



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

BUILDING AND STRUCTURAL SURVEYING N5

8 APRIL 2016

This marking guideline consists of 6 pages.

MARKING INSTRUCTIONS

1. Mark neatly with a red pen
2. Do not draw lines through wrong answers
3. Write the marks for each answer in the write margin and the TOTAL for a whole question in a circle in the left margin
4. Use your own discretion should there be more than one possible correct answer/formula/sketch that does not appear on the memorandum, please evaluate it and allocate marks accordingly

QUESTION 1

- | | | | |
|-----|--|---------|------|
| 1.1 | All three | | |
| 1.2 | Control an excavation | | |
| 1.3 | All three | | |
| 1.4 | Surveying instrument on a tripod | | |
| 1.5 | Adjust the circular bubble to be in its centre | (5 × 2) | (10) |

QUESTION 2

- | | | | |
|-----|-------|---------|------|
| 2.1 | False | | |
| 2.2 | True | | |
| 2.3 | True | | |
| 2.4 | True | | |
| 2.5 | True | (5 × 2) | (10) |

QUESTION 3

- | | | | |
|-----|--|---------|------|
| 3.1 | Placing of pegs in the ground to: define position of pegs beacons/survey stations, mark out the limits of a structure and refer to a vertical height. | | |
| 3.2 | A scale is a proportional representation on paper/drawing of the actual dimension of a horizontal distance on the ground. | | |
| 3.3 | Plane surveying can be regarded as covering a relatively small area. This area to be surveyed is considered so small that the effect of the curvature of the earth may be neglected. | | |
| 3.4 | This is the entering of measurements in a systematic, logical manner so that any draughtsmen can produce a map or a plan from the recorded information. | | |
| 3.5 | A plan is a true scale representation to display accurate detailed information. | (5 × 3) | (15) |

QUESTION 4

4.1

POINT	BACK SIGHT	INTER SIGHT	FORE SIGHT	RISE	FALL	REDUCED LEVEL	REMARKS
A	1,320					28,965	TBM 28,965
B	1,360		1,332		0,012✓	28,953✓	
C		1,233		0,127✓		29,080✓	
D	2,145		1,113	0,120✓		29,200✓	
E	2,165		2,652		0,507✓	28,693✓	
F			2,536		0,371✓	28,322✓	TBM 28,311
	6,990		7,633	0,247	0,890	28,965	
	7,633			0,890		-0,643✓	
	<u>-0,643✓✓</u>			<u>-0,643✓✓</u>			

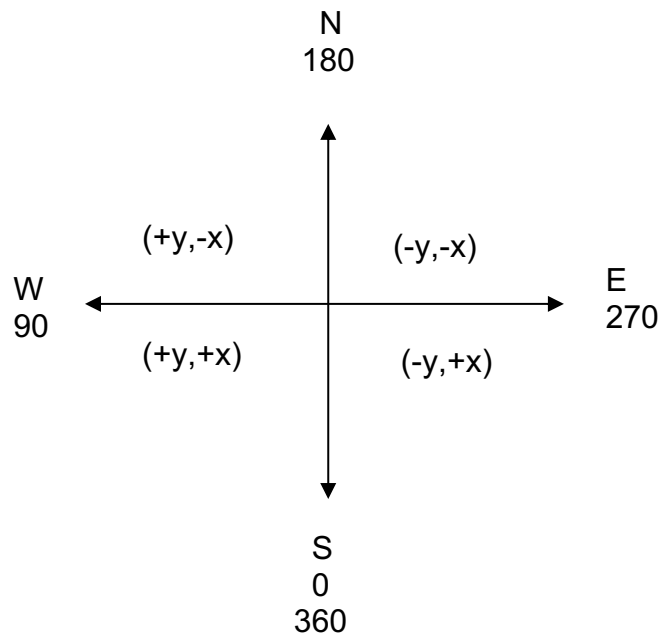
(15)

- 4.2
- Measure to the centre of a ranging rod
 - View tape vertical over the peg
 - Tape must be held on the correct peg
 - Tape must be held on its correct zero mark
 - Tape must be held horizontal

(5 × 2) (10)
[25]

QUESTION 5

5.1



(6)

- 5.2
- Gradients of landscapes can be estimated.
 - The volume of excavation or hill can be estimated.
 - The ability to see directly between two points can be established by interpolating along a line across contours. (2 x 2) (4)
- 5.3 Off-sets must be taken from the road reserve to the boundary of the site that is required✓✓ and a baseline parallel to the road drawn.✓✓ These offsets are taken from stipulated chainages on the site plan.✓✓ The remaining boundaries of the site are then measured, perpendicularly to the baseline✓✓ and the required site shape is then set out from the baseline.✓✓ (10)
- 5.4
- $$\tan \theta = 0,2/20 \checkmark$$
- $$\theta = \tan^{-1} 0,01 \checkmark$$
- $$\tan 0,573 = H/100 \checkmark$$
- $$H = 1,0001 \checkmark$$
- : Slope = 1%✓ (5)
- [25]

QUESTION 6

- 6.1
- $$\begin{aligned} \text{Correction} &= MD \times COE \times (T_2 - T_1) \\ &= 348 \times 0,00012 / ^\circ\text{C} \times (32 ^\circ\text{C} - 16 ^\circ\text{C}) \checkmark \\ &= 0,668 \text{ m} \checkmark \end{aligned}$$
- $$\begin{aligned} \text{Correction Slope} &= MD(1 - \cos \theta) \\ &= 348 (1 - \cos 50^\circ) \\ &= 1,802 \text{ m} \checkmark \end{aligned}$$
- $$\begin{aligned} \text{Correct Distance} &= 348 + 0,668 - 1,802 \checkmark \\ &= 346,866 \text{ m} \checkmark \end{aligned} \quad (5)$$

6.2

JOIN CALCULATIONS				
	Y	X	Calculations	Direction/D and Distance/S
C	-1056,480	+310769,260	$= \tan^{-1} \frac{-8621,480}{+58773,51} \checkmark$	D = 360- 8°20'43" ✓
D	-9677,960	+369542,770	$= -8^{\circ}20'43'' \checkmark$	
	-8621,480✓	+58773,510✓	Check:	S = 59402,486✓
			59402,486 Sin 351°39'17"✓	
			= -8621,566✓	
			AND:	
			59402,486 Cos 351°39'17"✓	
			= +58773,497✓	

(10)

TOTAL: 100