



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

BUILDING AND STRUCTURAL SURVEYING N5

28 NOVEMBER 2016

This marking guideline consists of 5 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 right 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 | False |
| 1.2 | True |
| 1.3 | False |
| 1.4 | True |
| 1.5 | True |

(5 × 2) [10]

QUESTION 2

- | | | |
|-----|-------|---|
| 2.1 | 2.1.1 | Cadastral survey is that branch of surveying concerned with property boundaries.✓✓ |
| | 2.1.2 | Contours are lines on the surface of the earth joining points of the same height above mean sea level.✓✓ |
| | 2.1.3 | Geodetic surveying is that branch of surveying concerned with the large areas on the surface of the earth to the extent that the curved nature of the earth can not be ignored.✓✓ |
| | 2.1.4 | A survey station refers to a peg/marker in the ground to be used as a boundary peg, control point, benchmark etc.✓✓ |
| | 2.1.5 | Level line is a line which lies in the level surface and is therefore normal to the direction of gravity at all times.✓✓ |

(5 × 2) (10)

- 2.2 2.2.1 Levelling instrument is mainly used to find differences in height/elevation on the surface of the earth.✓✓
- 2.2.2 Optical square is a hand-held instrument used to set out lines at right angles to each other.✓✓
- 2.2.3 Measuring tape is mainly used to measure horizontal distances on the surface of the earth.✓✓
- 2.2.4 Raging rods are used as sighting marks, intermediate markers, or markers for terminal points on a taped line.✓✓
- 2.2.5 Theodolite is used to measure vertical and horizontal angles on the surface of the earth and it can only be used for levelling work.✓✓
- (5 × 2) (10)
[20]

QUESTION 3

$$\begin{aligned} K-L &= 90.288 \text{ m} \times \cos 3^\circ 44' 20'' \checkmark \\ &= 90.096 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} L-M &= 72.408 \text{ m} \times \cos 4^\circ 32' 59'' \checkmark \\ &= 72.175 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} M-N &= 47.652 \text{ m} \times \cos 2^\circ 09' 07'' \checkmark \\ &= 47.618 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} K-N &= 90.096 \text{ m} \checkmark + 72.175 \text{ m} \checkmark + 47.618 \text{ m} \checkmark \\ &= 209.889 \text{ m} \checkmark \end{aligned}$$

[10]

QUESTION 4

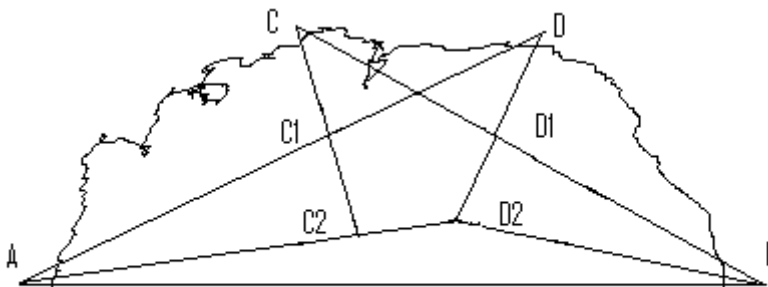
- 4.1 Tape must be held horizontally.✓
- Tape must be held on its zero mark.✓
- The correct or sufficient tension must be applied on the tape.✓
- View tape vertically over peg.✓
- Tape must be held on the correct peg.✓
- (5 × 1) (5)

- 4.2 This method of setting out a right angle from a point on a given straight line is executed by three people, ✓ the first person holding the tape on the point from which the perpendicular is required at 0 and 12 m. ✓ The second person holds the tape 3 m away from the first person, ✓ in line, and the third person holds the tape at 7 m in the direction in which the perpendicular line is required ✓ and the whole system makes a right-angled triangle when pulled tight by the third person. ✓

(5)
[10]

