

Roll No.

OLE-24067

B. Tech. 3rd Semester (Civil) Examination – April, 2021

SURVEYING

Paper : CE-207-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. Any complaint in this regard, will be entertained after examination.

Note : Attempt five questions in total selecting at least one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Sources of errors in chaining 2 · 10 = 20
(b) Methods of traversing
(c) Horizontal equivalent
(d) Transit and non-transit theodolite
(e) Types of Tapes
(f) Fly leveling and profile leveling
(g) Tacheometric constants
(h) Declination and dip
(i) Enumerate the instruments used in plane table surveying
(j) Necessity of vertical curves.

SECTION – A

2. (a) A steel tape 20 m long standardized at 55°F with a pull of 10 kg was used for a measuring a base line. Find the correction per tape length, if the temperature at the time of measurement was 80°F and pull exerted was 16 kg. Take wt. of 1 cubic cm of steel = 7.86 g, wt of tape = 0.8 kg and $E = 2.109 \times 10^{10}$ kg/cm², co-efficient of expansion of tape per 1°F = 6.2×10^{-6} . 15
- (b) Briefly describe chainage and offset. 5
3. (a) A 30 m chain was tested before starting the day's work and found to be 20 cm too short. After measuring a length of 1200m, the chain was tested again and was found to be 10 cm too long. At the end of day's work the chain was tested again and was found to be 30 cm too long. Find the true length of the line if the total length measured was 2648 m. 10
- (b) What are the principles of surveying ? Explain the classification of surveying in detail. 10

SECTION – B

4. (a) Give the corrected bearings of the following traverse taken from compass survey. 10

| Line | F.B | B.B |
|------|---------|---------|
| AB | 191°30' | 13°00' |
| BC | 69°30' | 246°30' |
| CD | 32°15' | 210°30' |
| DE | 262°45' | 80°45' |
| EA | 230°15' | 53°00' |

- (b) Define the following : 10
- True meridian and arbitrary meridian.
 - Fore bearing and back bearing
 - Local attraction
5. (a) The following consecutive readings were taken with a levelling instrument at intervals of 20 m. 2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255 and 3.630 m. The instrument was shifted after 4th and 8th readings. The last reading was taken on a BM of reduced level 110.200 m. Find the RL's of all the points. 10
- (b) Explain the direct and indirect methods of contouring. What are the advantages and disadvantages of these methods ? 10

SECTION - C

6. (a) State the three point problem. Explain how it is solved by the graphical method ? 10
- (b) Explain the methods used for measuring the horizontal angles of a traverse. 10
7. (a) Briefly explain the various methods used to balance a traverse. 5
- (b) The record of a closed traverse is given below, with two distances missing. 15

| Line | Length (m) | Bearing |
|------|------------|-------------|
| AB | 100.5 | N 30° 30' E |
| BC | ? | S 45° 00' E |
| CD | 75.0 | S 40° 30' W |
| DE | 50.5 | S 60° 00' W |
| EA | ? | N 40° 15' W |

Calculate the lengths of BC and EA.

SECTION – D

8. (a) Briefly explain the procedure to determine tacheometric constants by fixed hair method. 06.
- (b) The following observations were taken with a tacheometer fitted with an anallactic lens, the staff being held vertically. The multiplying and additive constant were 100 and 0, respectively.

| Instrument station | H.I. (m) | Staff station | Vertical angle | Staff readings (m) |
|--------------------|----------|---------------|-----------------|---------------------|
| P | 1.255 | B.M. | $-4^{\circ}20'$ | 1.325, 1.825, 2.325 |
| P | 1.255 | A | $+6^{\circ}30'$ | 0.850, 1.600, 2.350 |
| B | 1.450 | A | $-7^{\circ}24'$ | 1.715, 2.315, 2.915 |

Calculate P.L. of B and distance between A and B, if R.L. of B.M. is 255.750 m. 15

9. (a) What do you mean by vertical curve ? Explain the different types of vertical curves with neat sketches. 10
- (b) Two tangents meet at chainage 1022 m; the deflection angle is 36° . A circular curve of radius 300 m is introduced in between them. Find the following : 10
- Tangent length
 - Chainage of the tangent points
 - Length of the circular curve.