SE|civil||sem-IV|CBCGS|R-19|C-scheme|Surveying|SH-25

[Time:3 Hours] [Marks:80]

08/12/2025

QP-10099941

N.B:
- **Question 1 is compulsory**
- **Attempt any three from remaining**
- **Assume suitable data wherever necessary and mention it clearly.**
- **Figures to the write indicate full marks.**
- **Draw sketches wherever necessary.**
- **Attempt sub questions in order.**

Q1. Attempt any four

a. Compare plane and geodetic surveying **(05)**

b. Write detailed note on Gale's traverse table. **(05)**

c. A leveling staff was held vertical at a distance 100m and 300m from the axis of tacheometer and the staff intercept for the horizontal sights was recorded as 0.99m and 3.00m respectively. Find the constants of instrument **(05)**

d. List and sketch various types of horizontal and vertical curves stating the use of each **(05)**

e. List various accessories used in PTS and also list methods of plane table surveying. Discuss any one method of plane table surveying **(05)**

f. Define Contour. Explain characteristics of contours with necessary sketches **(05)**

Q2 a. The following bearings were taken in running a closed compass traverse surveying. **(10)**

Line	Fore Bearing	Back Bearing
AB	75° 5'	254° 20°
BC	115° 20'	296° 35'
CD	165° 35'	345° 35'
DE	224° 50'	44° 05'
EA	304° 50'	125° 05'

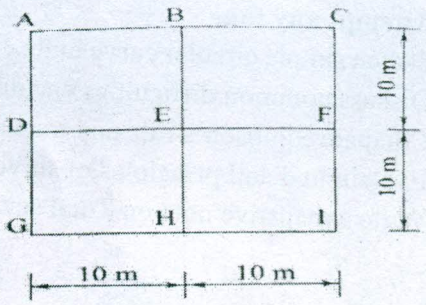
Determine which station are affected by local attraction and by how much? Determine the correct bearings.

Calculate the true bearings if the declination was 1° 30' E

b. Discuss repetition method of horizontal angle measurement using theodolite **(05)**

c. The plan of plot is shown, which is to be excavated up to formation level 10.00m for the entire plot. The existing ground levels before excavation are shown in table. Calculate the volume of excavation. The squares are of uniform size 10mx10m **(05)**

Point	Existing level in m	Point	Existing level in m
A	12.8	F	12.4
B	13.2	G	12.4
C	12.6	H	12.9
D	12.6	I	12.2
E	13.1	---	----



Q3 a Following readings were taken with a dumpy level and a 4m leveling staff on a sloping ground at common intervals of 20m. The readings are: 0.78 on P, 1.545, 1.825, 1.955, 2.335, 2.975, 3.115, 3.655, 3.825, 0.655, 1.380, 1.935, 2.055, 2.645, 2.855, 3.455, 3.865, 0.585, 0.965, 1.015, 1.630, 1.925, 2.545, 3.335 and 3.835 on Q. The RL of the first point was 150. Rule out the page of level book and enter the above readings. Calculate the RL's of all the staff stations and gradient between first and last point Apply necessary checks. **(10)**

b. Explain execution of block contouring project survey of plot size 50m x 40m in detail. **(05)**
c. Compare dumpy level and auto level. **(05)**

Q4 a. Calculate the missing length and bearing of line DA for a closed traverse ABCDA from the following data: **(08)**

Line	Length	Bearing
AB	130	320°
BC	610	10° 45'
CD	105	85°
DA	?	?

b. In a traverse, latitude and departure were observed to be 1.4m and -2.2m. Calculate closing error and bearing of closing error. **(04)**
c. Define tacheometry and explain its principle **(04)**
d. The following readings were obtained when a figure was traversed clockwise with the anchor point outside. The tracing arm was set to natural scale giving the multiplier as 100 cm^2. The zero mark of the counting disc passed the fixed index mark twice in the clockwise direction. Initial reading: 9.375; final reading: 1.235. Calculate the area of figure. **(04)**

Q5 a. Determine the gradient from point M to N from the following observations made with a tacheometer with staff held vertical. The multiplying and additive constants are 100 and 0.5 respectively. RL and HI of instrument station is 150m and 1.5m respectively. **(10)**

Instrument Station	Staff station	Vertical Angle	Staff Readings		
O	M	-5° 45'	1.30	2.00	2.70
	N	+10° 30'	1.00	1.75	2.50

b. Calculate all the data necessary and prepare a table for setting out a 8° simple circular curve using Rankine's method from following data: **(10)**
Deflection angle = 144°; Chainage of point of intersection = 1280 meters.
Peg interval = 20 meters, least count of Vernier = 20"

Q6 Attempt any four

a. Sketch simple circular curve indicating its all elements and state necessity of providing curves **(05)**
b. Discuss common difficulties encountered during leveling operation. **(05)**
c. Compare Simpson's rule and trapezoidal rule. **(05)**
d. Explain in detail principles of surveying **(05)**
e. Write exhaustive note on Total station. **(05)**

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