higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

17 April 2020

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 False
1.2 False
1.3 True
1.4 False
1.5 True
1.6 True
1.7 False
1.8 False
1.9 False
1.10 True

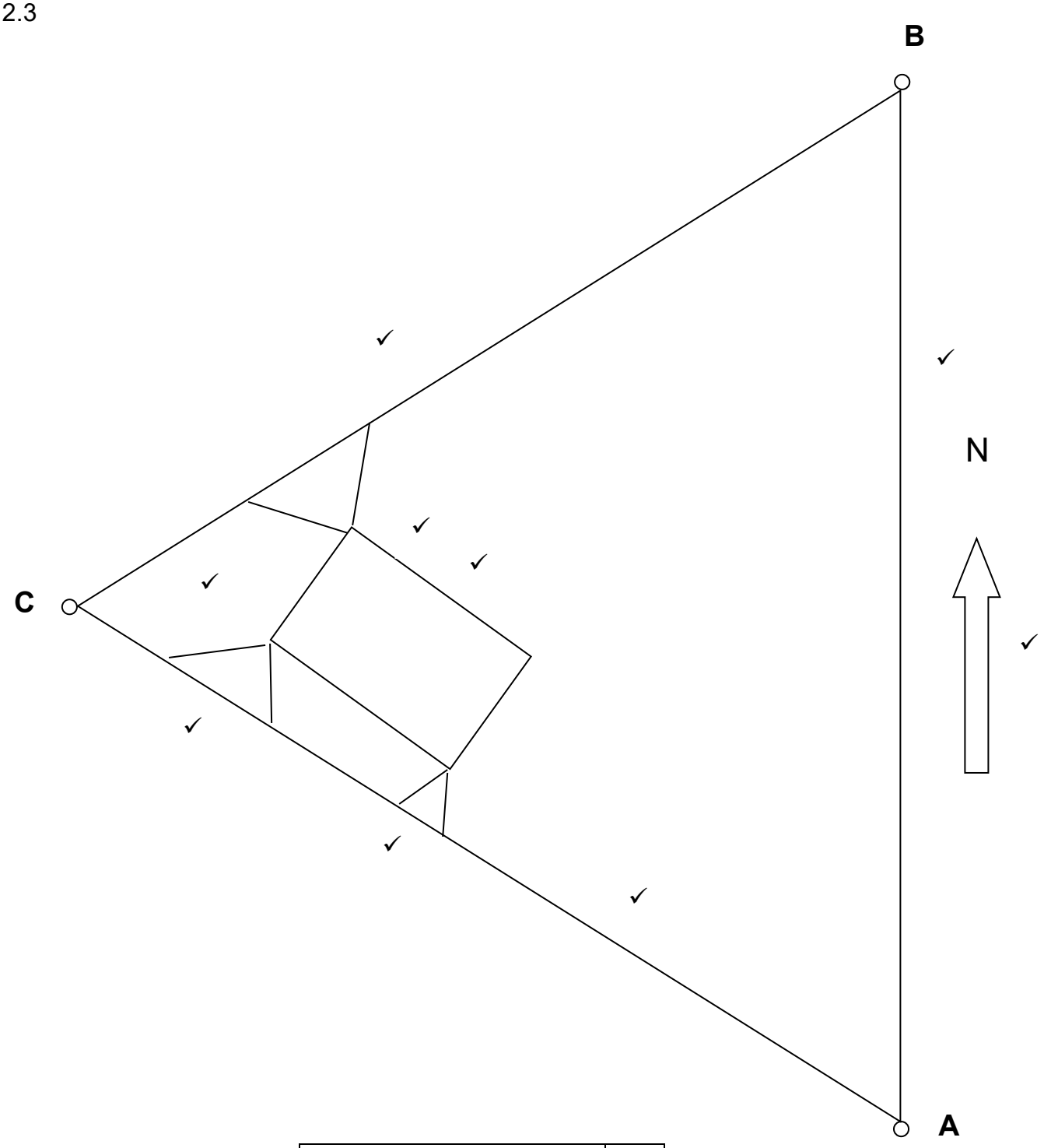
(10 × 1) **[10]**

QUESTION 2

2.1 Chain surveying involves the location of points by measuring distance.✓ The survey team involves the surveyor and two chain people, one being the leader and the other the follower.✓ Chain surveying uses a tape or chain as the principle instrument for the accurate of measurement of lengths.✓ (3)

