



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N5

31 March 2020

This marking guideline consists of 5 pages.

SECTION A**QUESTION 1**

- 1.1 True
- 1.2 False
- 1.3 True
- 1.4 False
- 1.5 True

Candidate must supply applicable reason for each answer. (5 × 2) **[10]**

QUESTION 2

- 2.1 F
- 2.2 K
- 2.3 A
- 2.4 I
- 2.5 B
- 2.6 L
- 2.7 C
- 2.8 E
- 2.9 G
- 2.10 H

(10 × 1) **[10]**

QUESTION 3

- 3.1 When the elevation of the underside✓ of a bridge, the roof of a tunnel,✓ is required, the staff may be inverted✓ (held upside down). These readings are booked in the normal manner,✓ but a line is drawn above✓ the entry to show that the staff was inverted (some surveyors use a minus sign in front of the entry).
- 3.2 Whatever system is used, the instrument must be correctly orientated, that is the lower plate✓ must be set in such a way that the reading obtained when sighting any point is the true angle✓ at the instrument station between that point✓ and the chosen zero.✓ These directions are always measured in a clockwise sense✓ and may vary from 0° to 360°.
- 3.3 If the image formed by the objective does not lie in the plane of the cross hairs✓ and if the eye piece✓ is not accurately focused✓ on the cross hairs, a relative movement✓ between the image and the cross hairs will occur if the eye of the observer is moved.✓

- 3.4 These 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 conditions.✓ The system underlying a systematic error may depend on the observer,✓ the instrument used✓ and the physical or environmental conditions✓ at the time the measurement is made.✓
- 3.5 On this system the Y-co-ordinate is measured positive✓ to the west of the origin and negative to the east.✓ The X-co-ordinate is measured positive from the origin, in the positive direction of the X-axis, and negative in the opposite direction.✓ As a point on the equator is the origin, it is measured positive to the south. The system is divided into four quadrants✓ numbered in a clockwise direction, starting from the one in which both co-ordinates are positive.✓

(5 × 5) [25]

TOTAL SECTION A: 45**SECTION B****QUESTION 4**

- 4.1 Measure the distance of the proposed structure from all four corners✓ and make it about 1 m less each side of the building.✓ Put the steel pegs or droppers on these new-found points✓ and mark them for a 2 m traveller✓ and take the 150 mm depth of top soil into consideration.✓ (Explanation 5 marks)

Equipment:

- About 2 m traveller
- Levelling instruments
- 3 fish lines
- Lime
- 4 m × 2 m steel pegs or droppers
- About 100 m tape

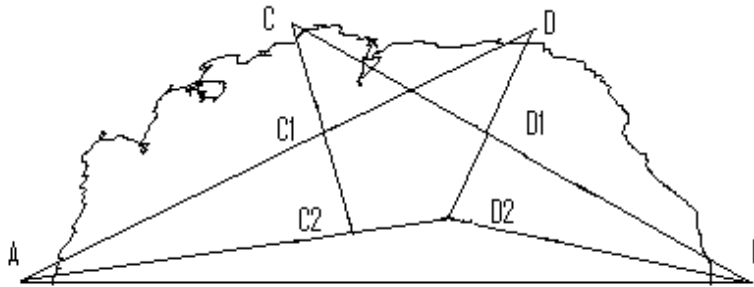
(Any FIVE) (10)

4.2

STATION	Y	X	CALCULATIONS	DIRECTION/DISTANCE
A	-2 167, 59✓ -2 315, 81✓	+303 248, 75✓ +303 409, 06✓	$\tan^{-1} -148, 22/160, 31✓$ $= 42^{\circ}45'21''✓$	$D = 360 - 45^{\circ}45'21''✓$ $317^{\circ} 14' 38''✓$
	-148, 22✓	+160, 31✓		
			Check	$S = 218. 33 \text{ m}✓$
			$218.33\cos 317^{\circ} 14' 38''✓$ $= +160.31✓$	
			$218.33\sin 317^{\circ} 14' 38''✓$ $= -148.22✓$	

(15)

4.3



(4 marks for sketch)

Plumb at A and B two men✓ with ranging rods so that D can see AC✓ and C can see BD.✓ D directs C in line AD, then C directs D in line with BC at D1.✓ D1 directs C1 in line with A–D1 at C1.✓ This continues until C and D are in a straight line from A and B.✓

(10)

4.4

- Apply correct tension
- Use correct zero mark
- Measure to centre of peg
- View tape vertically on graduations
- Clear obstacles on chain line
- Minimise sag

(Any 5 × 1)

(5)

[45]

QUESTION 5

POINT	BACK-SIGHT	INTER-SIGHT	FORE-SIGHT	RISE	FALL	REDUCED LEVEL	REMARKS
A	4.50					94.20✓	TBM 94.20
B		4.00		0.50✓		94.70✓	
C		2.05		1.95✓		96.65✓	
D	3.32		0.42	1.63✓		98.28✓	
E		2.28		1.04✓		99.32✓	
F	0.26		1.54	0.74✓		100.06✓	
G		0.98			0.72✓	99.34✓	
TBM			4.24		3.26✓	96.08✓	
	8.08		6.20	5.86	3.98	-1.88	
			<u>8.08</u>		<u>5.86</u>		
			-1.88		-1.88		

[15]

TOTAL SECTION B: 55
GRAND TOTAL: 100