higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE

## BUILDING AND STRUCTURAL SURVEYING N4

**30 November 2022**

**This marking guideline consists of 6 pages.**

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## QUESTION 1

1.1 Parallax is the condition that comes about when the image formed by an object is not in the same vertical plane as the cross hairs.

1.2 Magnification is the number of times an object appears to be larger when seen through a telescope,✓ than when seen with the unaided eye. For a given object glass,✓ the magnification may be increased or decreased by fitting eyepieces of greater or lesser power.✓

1.3 The resolving power is a measure of the capacity of a telescope to distinguish between points situated close together✓ and the fore of the accuracy with which it may be pointed.✓ It may be stated in the second arc.✓

1.4 The forward bearing is the direction✓ in which the survey is being carried✓ and the back bearing is the opposite.✓

1.5 Irregular variations occurs due to magnetic disturbances such as a storm.✓ Secular variation is the most important✓ and the others are neglected for most practical purposes.✓

(5 × 3) **[15]**

## QUESTION 2

2.1
- Reconnaissance
- Measuring distance and angles
- Recording field notes
- Setting out of work areas (4)

2.2
- Accuracy
- Integrity
- Legibility
- Arrangement
- Clarity (5)

**[9]**

## QUESTION 3

3.1 E
3.2 F
3.3 J
3.4 C
3.5 B
3.6 I
3.7 G
3.8 A
3.9 D
3.10 H

(10 × 1) **[10]**

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## QUESTION 4

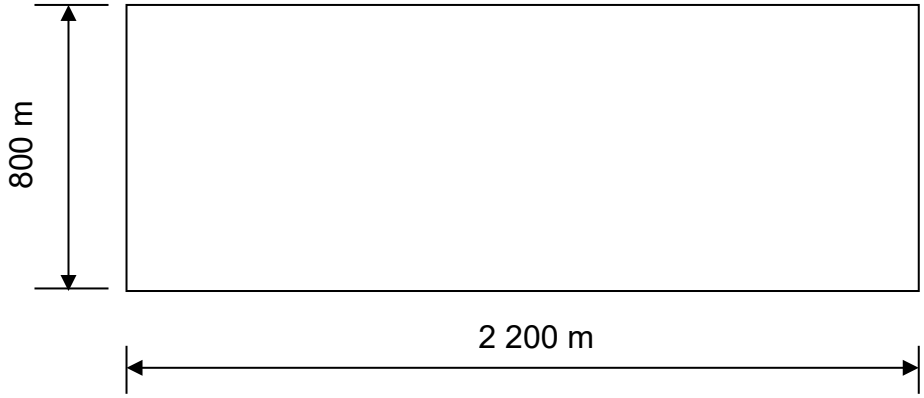
4.1 Natural scales are the relation between the same units of measurement, whereas engineering scales are the relation between two different units of measurement. (2 + 2) (4)

4.2 $$\text{Length} = \frac{2\,200 \times 1\,000}{20\,000}$$

$$= 110 \text{ mm}✓$$

$$\text{Width} = \frac{800 \times 1\,000}{20\,000}$$

$$= 40 \text{ mm}✓$$




(2 for calculations + 2 for correct drawing) (4)

4.3 $$A = LW$$
$$0{,}98 \text{ ha} = 2WW✓$$
$$0{,}98 \times 10\,000 = 2W^2$$
$$2W^2 = 0{,}98 \times 10\,000✓$$
$$W = \frac{\sqrt{0{,}98 \times 10\,000}}{2}✓$$
$$W = 70 \text{ m}$$
$$L = 140 \text{ m}✓$$

$$\text{Perimeter} = 2(70) + 2(140)$$
$$= 240 \text{ m}✓$$ (6)

4.4 $$\text{RF} = 1:5\,000$$
$$\text{True distance} = 2\,450 \text{ mm}$$

$$\text{Map distance} = \frac{2\,450 \times 1\,000}{5\,000}$$

$$= 490 \text{ mm}$$ (3)

