



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

16 April 2021

This marking guideline consists of 4 pages.

SECTION A**QUESTION 1**

- 1.1 False✓ The instrument should never be left on the tripod, even for a second.✓
- 1.2 False✓ Never allow the instrument to be manipulated by unskilled hands such as the chainman.✓
- 1.3 True✓ The instrument should be subjected to a minimum of rock shock by putting it in a container during transportation.✓
- 1.4 False✓ Rough treatment or heavy-handedness such as overtightening of clamps, will soon impair its efficiency.✓
- 1.5 False✓ When the instrument is carried, keep it as vertical as possible.✓
- 1.6 True✓ A soft cloth is desirable to avoid scratching out important marks such as graduation.✓
- 1.7 False✓ Clean all exposed parts at least monthly except the lenses to preserve its appearance and clear focus.✓
- 1.8 False✓ Occasionally polish all exposed parts, except lenses and screw threads to preserve it in clear focal and rigid condition.✓
- 1.9 True✓ Growth should not be left too long before the instrument is sent for cleaning.✓
- 1.10 True✓ The lenses should be clear from any mark including finger marks.✓
- (10 × 2) **[20]**

QUESTION 2

- 2.1 Determined
- 2.2 Measurements
- 2.3 Points
- 2.4 Corners
- 2.5 Surfaces
- 2.6 Areas
- 2.7 Position
- 2.8 Methods
- 2.9 Whole
- 2.10 Parts

(10 × 1) **[10]**

QUESTION 3

- 3.1
- The degree of closeness or conformity of repeated measurements to one another
 - The result of the degree of perfection used in the instruments
 - The methods and the observation
- 3.2
- The degree of conformity or closeness of measurement to the true value
 - The effects of uncorrected systematic errors
 - as well as the effects of accidental errors influence the accuracy obtained.
- 3.3
- Measured slope distances are transformed into their horizontal and vertical components.
 - Only horizontal distances are used for plotting a plan
 - and these horizontal distances, combined with their directions, are transformed into two further components.
- 3.4
- The representation on a map, of a system of equally spaced straight lines, parallel to the Y- and X-axes of the coordinate system,
 - the exact distance of each line from its parent axis that is known.
 - It consists of a system of squares or rectangles of known dimensions.
- 3.5
- They occur according to some system which, when known, can be expressed by some functional relationship.
 - It follows a pattern which will be duplicated if the measurement is repeated under the same condition.
 - The underlying system may depend on the observer, the instrument used and the environmental conditions at the time of measurement.

(5 × 3)

[15]**TOTAL SECTION A:****45****SECTION B****QUESTION 4**

- 4.1
- Loosen both plate clamps and rotate the lower plate✓ until the reading is approximately $215^{\circ}37'$.✓
 - Tighten the upper clamp and, by means of the upper plate tangent screw,✓ set the reading exactly to $215^{\circ}37'2''$.✓ (In the case of micrometre instruments, the fine reading must be preset by means of the micrometre drum.)
 - With the lower plate clamp still loose, rotate the instrument✓ until the chosen object comes into the field of view of the telescope.✓
 - Tighten the lower plate clamp and, by means of the lower plate tangent screw,✓ set the vertical cross hair so that it bisects the object.✓
 - Check✓ that the reading is still $215^{\circ}37'20''$.✓
 - Loosen the upper plate clamp✓ and do not again touch the lower plate clamp or tangent screw.✓

(6 × 2)

(12)

- 4.2 Each side = 16 m^2 ✓
 = 4 m ✓✓
 = $4\,000 \text{ mm}$ ✓
 = $4\,000 \text{ mm}/500$ ✓✓
 = 8 mm ✓✓ (8)

- 4.3
- From the site boundaries measure/set out the proposed building increasing the area by +/- 1 m.
 - Punch in two pegs (+/- 2 m long pegs) 1 m away from each corner in line with the building line in all four corners.
 - Because of the length of the pegs, a traveller of 1,5 m would be appropriate.
 - The formation level plus/minus the bench mark
 - plus the length of the traveller will give the staff reading on all eight the sight rail pegs. (5 × 2) (10)

4.4

JOIN CALCULATIONS			
Y	X	Calculations	Direction/D and Distance/S
-1 065.84	+310 796.62	$= \tan^{-1} -8\,611.850 / +58\,728.150$ ✓	$D = 360 - 8^\circ 20' 32''$ ✓✓
-9 677.69	+369 524.77	$= -8^\circ 20' 32''$ ✓	
✓ -8 611.850	✓ +58 728.150	Check:	$S = 59\,356.209$ ✓✓
		$59\,356.209 \sin 351^\circ 39' 28''$	
		$= -8\,611.850$ ✓	
		And:	
		$59\,356.209 \cos 351^\circ 39' 28''$	
		$= +58\,728.150$ ✓	

(10)
[40]

QUESTION 5

5.1

POINT	BACK-SIGHT	INTER-SIGHT	FORE-SIGHT	RISE	FALL	REDUSED LEVEL	REMARKS
A	0.15					40.60	TBM 40.60
B	1.63		1.30		1.15✓	39.45✓	
C		1.20		0.43✓		39.88✓	
D	1.69		1.43		0.23✓	39.65✓	
E	2.35		1.43	0.26✓		39.91✓	
F			1.10	1.25✓		41.16✓	
	5.82		5.26✓	1.94	1.38✓	41.16	
	5.26			1,38		40.60	
	0.56✓			0.56✓		0.56✓	

[15]

TOTAL SECTION B: 55
GRAND TOTAL: 100