higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

BUILDING AND STRUCTURAL SURVEYING N4

2 APRIL 2013

This marking guideline consists of 8 pages.

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QUESTION 1

1.1 It has to do with the preparation and execution of civil engineering works such as roads, railways, bridges et cetera.

1.2 In geodetic surveying the curvature of the earth is taken into account.

1.3 A plane perpendicular to the direction of gravity from only one point in that plane.

(3 × 2) **[6]**

QUESTION 2

2.1
- Honesty is of prime importance. √
- Sound knowledge of the theory and the practice of surveying. √
- Neatness: i.e. booking of field observations etc. √
- Initiative and resourcefulness should be applied to each problem. √
- Only accept information given or results obtained as being trustworthy when verified.
- Must be reliable.
- Judgement must be sound.
- Must be able to think clearly without confusion.
- Reason logically without prejudice.
- Must be thorough and be content with his/her work only when it has been finished in a workmanlike manner.

(Any 4 x 1) (4)

2.2
- Observations √
- Descriptions √
- Sketches √
- Data √
- Weather information √
- Equipment list
- Benchmark description and location
- Party names
- Job description
- Surveyor's signature
- Date

(Any 5 x 1) (5)
[9]

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QUESTION 3

3.1
- Natural scale √
- Engineer's scale √
- Divided scale line √

(3 × 1) (3)

3.2 RF = 1: 200 000
Map distance = 30 mm
Actual distance = 30 x 200 000 √
= 6 000 000 mm √
= 6 000 m √

(3 × 1) (3)

3.3 Required distance $= \frac{2\,400 \times 1\,000}{25\,000}$ √√
= 96 mm √

(3 ×1) (3)

3.4 A = ½ base x ζ height √

$$A = \left(\frac{350\ x\ 2000}{2\ x\ 1000}\right) x \left(\frac{180\ x 2000}{1000}\right) \surd$$

$$A = 126000\ m^2 \surd$$

$$A = 12,6\ ha \surd$$

(4 × 1) (4)

3.5 Errors which depend for their magnitude and signs√, upon external conditions √such as temperature changes, slope of the land etc. √
These errors can be corrected by computation. √

(4 × 1) (4)

3.6 The process of ensuring that the plane–table board√ is in the direct relationship√ to the detail depicted on it. √

(3 × 1) (3)
[20]

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QUESTION 4

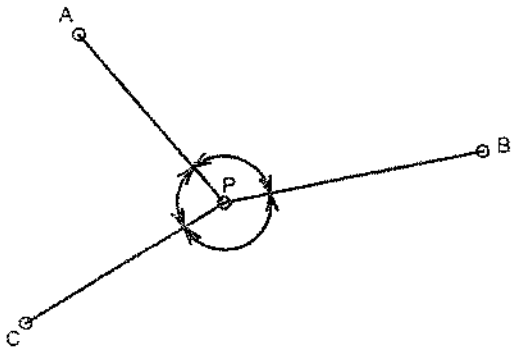
4.1
- The methods are easily mastered. √
- The amount of apparatus required is minimum. √
- It is inexpensive. √
- The location of detail is performed to a high degree of accuracy. √

(4 × 1) (4)

4.2
- It is brittle - breaks easily. √
- It kinks easily. √
- It is liable to rust.√
- It requires continual maintenance. √
- It stretches easily.
- It is difficult to repair accurately.
- Excessive tension can permanently damage it.

(4 × 1) (4)

4.3



A, B and C are known points.
Measure angle APB. √
Measure angle CPB. √
Measure angle APC. √

(3 × 1) (3)

4.4 Correct distance $C = MDx\left(\frac{actual\ tape\ length}{graduated\ tape\ length}\right)$ √

$$150\ m = MDx\left(\frac{100-0,75}{100}\right)\ \surd$$
$$150\ m = MD\ x\ (0,9925)$$
$$\frac{150}{0,9925} = MD\ \surd$$
$$MD = 151,134\ m\ \surd$$

(4 × 1) (4)

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4.5 $CT = L\ x\ E\ x\ (Tm - Ts)$ √

$-0{,}003 = 60x1{,}13x10^{-5}\ (TM - 20)$ √

$\frac{-0{,}003}{0{,}000678} = Tm - 20$ √

$Tm = 20 + \left(\frac{-0{,}003}{0{,}000678}\right)$

= 15, 575 EC √

(4 × 1) (4)

4.6 Slope distance $= \frac{\text{hor distance}}{\cos 7°40''20'}$ √

Slope distance $= \frac{94{,}596}{\cos 7°40''20'}$ √

Slope distance = 95, 45 m √

(3 × 1) (3)

4.7
- Reconnaissance √
- Measuring distances and angles. √
- Recording field notes. √
- Setting out. √

(ANY 3 × 1) (3)
[25]

QUESTION 5

5.1
- The radius of curvature of the internal surface √
- The diameter of the level tube √
- Length of the vapour bubble √
- The viscosity and surface tension of the liquid √
- Smoothness of the finish of the internal surface of the tube

(Any 4 × 1) (4)

5.2 5.2.1 Rapid throwing out movements to the right side with the right hand. √√

5.2.2 Right arm extended to the right, slightly bent and closed fist pumped up and down. √√

5.2.3 Both hands rose vertically above the head and kept there. √√

5.2.4 Left arm held out horizontally to the left. √√

(4 × 2) (8)

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5.3 It is when the cross hairs of the instrument and sighted object are not seen on the same plane.

