

17451

16117

3 Hours / 100 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any TEN of the following:** **20**
- Define ‘Surveying’.
 - State any two objects of surveying.
 - Enlist any four types of tapes.
 - Define ‘Base line’.
 - What do you mean by ‘Well-conditioned triangle’.
 - State any four component parts of a prismatic compass.
 - Define “Bearing” of a line.
 - Define “Level surface”.
 - State any two uses of contour map.
 - Define ‘horizontal equivalent’ of an contour.

P.T.O.

- k) State any four situation where plane table survey is preferred.
- l) Define “orientation” of a plane table surveying.
- m) State the uses of Auto-level.
- n) State the use of Plane Table Survey.

2. Attempt any FOUR of the following: 16

- a) State any four uses of total station.
- b) State any four uses of digital planimeter.
- c) Explain the method of radiation by using plane table surveying.
- d) Explain any five important characteristics of contours with neat sketches.
- e) Explain the method to locate a given contour gradient in a contour plan.
- f) State any four uses of surveying.

3. Attempt any FOUR of the following: 16

- a) Explain the difference between plane surveying and geodetic surveying.
- b) The length of a survey line was measured with a 30 m chain and found to be 128.65 m. Later it was observed that the chain was 0.02 m short. Find the true length of the line.
- c) Give a brief description of the optical square and the method of using it.
- d) Give a sample page of a field book to explain how the entries are made.
- e) Explain the construction of a diagonal scale.
- f) Enlist the steps to be taken to minimize errors in surveying.

4. Attempt any FOUR of the following:**16**

- a) Draw a neat sketch of a 30 m chain to show its salient features.
- b) Explain atleast one method to continue and measure the distance between points on either side of the obstacle in case of a river.
- c) The area of a plot of land was measured from a plan drawn to a scale of 1 cm = 40 m.

The area was found to be 125 sq.cm. If the 3 cm chain used for the survey was 0.01 m too short, find the true area of the land.

- d) Convert the W.C.B. to reduced bearings.
 - (i) $67^{\circ} 30'$
 - (ii) $278^{\circ} 45'$
 - (iii) $123^{\circ} 55'$
 - (iv) $326^{\circ} 30'$
- e) State the principle on which compass works.
- f) Explain the term dip angle? How does it affect the movement of a magnetic needle?

5. Attempt any FOUR of the following:**16**

- a) The distance between two stations P and Q is 900 m. The observations from reciprocal levelling were 1.686 m staff at P, 3.107 on staff at Q with the instrument at P and 0.560 on staff P, 2.015 on staff at Q with the instrument at Q. Find the true difference in elevation and the collimation error in the instrument.
- b) The following consecutive readings were taken with a level : 1.115, 0.745, 1.245, 1.065, 0.785, 1.315, 2.15, 0.845, 1.150, – 2.365, 1.360, 1.575 and 1.840. The instrument was shifted after the 4th, 8th and 11th readings. Tabulate the readings in a proper format and find the reduced levels using the rise and fall method if the eighth reading was taken to a benchmark of reduced level 325.675.

- c) Explain the difference between the height of collimation method and the rise and fall method of reduction of levels.
- d) Explain in brief “reciprocal levelling”.
- e) Draw a neat sketch of a dumpy level and label its parts.
- f) The following staff readings were recorded in a levelling operation: 1.185, 2.604, 1.925, 2.305, 1.155, 0.864, 1.105, 1.685, 1.215, 1.545 and 0.605. A is a benchmark of reduced level 185.685 m. Find the RLS of all the other points by H.I. method. The first reading was to point A and the instrument was shifted after the readings 2.604, 0.864 and 1.215.

6. Attempt any TWO of the following:

16

- a) Explain the process of orientation by magnetic needle and back sighting method.
- b) Some observations are missing from the page of a field book shown below. Find the missing readings from the available data.

Staff station	Back sight	I.S.	F.S.	Height of Collimation	R.L.	Remarks
A					100.91	
B		1.085				
C		2.125				B.m. RL 100
D	1.315				101.26	
E			1.325	102.235		
F					101.61	

- c) The following bearings are observed while traversing with a compass and tape. Check the bearings for local attraction. Correct the bearings by the method of included angles.

AB – $188^{\circ}45'$ BA $7^{\circ}45'$
 BC – $118^{\circ}15'$ CB $298^{\circ}15'$
 CD – $346^{\circ}35'$ DC $166^{\circ}30'$
 DE – $337^{\circ}05'$ ED $158^{\circ}10'$
 EA – $293^{\circ}30'$ AE $113^{\circ}00'$
