Local attraction

(v) Level line and horizontal line.

2. (a) Derive an expression to determine the height and distance of an object. When the object and Instrument stations are at very different levels. 10

(b) Explain with a neat diagram the method of Intersection and traversing in plane table surveying. 10

3. (a) Explain the effects of curvature and refraction to an observed line of sight? Derive an expression for combined correction due to curvature and refraction. 10

(b) Explain *any four* uses of contour map. 10

5. (a) With a neat diagram explain the fundamental lines and their desired relations in a theodolite. 10

(b) A nominal distance of 30m was set out with a steel tape from a mark on the top of one peg to a mark on the top of another, the tape being in catenary under a pull of 220N and at a mean temperature of 17°C, the top of one peg was 0·68m below the top of the other, which was 250m above MSL. Determine the horizontal distance between the marks on the two pegs, the tape which was standardized in catenary under a pull of 178N and at a temperature of 20°C, had a mass of 0·026 kg/m and a c/s area of

$3{\cdot}25mm^2$.Take the coefficient of linear expansion as 9×10^{-7} per $°C$, young's modulus as $155kN/mm^2$. and radius of earth as $6367\ km$.   **10**

6.   *(a)*   What is Reciprocal levelling ? Derive an expression to determine the difference in elevations between *any two* points by reciprocal levelling.   **10**

    (b)   The following bearings were observed in running a closed traverse.   **10**

Line	FB	BB
AB	71°05′	250°21′
BC	115°20′	297°35′
CD	160°35′	340°45′
DE	222°50′	42°05′
EA	300°50′	121°10′

compute the interior angles and correct them for any observational errors, also determine the corrected magnetic bearings of the lines.

7.   *(a)*   What is contour ? What are the characteristics of contours ?   **10**

(b) The following consecutive readings were taken with a level and 5m levelling staff on continuously sloping ground at a common interval of 25m ; 0·385 ; 1·030 ; 1·925 ; 2·825 ; 3·730 ; 4·685 ; 0·625 ; 2·005 ; 3·110 ; 4·485 ; 0·421 the R.L. of first point was 205·222m. Rule out a page of a level field book and enter the above readings. Calculate the RL of the points by H.I. method and also find the gradient of line joining the first and the last point. **10**