higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

13 AUGUST 2019

This marking guideline consists of 5 pages.

Copyright reserved

QUESTION 1

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

(10 × 1) **[10]**

QUESTION 2

2.1
- Control (framework)
- Scale
- Speed and cost
- Skills and experience (4)

2.2
- Wrong reading
- Incorrect booking, e.g. wrong side
- Measuring the scope of the ground instead of the slope of the tape
- Reading numbers incorrectly
- Tape not kept on a zero mark
- Booking long figure for correct measurement (Any 5 × 1) (5)

2.3
- Make sketches where necessary.
- Book systematically.
- Note enough information to enable location.
- Take bearing from true or magnetic north at least one line.
- Insert explanatory matters in writing. (5)

[14]

QUESTION 3

3.1
- An expression of the scale is given graphically in the form of a divided scale line.
- This is a straight line of given length equally divided into primary divisions.
- Measurement is done by means of a divider. (3)

3.2 10 mm = 10 m✓
1 mm = 100 m✓
RF = 1:100✓ (3)

3.3 $S = \frac{a + b + c}{2}$✓

$= \frac{100 + 180 + 210}{2}$✓

$= 245$✓

$A = \sqrt{S(s-a)(s-b)(s-c)}$ ✓

$= \sqrt{254(245-100)(245-180)(245-210)}$ ✓

$= \sqrt{245(145)(65)(2,5)}$ ✓

$= 8\ 989,96\ m^2$✓

$= \frac{8\ 989,96}{10\ 000}$✓

$= 0,899$ ha✓ (9)

3.4 $MU = RF \times GU$

$= \frac{1 \times 1\ 250}{10\ 000}$✓

$= 0,125$ m✓

In mm concert $1\ 250 \times 1\ 000 = 1\ 250\ 000$

$= \frac{1\ 250\ 000}{10\ 000}$✓

$= 125$ mm✓ (4)
[19]

QUESTION 4

4.1 Vertical circle
4.2 Illuminating mirror
4.3 Telescope vertical clamp
4.4 Telescope eyepiece
4.5 Circle-reading eyepiece
4.6 Vertical circle screw
4.7 Circular bubble
4.8 Levelling screw
4.9 Horizontal circle screw
4.10 Plate level
4.11 Inverter knob
4.12 Telescope focusing knob
4.13 Micrometer knob
4.14 Telescope

(14 × 1) **[14]**

QUESTION 5

5.1 The purpose 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,✓ plans and to set out✓ on the ground the position of proposed construction or engineering works.✓ (5)

5.2 5.2.1 The distance to points and the heights✓ (vertical distances) relative to the instrument✓ are measured optically.✓ (3)

5.2.2 Traversing involves the location of points✓ by the measurement of distance✓ and angles.✓ (3)

5.2.3 Compass surveying involves the location of points✓ by measurement of compass bearings (angles).✓✓ (2)

[13]

QUESTION 6

6.1 The telescope of the tilting level is not fixed as is that of a dumpy level✓ and it can be tilted a little on the vertical plane✓ on a hinge mounted beneath the telescope.✓ (3)

6.2 6.2.1 HC = 156,55 + 2,34✓
= 158,89 m✓ (2)

6.2.2 RL = 158,89 – 1,42✓
= 157,47m✓ (2)

[7]

QUESTION 7

7.1 $$CD = MD \times \frac{ALT}{GLT} \checkmark$$
$$= 600 \times \frac{100,06}{100} \checkmark$$
$$= 600,36 \text{ m} \checkmark$$ (3)

7.2 $$Cs = \frac{w^2 L^3}{24 T^2}$$
$$= \frac{0,015^2 \times 37,5^3}{24 \times 7^2} \checkmark$$
$$= \frac{11,86523438}{1\ 176} \checkmark$$
$$= 0,010 \checkmark$$
$$CD = 37,5 - 0,010$$
$$= 37,49 \text{ M} \checkmark$$ (4)

7.3 $$Ct = L \times e\ (Tm - Ts) \checkmark$$
$$= 96 \times 1,13 \times 10^{-5} \times (20 - 25) \checkmark$$
$$= -0,005 \text{ m} \checkmark$$
$$CD = 96 - 0,005 \checkmark$$
$$= 95,995 \text{ M} \checkmark$$ (5)

7.4 $$HD = SD \times \cos\theta \checkmark$$
$$= 250 \times \cos 5° 25' \checkmark$$
$$= 248,88 \text{ m} \checkmark\checkmark$$ (4)
[16]

QUESTION 8

8.1 Orientation is the process of ensuring that the plane-table board✓ is in direct relationship✓ to the detail depicted on it.✓ (3)

8.2 Systematic errors 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)
[7]

TOTAL: 100

Copyright reserved