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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20508

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Third Semester

Civil Engineering

CE 3351 — SURVEYING AND LEVELLING

(Common to Environmental Engineering and Agricultural Engineering)

(Regulations 2021)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write a few words on geodetic surveying.
2. Define the term Magnetic declination.
3. Tell how reciprocal leveling is carried out and mention it's purpose.
4. Write about G.T.S bench marks.
5. Enlist the major characteristics of Tacheometer.
6. Write a few words on spire test.
7. Enlist the types of signals used in Triangulation.
8. Write about trilateration process and mention its application.
9. Define reduction to centre in surveying.
10. List the types of GPS receivers.

PART B — (5 × 13 = 65 marks)

11. (a) Explain three point problem in plane table survey and also brief its methods available for the solution of three point problem in detail.

Or

(b) Determine the values of included angles in the closed compass traverse ABCD conducted in the clockwise direction, given the following fore bearings of their respective lines:

LINE	F.B
AB	40°
BC	70°
CD	210°
DA	280°

Apply the check.

12. (a) Explain three principal methods used for determining difference in elevation in detail and also explain how temporary adjustments of level carried out?

Or

(b) The following consecutive readings were taken with a level and 5 metre leveling staff on continuously sloping ground at a common interval of 20 metres: 0.385; 1.030; 1.925; 2.825; 3.730; 4.685; 0.625; 2.005; 3.110; 4.485. The reduced level of the first point was 208.125 m. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points by rise and fall method and also the gradient of the line joining the first and the last point.

13. (a) Explain the steps involved in measuring a horizontal angle by repetition method and also discuss about the elimination of errors by method of repetition in theodolite survey.

Or

(b) (i) A levelling staff is held vertical at distance of 104 m and 307 m from the tacheometer axis and staff intercepts for horizontal sights are 0.850 m and 2.750 m respectively. Find the instrument constants.

When instrument was set up at P and staff at Q, the telescope was depressed at an angle of 8.5° with the horizontal and the staff readings were 2.780 m, 1.845 m and 0.955m. Find the R.L. of Q and its horizontal distance from P. The height of instrument at P is 1.25 m and R.L of P is 435 m. (10)

(ii) The combined correction due to curvature and refraction (in m) for distance of 1 km on the surface of Earth is? (3)

14. (a) (i) Write the procedures to be followed for the selection of triangulation stations. (7)

(ii) Explain the theory of least square in detail. (6)

Or

(b) (i) Write down the different sources of error in levelling and explain them in detail. (7)

(ii) How are the triangulation system classified and how triangulation survey work will be carried out? (6)

15. (a) Explain the working principle of EDM and different types of EDM along with its merits and demerits in detail.

Or

(b) Write briefly about the space, control and user segments of GPS and their functions.

PART C — (1 × 15 = 15 marks)

16. (a) In running fly levelling from a BM of RI. 100m, the following readings were taken

Back sights 3.125 1.000 1.295 1.855

Fore sights 1.225 3.290 2.085

From the last position of the instrument, 6 pegs at 25 m intervals are to be set out on a uniformly falling gradient of 1 in 250. The top of first peg in to have a RL of 99.205. Work out the staff readings required to set out the tops on the given gradient. Show the results as it is shown in a level book.

Or

(b) In a city property survey, following observations were made. Calculate the latitude, departures and closing error, prior to computation of the area closed in the transverse. Adjust the coordinates using Bowditch's rule.

Line	Length in m	Whole circle bearing
AB	89.31	45°10'
BC	219.76	72°05'
CD	151.18	161°52'
DE	159.10	228°43'
EA	232.26	300°42'