higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

3 August 2021

This marking guideline consists of 6 pages.

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QUESTION 1

1.1
- Honesty
- Sound knowledge of the theory and practice of surveying
- Must be neat, especially in booking field work
- Must take initiative and approach each problem with resourcefulness
- Must accept information or results as trustworthy only after verification by an independent check
- Must be reliable
- Must have sound judgement
- Must think clearly without confusion and reason logically without prejudice
- Must be thorough and content with his/her work (Any 6 × 1) (6)

1.2
- Triangles should be well conditioned.
- The number of lines should be kept to a minimum.
- Lengths of offsets should be as short as possible.
- Lines should be free from obstruction.
- Lines should be as near to the horizontal as possible.
- All triangles must be provided with a check (Any 5 × 1) (5)

1.3
- Horizontal distance
- Vertical distance
- Horizontal angle
- Vertical angle (4)

[15]

QUESTION 2

2.1 E
2.2 C
2.3 I
2.4 B
2.5 G
2.6 A
2.7 J
2.8 F
2.9 H
2.10 D

(10 × 1) **[10]**

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QUESTION 3

3.1 Surveying may be defined as the art of taking measurements✓ and making field observations that are necessary to determine the position, volumes✓ and areas of all natural and/or man-made features on the earth's surface and representing the results on a map or plan to a suitable scale.✓

3.2 Levelling is determining the relative elevation✓ or heights of points using a dumpy level✓ or automatic level.✓

3.3 Compass surveying is the location of points by measuring compass bearing (angles).✓ It is used to ascertain magnetic north✓ and direction.✓

3.4 A map is the representation of a large section of the earth's surface on a scale with very little detail, on a horizontal plane surface (sheet of paper).✓ Although a map has a scale, not everything is drawn to scale.✓ Some parts on the map are represented by a dot, which could represent a town in reality.✓

3.5 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.✓

3.6 A plan is the representation of the surface features of a small section of the earth's surface✓ drawn to a large scale on a horizontal plane surface, showing more detail.✓ All parts of the plan are drawn to the scale indicated.✓

(6 × 3) **[18]**

QUESTION 4

4.1 AREA = L × B✓

= 450 × 90✓

= 40500 m^2✓ (3)

4.2 AREA = $\frac{1}{2}bc\sin A$ ✓

= $\frac{1}{2}(380)(450)\sin 44:23:26$ ✓

= 85500 Sin 44: 23: :26✓

= 59811 ✓

= 5,981 ha✓ (5)

4.3 V = L × BH✓

2,64 = 8 × 5,5 × H✓

2,64 = 44 H✓

$\frac{2,64}{44} = \frac{44}{44}H$

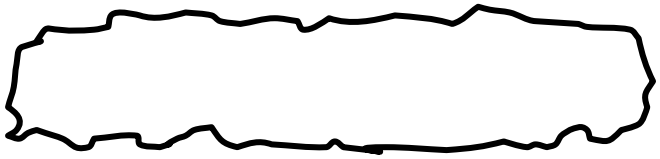
H = 0,06 m✓
= 0,06 × 1 000✓
H = 60 mm ✓ (6)
[14]

QUESTION 5

5.1

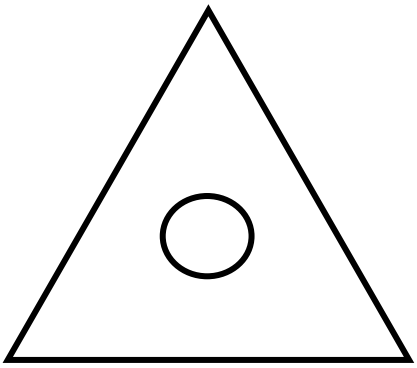


5.2



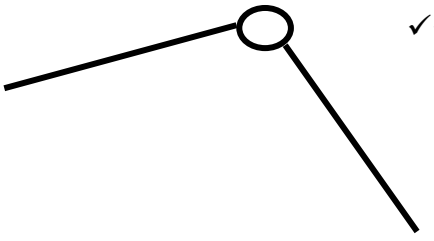
✓✓

5.3



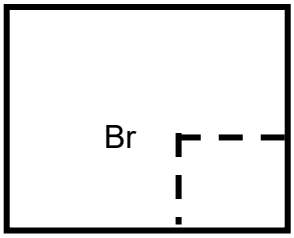
✓✓

5.4



✓✓

5.5



✓✓

(5 × 2) **[10]**

QUESTION 6

6.1 6.1.1 Main level
6.1.2 Tilt axis
6.1.3 Circular level
6.1.4 Micrometer tilting screw

(4 × 1) (4)

6.2
- The tape should be drawn out in a straight line, in the direction in which it is coiled.
- Ensure that no kinks are present.
- After use wipe tape with oily cloth to prevent rust.
- Do not allow a vehicle to run over the tape.
- Avoid stepping on the tape while it is lying on the ground.
- Never leave the tape lying on the ground for longer than is necessary.
- Do not apply too much tension.
- Detach the reel from the tape when using the full length. (Any 6 × 2) (12)

6.3
- A fraction of a metre
- The tape has stretched 0,2 m
- The tape is 0,3 m too short (3)

- A fraction of the nominal (graduated or marked) tape length
- The tape is $\frac{1}{200}$ too long
- The tape is $\frac{1}{200}$ too short (3)

- A percentage of the nominal tape length
- The tape is 0,5% too long
- The tape stretched 2% (3)

[25]

QUESTION 7

7.1 Accuracy refers to how closely a measurement or observation is✓ to measuring a true value, since measurements✓ and observations are always subject to error. ✓ (3)

7.2 $CD = MD \times \frac{ALT}{GLT}$ ✓

ALT = 100 – 0,02 = 99,98 m✓

$CD = 90,5 \times \frac{99,98}{100}$ ✓

CD = 90,5 × 0,9998✓

CD = 90,482 m✓ (5)
[8]

TOTAL: 100

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