Paper Id: | **100307** | **Roll No:**

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

Time: 3 Hours   *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in 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 contour s 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 as30 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 40^0. 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 4th and 7th 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.

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 transitionis 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/sec3. 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 $60^0 30'$ W
PQ	200	N $30^0 30'$ E
QB	150.5	S $50^0 15'$ W

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