2.2
- The chain must be checked regularly.
- It is very heavy to carry around.
- If not careful when unfolding the chain, it can become entangled easily.
- The links of the chain often hook into the ground causing irregularities during chaining. (4)

2.3



Correct plotting	
AB	1
BC	1
CA	1
Correct ties	3
Building correct	2
North	1
Neatness	1

(10)
[17]

QUESTION 3

3.1 Correct distance = md × $\frac{ALT}{GLT}$✓

= 98,600 × $\frac{100,00\ m - 0,02\ m}{100}$✓

= 98,600 × $\frac{99,98}{100}$✓

= 98,580 m✓ (4)

3.2 30 mm represents = $\frac{30 \times 250\ 000}{1\ 000}$✓✓

= 7 500 m✓ (3)

3.3 Required distance = $\frac{1\ 500 \times 1\ 000}{10\ 000}$✓✓

= 150 mm✓

OR

MU = RF × GU✓

= $\frac{1 \times 1\ 500}{10\ 000}$✓

= 0,15 m✓ (3)
[10]

QUESTION 4

4.1 A planimeter is a mechanical instrument used to calculate irregular areas for which there is no formula, such as the area of a lake on a map.✓ The tracer point is used to trace the boundary of the area.✓ Upon returning to the starting point, the area can be read from a dial on the planimeter.✓ (3)

4.2
- Steel tapes are light and compact.
- It is easy to read steel tapes.
- Steel tapes are fairly accurate. (Any 2 × 1) (2)

4.3 The difference between the planimeters is in the movement of the end of the tracer arm opposite the tracer point.✓ In the linear planimeter,✓ the end is restricted to straight-line movement.✓ A drawing requires that the tracer runs along a track and for this motion to happen the end is attached to a set of wheels that are fixed to an axis so that the wheels turn together.✓ In the polar planimeter,✓ one end of the pole arm is fixed by a hinge between the tracer arm and a secondary arm (pole arm).✓ (3 + 3) (6)
[11]

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QUESTION 5

5.1 A plane is a surface on which any straight line joining two points on it✓ will touch the plane completely.✓

5.2 A datum is a point on the surface✓ or line from which heights or levels of points are measured.✓

5.3 A change point is a point where the instrument is moved✓ and it is the optical centre of the object glass.✓

5.4 Grid north is established by using the vertical grid lines on a map.✓ Grid north may be symbolised by the letters GN.✓

5.5 Magnetic declination is the angular difference between the direction of true north and magnetic north.✓ It is measured either east (+) or west (-) of true north.✓

5.6 Agonic lines are imaginary lines/places on the earth's surface✓ where the declination of a given point is zero.✓

5.7 A topographic survey measures the elevation of points on a particular piece of land✓ and presents them as contour lines on a plot. It is done to locate features such as hills, rivers, valleys, lakes, etc.✓

5.8 The prime meridian serves as the starting point✓ for longitude measurement.✓

5.9 Lines of longitude are imaginary vertical mapping lines that run vertical from the North Pole to the South Pole of the earth. ✓ It is also known as the meridian of longitude.✓

5.10 A parallax occurs when looking through a telescope.✓ It is the apparent movement of the cross hairs relative to the object onto which the instrument is being sighted.✓

(10 × 2) **[20]**

QUESTION 6

6.1 longitude
6.2 y-axis
6.3 x-axis
6.4 2°
6.5 central
6.6 odd
6.7 boundary
6.8 even
6.9 y-axis
6.10 x-axis

(10 × 1) **[10]**

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QUESTION 7

7.1 The objective of surveying is to determine the relative position of points✓ (natural or man-made) on the earth's surface✓ so that it may be accurately represented on maps and plans✓ and to set out✓ on the ground the position of proposed construction or engineering works.✓ (5)

7.2 7.2.1 The distance to points and the heights✓ (vertical distances) relative to the instrument✓ are measured optically.✓ (3)

7.2.2 Points are located✓ by measuring distance✓ and angles.✓ (3)

7.2.3 Points are located✓ by measuring compass bearings (angles).✓ (2)
[13]

QUESTION 8

8.1 $CD = MD \times \frac{ATL}{GLT}$✓

$450 = MD \times \frac{99,27}{100}$✓

$MD = \frac{100 \times 450}{99,27}$✓

$= 453,309$✓ (4)

8.2 $CD = MD \times Coe \times (Tm - Ts)$✓
$= 180 \times 0,0000113 \times (25 - 20)$✓
$= 0,01$ m✓

$CD = 180 + 0,01$✓
$= 180,01$ m✓ (5)
[9]

TOTAL: 100

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