

Paper Id: 

100307
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Roll No: 

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**B. TECH.**  
**(SEM-III) THEORY EXAMINATION 2019-20**  
**SURVEYING-I**

Time: 3 Hours

Total Marks: 100

**Note** Attempt all sections equally in writing the answers suitably.

**SECTION**

1. Attempt all questions brief.

2 x 10 = 20

- a. What do you mean by normal tension?
- b. What is a 12 cm compass?
- c. What do you mean the term 'great triangle' and 'great circle'?
- d. What is the difference between the line of collimation and axis of the telescope?
- e. Write the functions of theodolite.
- f. In a map, it is found that two consecutive contours cross each other. What would you comment.
- g. What do you mean by terms 'rear tangent' and 'forward tangent'?
- h. What are the initial and final sub-cords?
- i. What is super elevation and why it is provided?
- j. What would you mean by 'positive RL' and 'negative RL'?

**SECTION B**

2. Attempt any three of the following:

10 x 3 = 30

- a. A chain line AB crosses a river, C and D being on the near and distant banks, respectively. A point O at right angle to AB from C is fixed at 50 m and at O the bearings of D and A is taken so that the included angle DOA is 90°. AC is then measured as 30 m. find the width of the river.
- b. What are permanent and temporary adjustments? How temporary adjustments are done? What are the sources of error in leveling?
- c. What is orientation? What are the methods of orientation? Describe the methods with sketch.
- d. Two straight AB and BC intersect at chainage 1000 m, the deflection angle being 40°. It is proposed to insert a circular curve of radius 300 m with a transition curve of length 90 m at each end. Calculate all necessary data for a setting out the curve by deflection angle method, taking peg interval of 20 m. prepare the setting out table, taking the least count of theodolite as 20".
- e. What is triangulation and how is it different from traversing? What is meant by the strength of triangulation figure?

**SECTION C**

3. Attempt any one part of the following:

10 x 1 = 10

- (a) What do you mean by contour? Describe the characteristics of contour. State the uses of contour map and contours.
- (b) The staff readings for a survey work were as follows:  
 1.810, 2.110, 1.225, 1.455, 0.905, 2.435, 2.810, 2.675 and 1.765.  
 The level was shifted after the 4<sup>th</sup> and 7<sup>th</sup> readings. The first reading was taken on a bench mark of R.L. 50.000. rule out a page of level book and enter the readings:
  - i. work out the R.L.s of all stations
  - ii. If the staff were held inverted and readings on a ceiling from last instrument position was 3.500, Find the R.L. of the ceiling
  - iii. Work out the staff readings on the top of 4 pegs at 20 m intervals from the last station to give an upgrade of 1 in 100.

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4. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Explain the following:
- i. Reciprocal ranging
  - ii. Principle of chain survey
  - iii. Reconnaissance
- (b) What are the sources of error in chaining? What precautions would you take to avoid them?

5. Attempt any *one* part of the following: 10 x 1 = 10

- (a) What do you understand by balancing traverse? Describe any three method of adjusting the traverse.
- (b) What is the difference between transit and non transit theodolite? Describe the process of repetition and reiteration.

6. Attempt any *one* part of the following: 10 x 1 = 10

- (a) A transition curve is required for a circular curve of 410 m radius, the gauge being 1.5 m between rail centers and maximum super-elevation restricted to 12 cm. The transition is to be designed for a velocity such that no lateral pressure is imposed on the rails and the rate of radial acceleration is 30 cm/sec<sup>3</sup>. Calculate the required length of transition curve and the design speed.
- (b) Why is a curve provided? Derive the expression for an ideal transition curve.

7. Attempt any *one* part of the following: 10 x 1 = 10

- (a) What does the term 'sensitiveness' mean in the context of a bubble? How the sensitiveness of a bubble is determined?
- (b) The following observations were taken from stations P and Q.

Line	Length (m)	Bearings
PA	125	S 60°30' W
PQ	200	N 30°30' E
QB	150.5	S 50°15' W

Calculate the length and bearing of AB, and also the angles PAB and QBA.