4ᵗʰ Semester Regular/Back Examination: 2023-24
SUBJECT: Surveying
BRANCH(S): C&EE,CIVIL,CE
Time: 3 Hour
Max Marks: 100
Q.Code: P065
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Define direct ranging and indirect ranging in chain surveying.

b) What is local attraction in compass surveying, and how does it affect the accuracy of measured bearings?

c) What is the relation between fore bearing and back bearing of a line? Is it required to take both the fore bearing and back bearing for a line,and why?

d) State the principle on which a prismatic compass works.

e) What is reciprocal levelling? When reciprocal levellingtechnique is used?

f) How bearing of a line can be measured by using a theodolite?

g) Define contour interval and horizontal equivalent in contouring. How are these two parameters related?

h) Draw sample contour lines to represent the ridge of a mountain and a vertical cliff.

i) Differentiate between active and passive remote sensing.

j) What is the working principle of a total station?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Explain how to apply the corrections in measured length in a chain survey for the incorrect length of tape, pull, and sag.

b) During a chain survey, stations B and C were taken on the opposite sides of a pond. On the left of line BC, a line BD of length 300 m and a second line BE of length 200 m on the right of line BC was ranged. D, C, and E points are in the same straight line, where DC = 150 m and CE = 250 m. Calculate the distance between stations B and C.

c) Write the procedures to continue a levelling work across a lake or pond, across a high wall, and across a river.

d) Explain temporary adjustments of a levelhaving a three-foot screw levelling head.

e) Derive the expression for combined correction for curvature and refraction in levelling.

f) Describe the field procedure to determine the sensitivity of the bubble tube. Statethe factors and their influence on the sensitivity of the bubble tube.

g) Describe the repetition method for the measurement of horizontal angles using a theodolite.

h) Explain how to eliminate the error in measurement when the horizontal axis of a theodolite is not perpendicular to the vertical axis.

i) Explain how the nature of the ground and scale of the map affect the choice of contour interval for a map.

j) Explain the method to locate a contour gradient in the field with a level.

k) Describe selective and non-selective scattering in remote sensing.

l) Define spatial, spectral, temporal, and radiometric resolutions for a sensor.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 The following bearings were observed for a closed traverse. Determine the corrected included angles and corrected bearings of the lines, based on the principle that "Even if a station is affected by local attraction, the calculated included angles should be correct". **(16)**

Line	Fore bearing	Back bearing
AB	125°10'	306°35'
BC	175°40'	355°40'
CD	235°	54°20'
DE	315°10'	135°5'
EA	85°	263°50'

Q4 The following readings were taken during a reciprocal levelling between two stations A and B. Find the true difference in elevation between A and B. If the instrument had a collimation error of 0.003/150 m and the distance between the stations was 1100 m, find the error due to curvature and refraction. **(16)**

Instrument at	Staff reading taken at	
	A	**B**
A	1.525	2.825
B	1.530	2.605

Q5 The following consecutive staff readings (in m) were taken with a level: **(16)**

2.130, 1.505, 0.890, 2.090, 2.765, 1.162, 0.505, 1.880, 1.045, 2.585.

The level was shifted after 3rd, 6th and 8th readings. The 1st reading was taken on a benchmark of reduced level (RL) 400 m. Calculate RLs of all the staff locations using the Height of Instrument method. Apply all usual checks.

Q6 What are the different indirect methods of locating contours? Describe each method in detail with the help of neat sketches. **(16)**