(3 × 1) (3)

5.4 The angle between the line of sight through an optical instrument and the position the line would have in a perfect instrument.

Or

Is the small angle by which the line of sight departs from the actual level surface through the instrument when the instrument is considered to be level.

(ANY 3 × 1) (3)

5.5
- Alcohol√
- Chloroform √
- Ether √

(ANY 2 × 1) (2)
[20]

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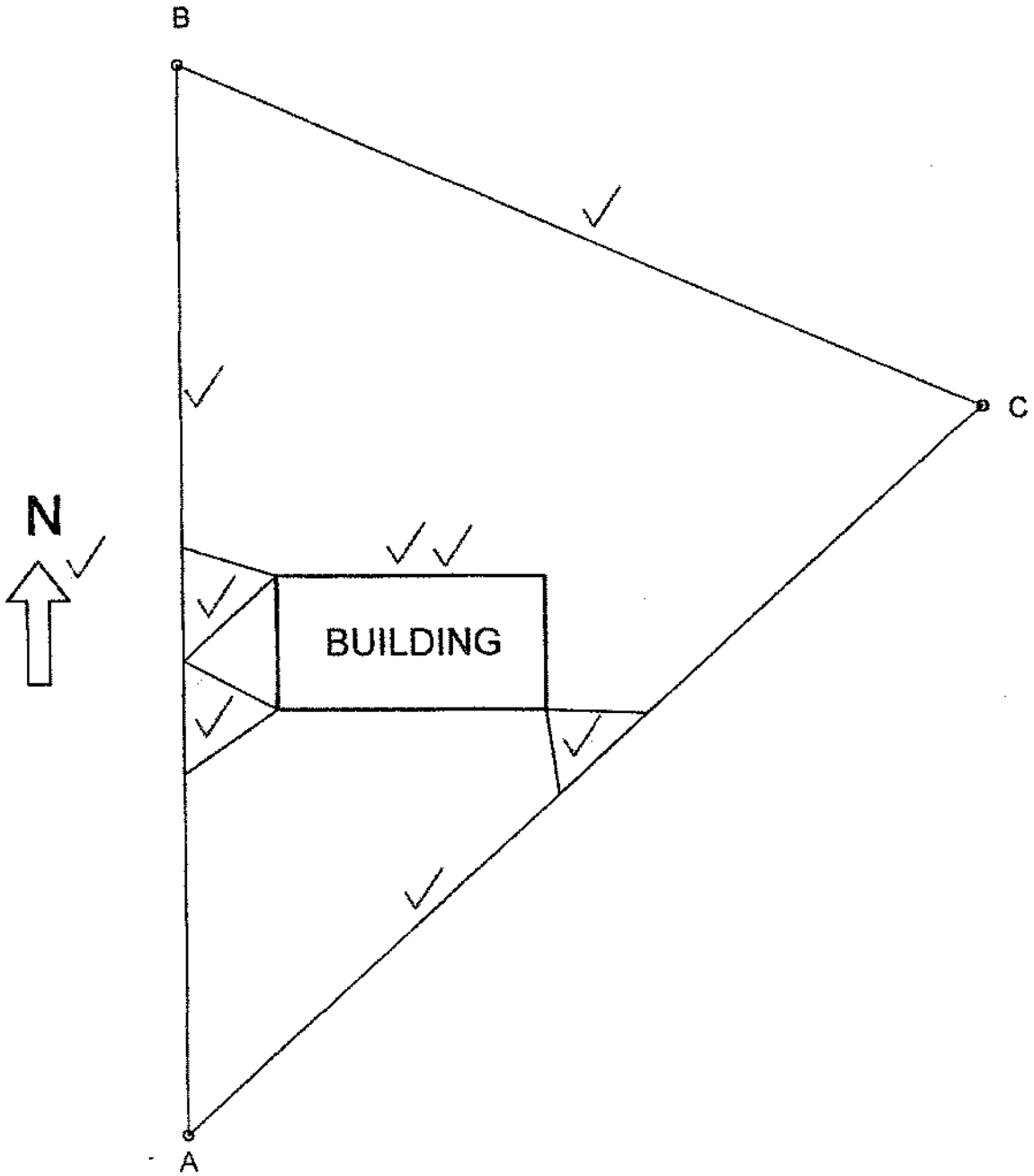
QUESTION 6



Correct plotting of AB = 1
BC = 1
CB = 1
Correct ties = 3 x 1
Building correct = 2 x 1
North = 1
Neatness = 1
Total **10**

[10]

QUESTION 7

7.1 False √

7.2 True √

7.3 False √

7.4 True √

7.5 True √

7.6 False √

7.7 False √

7.8 True √

7.9 False √

7.10 True √

(10 × 1) **[10]**

TOTAL: 100

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