

SURVEYING
(CIV2104)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) A 30m metric chain is found to be 10 cm too short throughout a measurement. If the distance measured is recorded as 300 m, then the actual distance is
 - (a) 300.1 m
 - (b) 301.0 m
 - (c) 299.0 m
 - (d) 310.0 m
- (ii) The process of turning the telescope about the horizontal axis in vertical plane is known as
 - (a) Transiting
 - (b) Reversing
 - (c) Plunging
 - (d) Swinging
- (iii) The correction for sag is
 - (a) Always additive
 - (b) Always subtractive
 - (c) Always zero
 - (d) Sometimes additive and sometimes subtractive
- (iv) The spiral angle of a transition curve will be given by the equation
 - (a) $L^2/2R$
 - (b) $L/2R$
 - (c) $2R/L$
 - (d) $2R/L^2$
- (v) Angles of simple triangulation figures for triangles should not be less than
 - (a) 45 degree
 - (b) 30 degree
 - (c) 60 degree
 - (d) 90 degree

- (vi) Radar is an acronym for
 (a) Radiation and ranging
 (b) Ratio detection and ranging
 (c) Radiation and response
 (d) Radiation and reporting
- (vii) If the declination is $5^{\circ}40'$ W, which one of the following magnetic bearing would represent the true bearing of S $25^{\circ}20'$ E?
 (a) S $19^{\circ}20'$ E
 (b) S $31^{\circ} 0'$ E
 (c) S $20^{\circ} 0'$ E
 (d) S $19^{\circ} 20'$ W
- (viii) Closing error correction can be performed using the following method
 (a) Rise and Fall method
 (b) Method of ranging
 (c) 3-4-5 method
 (d) Bowditch rule
- (ix) If the tangent distance of a curve is 242m and deflection angle is 36 degree, then the length of the curve is
 (a) 246m
 (b) 492m
 (c) 632m
 (d) 783m
- (x) Closed contour lines with higher elevation value inside the loop, represent
 (a) Depression
 (b) Hill or summit
 (c) Plane surface
 (d) Ridge line

Fill in the blanks with the correct word

- (xi) Reduced bearing value of $190^{\circ}35'$ is _____.
- (xii) In _____ surveying, curvature of earth is taken into consideration.
- (xiii) Latitude of S $30^{\circ}30'W$ will be _____
- (xiv) Dumpy level is used in _____.
- (xv) For a well-conditioned triangle, no angle should be less than _____.

Group - B

2. (a) The whole circle bearings of a traverse are recorded as given in Table 1. Develop the corresponding reduced bearings.

Table 1: Whole circle bearings of the traverse

Line	AB	BC	CD	DE
Bearing	$90^{\circ}00'$	$110^{\circ}30'$	$220^{\circ}30'$	$355^{\circ}47'$

[[CIV 2104.1)(Analyse/IOCQ]]

- (b) Explain the term local attraction. [[CIV 2104.1](Understand/LOCQ)]
 (c) The following Table 2 consists of the bearings of a closed traverse with compass, an area where local attraction was suspected. Solve for included angle of traverse and correct them if necessary.

Table 2: Bearings of the traverse

Line	Fore bearing	Back bearing
AB	165°30'	345°30'
BC	40°45'	221°45'
CD	315°45'	135°45'
DE	250°30'	69°30'
EA	120°45'	300°45'

[[CIV 2104.1](Apply/IOCQ)]

4 + 2 + 6 = 12

3. The following readings in Table 5, have been taken from the page of an old level book. Reconstruct the page and apply usual checks.

Table: 5 Reading from old level book

Point	B.S.	I.S.	F.S.	Rise	Fall	R.L.	Remarks
1	3.125					×	B.M.
2	×		×	1.325		125.005	C.P.
3		2.320			0.055		
4		×				125.350	
5	×		2.655				C.P.
6	1.620		3.205		2.165		C.P.
7		3.625					
8			×			122.590	T.B.M.

[[CIV 2104.1](Analyse/HOCQ)]

12

Group - C

4. Following are the details of railway embankment:

Embankment width = 12m

Side slope = 1.3 to 1

Interval station = 30m

Center height at interval stations = 3.22, 4.45, 2.68, 2.01, 3.34, 4.63 and 3.56

Calculate volume obtained from the data provided.

[[CIV 2104.2](Analyse/IOCQ)]

12

5. (a) Explain the followings terms
 (i) Transit theodolite
 (ii) Method of repetition
 (iii) Face left and face right condition
 (iv) Least count of theodolite.

[[CIV 2104.1](Understand/IOCQ)]

- (b) A closed traverse with a theodolite was conducted round an obstacle and the observation was made as shown in Table 6. Determine the missing values.

Table 6: Theodolite traverse reading

Line	Length	Azimuth
AB	500	98°30'
BC	620	30°20'
CD	468	298°30'
DE	?	230°00'
EA	?	150°00'

[[CIV 2104.1, CIV 2104.2](Apply/IOCQ)]

4 + 8 = 12

Group - D

6. (a) Two tangents intersect at a chainage 1120m with deflection angle being 30°. Calculate necessary data for setting out a circular curve of radius 200m, by the method of offsets from long chord. [[CIV 2104.3](Analyse/HOCQ)]
- (b) Explain the process of setting out of circular curve by angular method. [[CIV 2104.3](Understand/IOCQ)]
- 8 + 4 = 12**
7. (a) State the importance of base line in geodetic surveying. [[CIV 2104.5, CIV 2104.6](Remember/LOCQ)]
- (b) Write short note on 'strength of figures'. [[CIV 2104.5, CIV 2104.6](Remember/LOCQ)]

6 + 6 = 12

Group - E

8. (a) State the objectives of hydrographic surveying. [[CIV 2104.4, CIV 2104.6](Remember/LOCQ)]
- (b) Write short note on "Shoreline survey". [[CIV 2104.4, CIV 2104.6](Remember/LOCQ)]
- (c) Explain the term "Mean sea level". [[CIV 2104.4, CIV 2104.6](Understand/LOCQ)]
- (d) State and explain "Establishing controls" in hydrographic survey. [[CIV 2104.4, CIV 2104.6](Understand/LOCQ)]
- 6 + 2 + 2 + 2 = 12**
9. (a) Illustrate some applications of photogrammetry. [[CIV 2104.4, CIV 2104.6](Understand/LOCQ)]
- (b) What are the limitations of photogrammetry? [[CIV 2104.4, CIV 2104.6](Remember/LOCQ)]
- (c) State in tabular form the difference between terrestrial and areal photogrammetry. [[CIV 2104.4, CIV 2104.6](Understand/LOCQ)]

4 + 4 + 4 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	39.6	39.6	20.8