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B. TECH.
(SEM III) THEORY EXAMINATION 2017-18
SURVEYING

Time: 3 Hours

Total Marks: 70

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

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14
- a. What are the initial and final sub-cords?
 - b. What is a 12 cm compass?
 - c. In a map, it is found that two consecutive contours cross each other. What would you comment.
 - d. How is a chain folded and unfolded?
 - e. What do you mean by normal tension?
 - f. What is index sketch?
 - g. What is an azimuth?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21
- a. Classify surveying on the basis of instruments used and name all equipments necessary for the field work involving any one of them.
 - b. Explain how details can be surveyed by offset from survey lines. Discuss the relative merits of different types of offsets. Why are short offsets preferred to long ones.
 - c. 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.
 - d. What is Shift? Prove that a transition curve bisects the shift and that the shift bisects the transition curve.
 - e. Why is a curve provided? Derive an expression for an ideal transition curve.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7
- (a) A steel tape was exactly 30 m long at 20^oC when supported throughout its length under a pull of 10 kg. A line measured with this tape under a pull of 15 kg and at a mean temperature of 32^oC and found to be 780 m long. Cross-sectional area of the tape = 0.03 cm², and its total weight = 0.693 kg. α for

steel = 11×10^{-6} per⁰C and E for the steel = 2.1×10^6 kg/cm².

- (b) What are the sources of error in chaining? What precautions would you take to guard against them?

4. Attempt any *one* part of the following:

7 x 1 = 7

- (a) The following are the observed fore and back bearings of lines of a closed traverse. Correct them where necessary for local attraction

Line	F.B.	B.B.
AB	292 ⁰ 15'	11 ⁰ 45'
BC	221 ⁰ 45'	41 ⁰ 45'
CD	90 ⁰ 05'	270 ⁰ 00'
DE	80 ⁰ 35'	261 ⁰ 40'
EA	37 ⁰ 00'	216 ⁰ 30'

- (b) What do you understand by balancing the traverse? Describe any three methods of adjusting traverse.

5. Attempt any *one* part of the following:

7 x 1 = 7

- (a) What is orientation? What are the methods of orientation? Describe the methods with sketch.
- (b) What do you mean by contour? Describe the characteristics of contour. State the uses of contour map and contours

6. Attempt any *one* part of the following:

7 x 1 = 7

- (a) What does the term 'sensitiveness' mean in the context of a bubble? How the sensitiveness of a bubble is determined?
- (b) What do you mean by traversing? Describe various methods of traversing.

7. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Two straights intersect at angle of 122^0 . The maximum allowable speed of the vehicle on the curve is 80 km/hr. centrifugal ratio is $\frac{1}{4}$ and the rate of change of radial acceleration is 30 cm/sec^2 . Calculate the radius of the circular curve and the length of the transition curve.
- (b) What is the necessity of transition curve? Describe the different method of finding out its length.