higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

20 November 2020

This marking guideline consists of 5 pages.

Copyright reserved

QUESTION 1

1.1 C
1.2 D
1.3 B
1.4 A
1.5 A
1.6 A
1.7 C
1.8 D
1.9 B
1.10 D

(10 × 1) **[10]**

QUESTION 2

2.1 Sight rule with sighting vanes at both ends or fitted with telescope,✓ used for sighting the direction of distant target.✓ Edge of alidade acts as straight edge,✓ used to rule lines,✓ parallel to observed sight direction on paper.✓ (5)

2.2 Errors of which magnitude✓ and sign depend on external circumstances such as temperature changes,✓ slope of land and which tend to produce a cumulative effect.✓ These errors can be avoided by not observing under such conditions.✓ (4)

2.3 2.3.1 Setting up at convenient height for working over ground station.✓ With legs spread well apart and firmly fixed to ground✓ table is approximately levelled judging by eye.✓ Plane table is centred exactly over ground station by means of plumbing fork and plumb bob.✓ (4)

2.3.2 Done by spirit level.✓ Bubble of spirit level brought to centre in two directions✓which are at right angles to each other✓ and is done by moving the legs.✓ (4)

2.3.3 Positioning plane table so that lines on paper are parallel✓ to lines on the ground which they represent.✓ Orientation of plane table can be done by using orientation of magnetic needle method or by back sighting.✓ (3)

[20]

Copyright reserved

QUESTION 3

3.1 ATL = 100 – 0,03 = 99,97 m✓

$$CD = MD \times \frac{ATL✓}{GLT}$$

$$= 82,400 \times \frac{99,97✓}{100}$$

= 82,375 m✓ (4)

3.2 Ct = L x e (Tm – Ts) ✓

= 136,40 x 0,000113 (20 – 25) ✓

= - 0,077 m✓

CD = 136,40 – 0,077✓
= 136,323 m✓ (5)

3.3 MU = RF X GU✓

$$= \frac{1}{1200} \times 450✓$$

$$= \frac{450✓}{1200}$$

= 0,375 m (or 37,5 cm) ✓ (4)
[13]

QUESTION 4

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

4.2
4.2.1 Focusing knob
4.2.2 Circular bubble
4.2.3 Horizontal motion screw
4.2.4 Levelling screw
4.2.5 Pedestal
4.2.6 Object lens focus

(6 × 1) (6)

4.3
- Spirit level
- Telescope
- Eyepiece
- Tilting screw (4 × 1) (4)

[13]

QUESTION 5

5.1
- Use straight pull drawing out tapes housed in cases
- Pull tape out and re-wind it in line with opening
- Tape sticking in case can be freed by tapping side of case
- Detach reel from tape when using full length
- Avoid stepping on or driving over tape on the ground
- Never leave tape lying on ground for longer than necessary
- Before straightening tape remove all kinks (Any 6 × 2) (12)

5.2
- Centre instrument as accurately as possible over instrument station
- Orient on farthest possible points consistent with good visibility
- Orient on object which can be sighted with utmost accuracy
- Ensure sighting object is truly vertical
- Keep lines of sight well clear of ground to minimise effect of irregular refraction
- When possible make small mark on top of peg so that sighting object may be held at same spot each time
- Sight at least one additional known point to check orientation setting
- Upon completion of observation orienting point must again be sighted to ensure that instrument has not moved accidentally (Any 6 × 2) (12)

[24]

QUESTION 6

6.1 $A = \frac{a + b}{2} \times h$ ✓

$= \frac{52 + 24}{2} \times 11$ ✓

$= 38 \times 11$ ✓

$= 418\ m^2$ ✓

$= \frac{418}{10000}$ ha ✓ (5)

6.2 $Area\ of\ segment = \frac{\theta}{360}(\pi R^2) - \frac{R^2 Sin69}{2}$ ✓✓

$= \frac{69}{360}(\pi \times 15^2) - \frac{15^2 SIN69}{2}$ ✓✓

$=$ 135.481 – 105.028 ✓

$=$ 30, 453 m^2✓ (6)

6.3 $A = \frac{S^2\ N}{4\ \tan(\frac{180}{10})}$ ✓

$= \frac{32^2 \times 10}{4TAN(\frac{180}{10})}$ ✓

$= \frac{10240}{1,2997}$ ✓

= 7878,741 m^2✓ (4)
[15]

QUESTION 7

7.1
- Radiation
- Triangulation (intersection)
- Traversing
- Resection

(Any 4 × 1) (4)

7.2 Aligning plane table with magnetic north (1)
[5]

TOTAL: 100

Copyright reserved