

**4E 2035**

Roll No. \_\_\_\_\_

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**4E 2035****B. Tech. IV Semester (Main/Back) Examination 2012****Civil Engineering  
4CE4 Surveying - I****Time : 3 Hours****Maximum Marks : 80****Min Passing Marks : 24****Instructions to Candidates:**

Attempt any **Five questions** selecting **one question** from each unit. All questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.) Units of quantities used/ calculated must be stated clearly.

**Unit - I**

1. a) Explain following terms- (4×2=8)
- i) First principle of surveying.
  - ii) Representative fraction.
  - iii) Construction of diagonal scale.
  - iv) Use of chord scale.
- b) A tape of designated length 30m was used to measure a line AB by suspending it between supports. If the measured length was 29.855m when the slope angle was  $2^{\circ}15'$ , and the mean temperature and tension applied were respectively  $17^{\circ}\text{C}$  and 120N. Determine the correct horizontal length of the line if the standard length of the tape on horizontal ground was 30.015m at  $27^{\circ}\text{C}$  and 75N tension. The tape weighed 0.20 N/m and had a cross-sectional area of  $2.5 \text{ mm}^2$ .  $E = 2.1 \times 10^5 \text{ N/mm}^2$  and  $\alpha = 1.15 \times 10^{-5}/^{\circ}\text{C}$ . (8)

**Or**

1. a) Draw conventional symbols of the following and mention the colours used in the symbol-
- i) Temple, church, mosque.
  - ii) Earthen embankment, cutting.
  - iii) Lake, pond.
  - iv) Rail-road level crossing. (4x2=8)

- b) What are different types of errors? Illustrate your answer for the case of linear measurements with a tape. (8)

### Unit - II

2. a) Define following :- (8)
- i) True meridian.
  - ii) Whole circle bearing.
  - iii) Local attraction.
  - iv) Magnetic declination. (4x2=8)
- b) Draw neat and clean enumerated sketch of a transit theodolite mentioning its principle axes and component parts. (8)

Or

2. a) Explain the method of permanent adjustment of axis of plate level of a transit theodolite. (8)
- b) Draw neat and clean sketch of a prismatic compass mentioning its component part. Also explain its working and use in surveying. (8)

### Unit - III

3. a) Explain the method of adjusting a chain traverse by Boarditch's graphical method. Draw suitable sketches wherever required. (8)
- b) Observed bearings of a closed compass traverse are as under. Compute correct included angles and bearings of the traverse.

| Line | Fore bearing | Back bearing |
|------|--------------|--------------|
| AB   | 150° 30'     | 329° 45'     |
| BC   | 78° 00'      | 256° 30'     |
| CD   | 42° 30'      | 223° 45'     |
| DE   | 315° 45'     | 134° 15'     |
| EA   | 220° 15'     | 40° 15'      |

Or

3. a) In a closed theodolite traverse ABCDEA running anticlockwise, the whole circle bearing of line AB is 55° 40' 35". The included angles and length of sides are as given under :-

| Line | Length | Angle | Magnitude    |
|------|--------|-------|--------------|
| AB   | 137.5m | A     | 115° 15' 25" |
| BC   | 142.8m | B     | 110° 27' 10" |
| CD   | 139.6m | C     | 102° 49' 50" |
| DE   | 141.0m | D     | 105° 08' 15" |
| EA   | 134.3m | E     | 106° 19' 20" |

Adjust the traverse by transit-rule and compute independent co-ordinates of the traverse. Take co-ordinates of point E as (100;100)m. (16)

#### Unit - IV

4. a) Explain the method of carrying the level across a stream by reciprocal level and arrive at suitable expression for the same. (6)
- b) A level was set up at a point P at a distance 150m from A and 1250m from B. The staff reading on the staff held on A was 0.765m and that on the staff held on B was 2.355m. Find true difference in elevation between A and B. Take radius of earth as 6375 km. (5)
- c) Define following -
- Level surface.
  - Reduced level.
  - Temporary bench mark.
  - Profile levelling.
  - Height of instrument axis. (5)

Or

4. a) Draw neat and clean enumerated sketch of a Dumpy level and explain its working and use in leveling. (8)
- b) A Dumpy level was set at A,B,C,D and E and staff readings were taken as listed below-

| Level at | Staff readings-            |
|----------|----------------------------|
| A        | 2.575; 0.865; 0.890; 0.415 |
| B        | 1.650; 1.430; 0.610        |
| C        | 1.000; 1.590; 1.115        |
| D        | 2.430; 3.845; 3.780; 2.785 |
| E        | 2.630; 2.100; 2.290.       |

The first staff reading while level was at A was taken at T.B.M having R.L 250.000m. Tabulate the readings and compute the R.L of each staff station using rise and fall method. Apply all usual arithmetic checks. (8)

**Unit - V**

5. a) Explain Bessel's graphical method of solving three point problem of resection in plane table surveying. (8)
- b) Describe various characteristics of contours. (8)

**Or**

5. a) Define contour interval and contour gradient. (3)
- b) Describe any one method of contouring and plotting of contours. (5)
- c) Describe method of plane table traversing. (8)
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