QUESTION 5

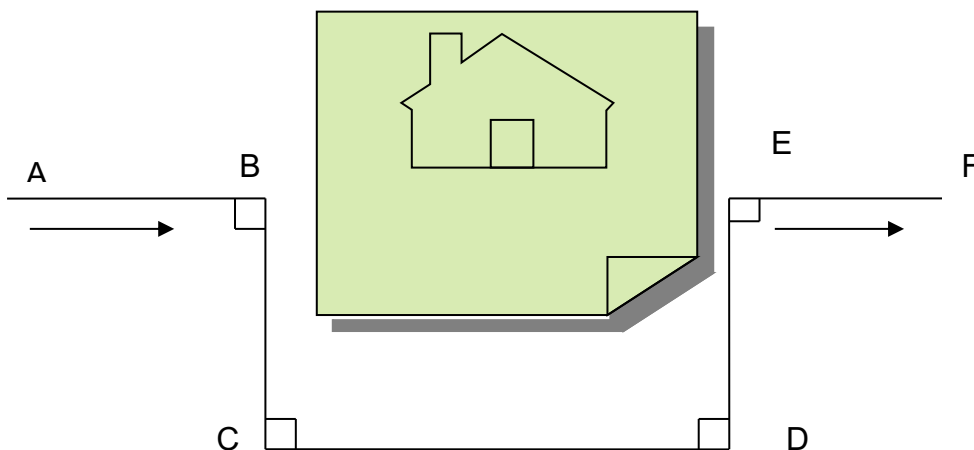
5.1



Ranging rods plumb at A and B and 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. ✓ (Sketch – 5, Expl. – 5)

(10)

5.2

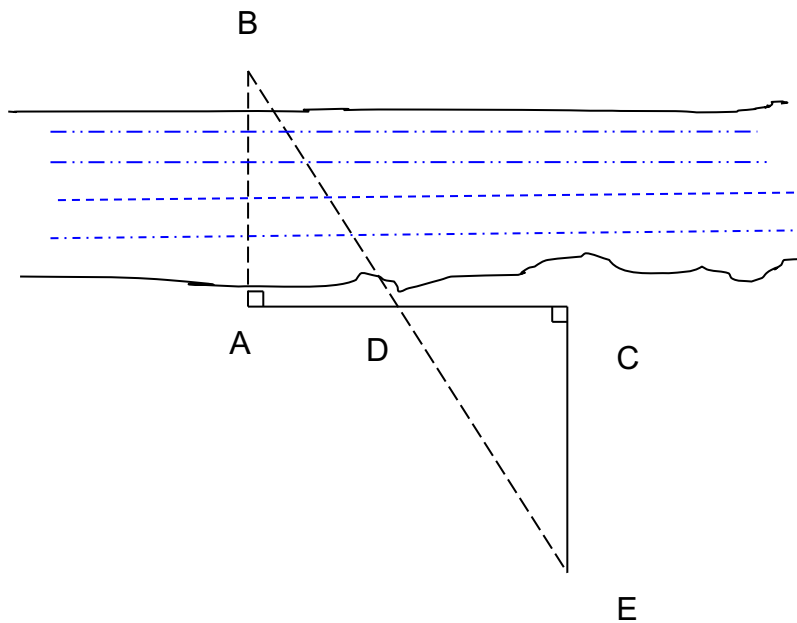


At two points A and B erect perpendicular line BC. ✓ At line BC erect another perpendicular line CD, ✓ to clear the obstacle. At CD erect a perpendicular line DE and equal in length ✓ to BC and at DE set off a right angle EF. ✓ The direction EF is the extension of the survey line and distance $CD=BE$. ✓

(5 Marks for sketch and 5 for explanation)

(10)

5.3



Erect line AC right-angled to AB, ✓ measure AD equal to DC. ✓ Locate point E by sighting ✓ from E through D to B, ✓ thus CE is equal to AB. ✓
 (5 Marks for sketch and 5 for explanation)

(10)
[30]

QUESTION 6

6.1 Each side = 16 m² ✓✓
 = 4 m ✓
 = 4000 mm ✓
 Thus $\frac{4000}{150}$ ✓
 = 26.667 mm ✓ (6)

6.2 The contours are further apart when the terrain is gentle. ✓✓
 The contours are closer together when the terrain is a steep slope. ✓✓ (2 × 2) (4)

6.3 From the site boundaries measure and set out the proposed building increasing the area by plus or minus 1 m. ✓✓ Punch in two pegs (plus/minus 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 benchmark, plus the length of the traveller will give the staff a reading on all the eight pegs' sight rails. ✓✓ (5 × 2) (10)
[20]

TOTAL: 100