B.Tech. Degree III Semester Examination, November 2009

CE 302 SURVEYING I

(Common for 1999 & 2002 Schemes)

Time: 3 Hours   Maximum Marks: 100

(All questions carry *EQUAL* marks)

I.   (a)   What are the two primary divisions of surveying?   (5)
     (b)   Explain the construction and working of cross staff and optimal square.   (6)
     (c)   A survey line CD intersects a high building. To prolong the line beyond
           this obstacle, a perpendicular DE, 150 m long, is set out at D. From E two
           lines EF and EG are set out at angles of 45° and 60° with ED respectively.
           Determine the length of EF and EG in order that the points F and G may lie
           on the prolongation of CD and also the obstructed distance DF.   (9)

OR

II. (a)   Explain the principle of surveying: 'Working from whole to part'.   (5)
     (b)   Explain the different methods of ranging out survey lines.   (6)
     (c)   A steel tape was exactly 30 m long at 18°C when supported throughout its length
           under a pull of 80N. A line was measured with the tape under a pull of 120N and
           found to be 801M. The mean temperature during the measurement was 26°C.
           Assuming the tape to be supported at every 30M, compute the true length of the line,
           given that the cross sectional area of the tape = 0.04 cm^2, the mass density of
           steel = 0.0077 kg/cm^3, the coefficient of expansion = 0.0000117 per degree celcius
           and the modulus of elasticity = 21 x 10^6 N/cm^2.   (9)

III. (a)   Explain the following terms as employed in compass surveying:
                (i)   True meridian and magnetic meridian
                (ii)   Whole circle system and Quadranted System   (6)
     (b)   The following bearings were taken in traversing with a compass in a place
           where local attraction was suspected:

Line	AB	BC	CD	DA
Forebearing	S 45° 30'E	S 60° 0'E	S 5° 30' E	N 4° 30' W
Backbearing	N 45° 30' W	N 60° 40' W	N 3° 20' W	S 56° 0' E

           Determine the stations where there is local attraction as well as the corrected bearings
   of each of the lines.   (9)
     (c)   Explain the procedure of 'method of intersection' in plane table surveying.   (5)

OR

IV. (a)   Explain the following terms as applied in Compass Surveying:
                (i)   Dip   (ii)   Declination   (6)

     (b)   Explain the procedure of 'two point problems' in plane table surveying.   (6)
     (c)   The bearings of the sides of a traverse ABCDE are as follows:

Sside	AB	BC	CD	DE	EA
Forebearing	107° 15'	22° 0'	281° 30'	189° 15'	124° 45'
Backbearing	287° 15'	202° 0'	101° 30'	9° 15'	304° 45'

           Compute the interior angles of the traverse.   (8)
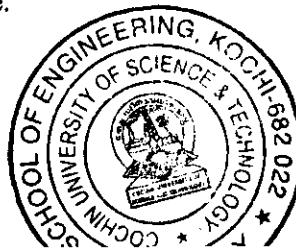
(Turn over)

V.	(a)	What are the temporary adjustments of a Levelling instrument.	(6)
	(b)	The observer at a height of 40m above Mean Sea Level just sees a luminous object on the top of a hill. All the points below the luminous objects are invisible. The distance between the observer's station and the hill is 80 km. What is the height of the hill?	(6)
	(c)	What are the indirect methods of locating contours? Explain.	(8)

OR

VI. (a) Explain the two corrections to be applied for precise leveling work: Curvature, refraction (6)

(b) Two pegs A and B were 75 cm apart across a wide river. The following readings were taken with one level:

Level at	Reading on	
	A	B
A	1.543	2.847
B	1.422	2.622

The error in the collimation adjustment of level was +0.002 m per 100 m. Determine the true difference of level between A and B and refraction correction in meters. (8)

(c) List the characteristics of contour lines. (6)

VII. (a) The following offsets were taken from a chain line to a hedge:

Distance (in M)	0	6	12	18	24	36	48	60	72	81	90
Offset (in M)	3.60	3.00	2.40	1.80	1.20	1.50	2.10	2.40	3.00	3.30	3.90

Calculate the area enclosed between the chain line, hedge and the end offsets by
(i) Simpson's rule   (ii) Trapex zooidal rule (8)

(b) A road at a constant R.L. of 180.000 runs North to South. The ground East to West is level. The surface levels along the centerline of the road are as follows:

Chainage (in M)	0	30	60	90	120	150	180
Level (in M)	183.50	182.45	182.15	181.55	180.95	182.05	180.80

Compute the volume of cutting given that the width at formation level is 8 m and side slopes 1½ to 1. (7)

(c) Explain construction and working of box sextant. (5)

OR

VIII. (a) Explain the working of planimeter. (6)

(b) What is a Mass Haul Diagram? What are its uses? (6)

(c) Explain with help of figures, the salient features of Pantagraph and Clinometer. (8)

IX. (a) Explain the method of finding horizontal angles by repetition and reiteration using a theodolite. (8)

(b) The following are the interior angles of a closed traverse ABCDE. $\angle A=87°50'20"$, $\angle B=114°55'40"$, $\angle C=94°38'50"$, $\angle D=129°40'40"$, $\angle E=112°54'30"$. Given the bearing of AB as $221°18'40"$, calculate the bearings of the remaining sides of traverse. (6)

(c) What is an analectic lens? (6)

OR

X. (a) Explain the Bowditch rule. (5)

(b) Derive the formula used for calculating horizontal distance in tangential tacheometry. (8)

(c) From the data given below, find RL of station B given RL of A = 100.000. Find distance AB, if $\angle ADB=30°0'0"$.

Instrument at	Staff at	Vertical angle	Staff intercept		
			Bottom	Middle	Top
Station O	A	Depression 3°0'0"	2.200	2.400	2.600
	B	Elevation 1°0'0"	1.105	1.205	1.305

(7)

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