29-12-22- FN.

Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : **70059**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022

Third Semester

Civil Engineering

CE 3351 – SURVEYING AND LEVELLING

(Common to : Environmental Engineering/Agricultural Engineering)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between the plane and geodetic surveying.

2. Define local attraction.

3. List the different kinds of bench marks.

4. Define the term contour interval and horizontal equivalent.

5. Write down the steps in temporary adjustments of theodolite surveying.

6. In equation D = KS+C, describe the notations D, K, S and C.

7. Write the characteristics of Gale's table.

8. Explain the terms true from error and most probable error.

9. Calculate the elevation difference in TS if the vertical distance is 14.89 m, instrument height is 9.2 m, ground is at 2.8 m.

10. What are the errors in GPS?

PART B — (5 × 13 = 65 marks)

11. (a) The following bearings were observed in a compass traverse:

Line	FB	BB
AB	305° 00'	125° 30'
BC	75° 30'	254° 30'
CD	115° 30'	297° 00'
DA	165° 30'	345°30'
EA	225°00'	44°00'

At which of these stations would local attraction be suspected? Find the corrected bearings and included angles of the lines.

Or

(b) (i) Describe the merits and demerits of plane table surveying. (7)

(ii) Write down the procedure of anyone of the method of plane table surveying. (6)

12. (a) The following consecutive readings were taken with a leveling instrument at intervals of 20m. 2.375, 1 .730, 0.615, 3.450, 2.835, 2.070, 1,835, 0.985, 0.435,1.630, 2.255 and 3.630m. The instrument was shifted after the fourth and eighth reading. The last reading was taken on a benchmark of RL 110.200m. Find RLs of all points.

Or

(b) The following consecutive readings were taken with a level and 5 metre levelling staff an continuously slopping ground at a common interval of 25 metres: 0.450, 1.120, 1.875, 9905, 3.685, 4.500, 0.520, 2.150, 3.205 and 4.485 Given: The reduced level of the change point was 250.000 Rule out a page of level field book and enters 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) The readings given below were made with a tacheometric theodolite having multiplying constant of 100 and no additive constant. The RL at station A was 100.00m and the ht. of the instrument axis 1.35m above the ground. Calculate the gradient expressed as the horizontal distance one meter rise or fall vertically between the stations B and C.

Station	To	WCB from N	Vertical Angle	Stadia Readings
A	B	48°00'	+11°30'	2.048/1.524/1.000
	C	138°00'	−17°00'	2.112/1.356/0.600

Or

(b) Derive the expressions for horizontal and vertical distances by stadia method when the line of sight is inclined, but staff is held vertically and considering the angle of elevation.

14. (a) Find the most probable values of the angles A, B and C from the following observations at a station P:

A = 38° 25' 20" wt. 1

B = 32° 36' 12" wt. 1

A + B = 71°01' 29" wt. 2

A + B + C = 119° 10' 43" wt. 1

B + C = 80°45' 28" wt. 2

Or

(b) Two triangulation stations A and B are 60 kilometres apart and have elevations 240 m and 280 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 2 metres. The intervening ground may be assumed to have a uniform elevation of 200 metres.

15. (a) What do you understand about total station? Explain the fundamental measurements can be made with total station and also mention the procedure of the calculating the horizontal and vertical distance.

Or

(b) Give brief description of GPS what are the main advantages of GPS over traditional methods of surveying and write a GPS applications in various field of surveying

PART C — (1 × 15 = 15 marks)

16. (a) The following data refer to a closed traverse. Compute the missing

Line	Length (m)	Bearing
AB	725	S 60°00' E
BC	1050	?
CD	1250	?
DE	950	S 55°30' W
EA	575	S 02°45' W

Or

(b) A steel tape 30m long standardized at 100C with a pull of 10 kg was used for measuring a base line. Find the correction per length, if at the time of measurement the temperature was 22° C and the pull exerted 15 kg weight of steel per cubic centimeter equals 7.75 gms. Weight of tape is 0.68kgs, E = 2.11 × 10⁶ kg/cm², and α = 12 × 10⁻⁶ per °C.