



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 100303

Roll No.

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**B.Tech.**  
(SEM. III) (ODD SEM.) THEORY  
EXAMINATION, 2014-15  
**SURVEYING**

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1. Attempt any Two questions.

10×2=20

- (a) A 20 m tape was tested before starting the day's work and found to be 0.02m too short. At the end of the day's work it was tested again and found to be 0.06 m too long. If the total length measured during the day was 1243.5 m, find the true length.
- (b) Explain various types of meridians and bearings used in compass surveys. Define and explain declination. What are the causes of variations in declination?

- (c) The bearings of lines of a traverse are given below. At which station you suspect local attraction? Find the included angles and correct the bearings for local attraction. Also, find the true bearings of the line if the declination is  $10^\circ$  W.

Line	FB	BB
AB	$36^\circ 00'$	$216^\circ 45'$
BC	$98^\circ 15'$	$276^\circ 00'$
CD	$201^\circ 45'$	$23^\circ 15'$
DA	$322^\circ 45'$	$142^\circ 45'$

2. Attempt any two questions.

$10 \times 2 = 20$

- (a) What is the difference between height of collimation method and rise and fall method? The following readings were taken in sequence during a leveling operation: 1.605, 2.150, 1.385, 1.895, 1.365, 2.105, 1.950, 0.985, 1.305, 1.185, 1.305, -2.105, 1.385, 1.005, 1.155 and 1.145. The first reading was to a benchmark of assumed elevation 100.00m find the RL's of the remaining stations if the instrument was shifted after the 3<sup>rd</sup>, 7<sup>th</sup>, 10<sup>th</sup> and 13<sup>th</sup> readings. Use the height of collimation method.

- (b) Explain contouring? Describe the different methods of contouring.
- (c) As chaining was not possible, a traverse was conducted using tacheometry. The line of sight was horizontal in all cases. The data obtained is given below. Find the lengths of sides and the length and bearing of line AC. Find the gradient from A to C if the reading on the staff held at a benchmark is 2.145 m from A and 0.645 m from C. The instrument constants are 100 and 0.3.

Line	Bearing	Instrument at	Staff at	Cross hair readings
AB	$70^\circ 30'$	A	B	1.535, 2.214, 2.893
BC	$120^\circ 45'$		D	2.018, 2.70, 3.708
CD	$223^\circ 30'$		C	
DA	$320^\circ 47'$	C	B	1.033, 1.733, 2.432
			D	1.363, 2.243, 3.123
			A	

3. Attempt any two questions.

10×2=20

- (a) Plot the following compass traverse and adjust it for closing error if any by Bowditch's rule:

Line	Length (m)	Bearing
AB	130	S 88° E
BC	158	S 6° E
CD	145	S 40° W
DE	308	N 81° W
EA	337	N 48° E

Scale of plotting 1 cm = 20m. Plot the corrected traverse to scale.

- (b) Answer the following:

- (i) What are towers and signals in a triangulation survey? Throw some light on satellite stations.
- (ii) What is the principle of triangulation survey? How classification of triangulation systems is done?
- (iii) What are contour lines? Explain their characteristics and uses with help of a Suitable field example.

- (c) State Three Point Problem. How it can be solved by trial and error method? Also, state the Lehman's rules.

4. Attempt any two questions.

10×2=20

- (a) Answer the following :

- (i) What is a vertical curve? Why is it provided?
- (ii) What is super elevation ? Explain why super-elevation is provided in roadways and railways.
- (iii) What is a transition curve? Why and where are transition curve is provided?

- (b) The deflection angle between the tangents of a circular curve is 60° and it is proposed to have a transition curve at its ends. The maximum speed of vehicles is assumed to be 100kmph and the centrifugal ratio is  $\frac{1}{4}$ . The rate of

change of radial acceleration is  $0.3\text{m/s}^3$ . Find the radius of the circular curve, length of the transition curve and chainages of the points at the beginning and end of the curves if the chainage of the point of intersection of the tangents is 1850m.

- (c) Draw a neat sketch of a circular curve and show the following notation thereon:
- i. Back tangent
  - ii. Forward tangent
  - iii. Point of curvature
  - iv. Point of tangency
  - v. Point of intersection
  - vi. Angle of deflection
  - vii. Angle of intersection
  - viii. Long chord
  - ix. Apex distance
  - x. Versed sine of curve

5. Attempt any two of the following

10×2=20

- (a) Explain with neat sketches how the setting out work for a residential building is done in the field.
- (b) What do you understand by plane table? Giving the neat sketch of plane table show its components and explain how topographical survey is done with help of plane table.
- (c) Explain the difference between temporary and permanent adjustment of a theodolite.  
How the permanent adjustment of a theodolite is done ?