**[17]**

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## QUESTION 5

5.1 ==========

5.2




5.3 **X**

5.4 – – – – – – – – – – – – – – – – – – – – – – – – – –

– – – – – – – – – – – – – – – – – – – – – – – – – –

5.5 100 mm oil pipeline

–·–·–·–·–·–·–·–·–·–·–·–·–·–·–·–·–·–·–

(5 × 2) **[10]**

## QUESTION 6

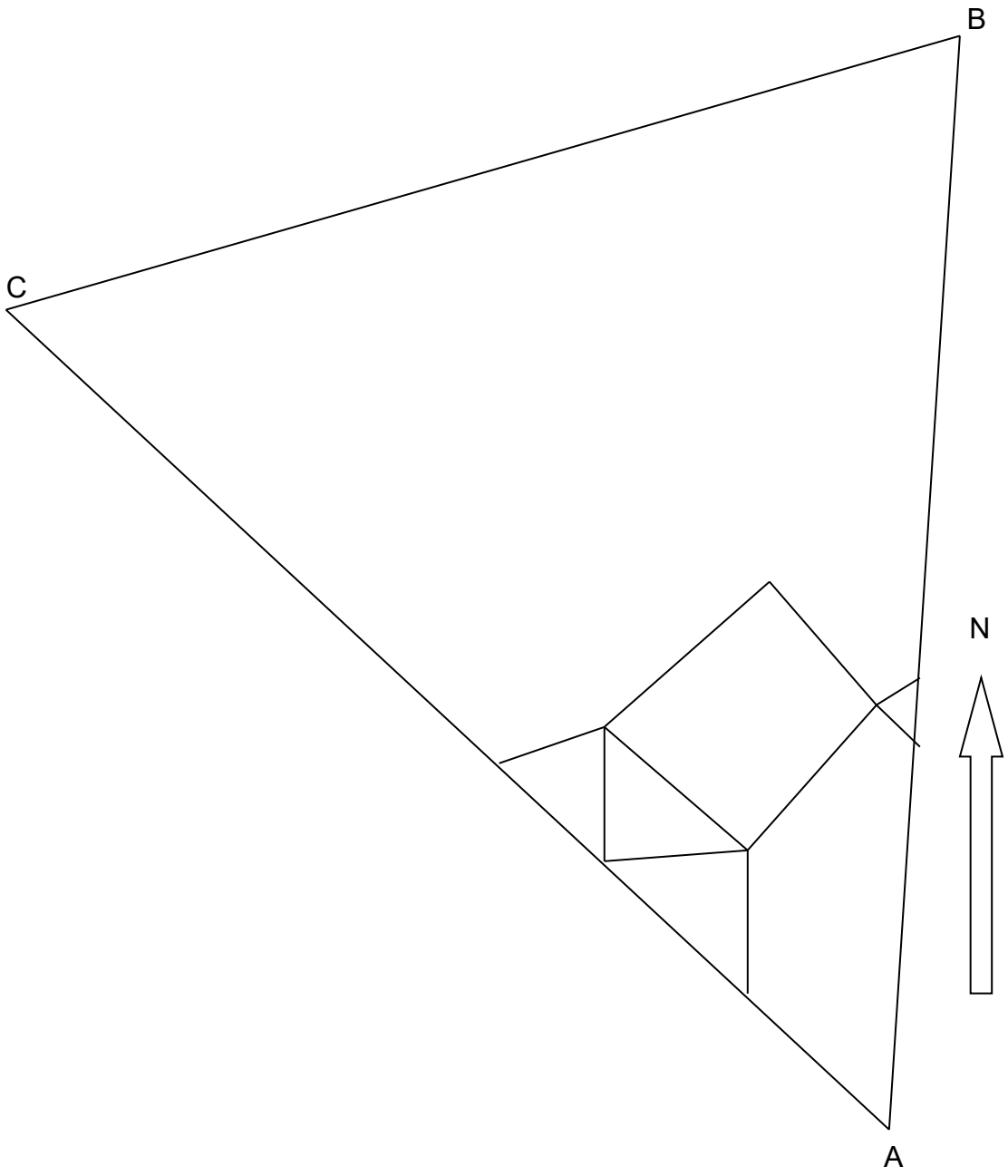
6.1
- Radiation
- Triangulation (intersection)
- Traversing
- Resection (4)

6.2
- Measurement of horizontal and vertical angles
- Setting out lines and angles
- Levelling
- Optical distance measurement
- Plumbing tall buildings
- Geographical position fixing from observations of the sun and stars
- Checking lines and heights (Any 5 × 1) (5)

6.3
- Horizontal distance
- Vertical distance
- Horizontal angle
- Vertical angle (4)

**[13]**

**QUESTION 7**




| MARK ALLOCATION | |
|---|---|
| Correct plotting: AB | 1 |
| BC | 1 |
| CB | 1 |
| Correct ties | 3 |
| Correct building | 2 |
| North | 1 |
| Neatness | 1 |

**[10]**

## QUESTION 8

8.1 Measured distance $= CD \times \frac{GLT}{ALT}$ ✓

$= 100 \times \frac{60}{60{,}03}$ ✓

$= \frac{6\ 000}{60{,}03}$ ✓

$= 99{,}950$ m✓ (4)

8.2 True or correct area $= MD \times \frac{(ALT)^2}{GLT}$ ✓

$= 2 \times \frac{99{,}8^2}{100}$ ha✓

$= 2 \times \frac{9\ 959{,}44}{10\ 000{,}00}$ ha✓

$= 2 \times \frac{19\ 918{,}88}{10\ 000{,}00}$ ha✓

$= 1{,}992$ ha✓ (5)

8.3 W = mass of tape in kg/m

$= \frac{2{,}3}{200}$ ✓

$= 0{,}011$ kg/m✓

$Ct_s = \frac{4w^2L^3}{N^2}$ ✓

$= \frac{4 \times (0{,}011)^2 \times 180^2}{90^2}$ ✓

$= 0{,}324$ m✓

Correct distance between towers $= 180{,}00 - 00{,}324$ ✓

$= 179{,}676$ m (7)

**[16]**

**TOTAL: 100**

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