

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: BE  
BRANCH: CIVIL**

**SEMESTER : III  
SESSION : MO/18**

**SUBJECT: CE3003-SURVEYING I**

**TIME: 03:00**

**FULL MARKS: 60**

**INSTRUCTIONS:**

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
  2. Candidates may attempt any 5 questions maximum of 60 marks.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is the difference between map and plan? [2]  
(b) Explain the principles of surveying. [4]  
(c) The area of an old survey plotted to a scale of 10 m to 1 cm measures now as 105.35 sq. cm as found by a planimeter. The plan is found to have shrunk so that a line originally 10 cm long now measures 9.5 cm only. Find (i) the shrunk scale, (ii) the true area of the survey. [6]

- Q.2(a) Define (i) check line, (ii) tie line. [2]  
(b) Draw a typical page of field book showing relevant features. [4]  
(c) A survey line CD intersects a building. To overcome the obstacle a perpendicular DE, 87 m long, is set out at D. From E, two lines EF and EG are set out at angles  $50^\circ$  and  $65^\circ$  respectively with ED. Find the lengths EF and EG such that points F and G fall on the prolongation of CD. Also find the obstructed distance DF. [6]

- Q.3(a) Define different types of meridians. [2]  
(b) Explain adjustment of closing error by applying Bowditch's rule. [4]  
(c) The following are the bearings observed in traversing, with a compass, an area where local attraction was suspected. Calculate the interior angles of the traverse and correct them if necessary. [6]

Line	F.B.	B.B.
AB	$150^\circ 0'$	$330^\circ 0'$
BC	$230^\circ 30'$	$48^\circ 0'$
CD	$306^\circ 15'$	$127^\circ 45'$
DE	$298^\circ 00'$	$120^\circ 00'$
EA	$49^\circ 30'$	$229^\circ 30'$

- Q.4(a) What are the advantages of plane table survey? [2]  
(b) Write a short note on Three point problem. [4]  
(c) What are the methods of plane table survey? Compare them. [6]

- Q.5(a) Define (i) Contour interval, (ii) Horizontal equivalent. [2]  
(b) What is reciprocal leveling? [4]  
(c) The following consecutive readings were taken with a dumpy level along a chain line at a common interval of 15 m. The first reading was at a chainage of 165 m where the RL is 98.085 m. The instrument was shifted after the fourth and ninth readings:  
3.150, 2.245, 1.125, 0.860, 3.125, 2.760, 1.835, 1.470, 1.965, 1.225, 2.390, 3.035 m.  
Rule out a page of level book, enter the above data. Calculate the RL of the points by Rise and Fall method. Apply the usual checks. [6]

- Q.6(a) Name different parts of theodolite. [2]  
(b) What are the sources of errors in theodolite work? [4]  
(c) What are the permanent adjustments of theodolite? [6]

- Q.7(a) What is a tachometer? [2]  
(b) What are tachometric constants? [4]

- (c) The elevation of a point P is to be determined by observations from two adjacent stations of a tacheometric survey. The staff was held vertically upon the point, and the instrument is fitted within an anallactic lens, the constant of the instrument being 100. Compute the elevation of the point P from the following data, taking both the observations as equally trustworthy: [6]

Inst. Station	Height of axis	Staff point	Vertical angle	Staff readings	Elevation of station
A	1.40 m	P	+ 3° 24'	1.340, 2.255, 2.990 m	87.870 m
B	1.42 m	P	- 2° 36'	0.685, 1.700, 2.915 m	96.356 m

Also, calculate the distance of A and B from P.

\*\*\*\*\*28.11.18\*\*\*\*\*E