



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL SURVEYING N4

22 April 2021

This marking guideline consists of 7 pages.

QUESTION 1

- 1.1 F
- 1.2 I
- 1.3 A
- 1.4 H
- 1.5 G
- 1.6 D
- 1.7 E
- 1.8 C
- 1.9 J
- 1.10 B

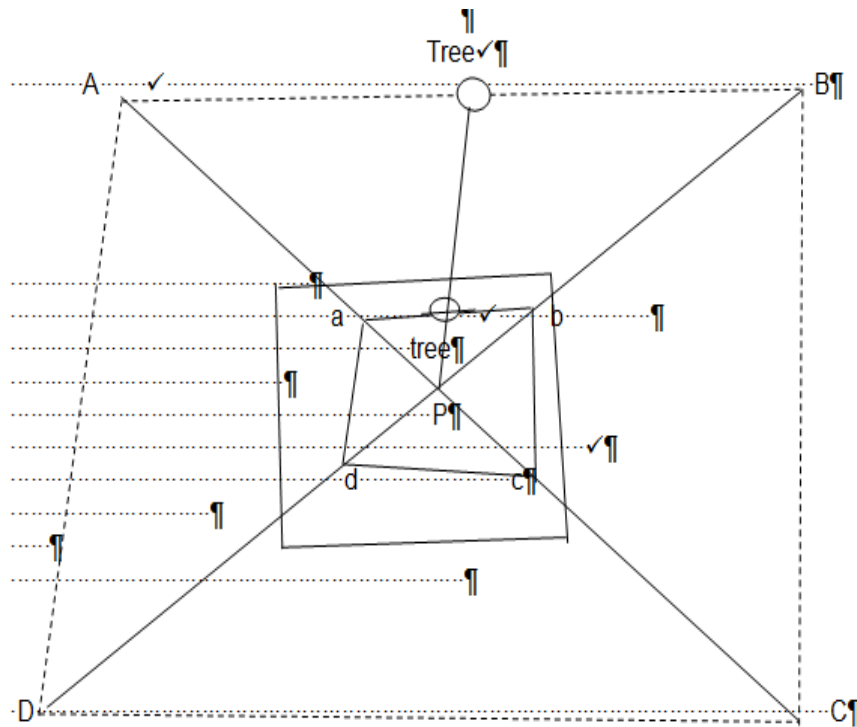
(10 × 1) **[10]****QUESTION 2**

- | | | | |
|-----|-------|---|-----|
| 2.1 | 2.1.1 | This is the examination of the area to be surveyed before taking measurements.✓ This will help the surveyor to plan the work accordingly:✓ to decide which method to use, to select the stations to use,✓ to assess the suitability of the site for the proposed works,✓ to assess the effects of change the proposed work will have on the environment.✓ | (5) |
| | 2.1.2 | This involves measuring distance✓ and angles accurately by the correct handling✓ and manipulation of instruments,✓to determine the horizontal and vertical distances of points✓ | (4) |
| | 2.1.3 | This is the recording of all data collected in a field book.✓ This data is what will be used to design the final map✓ or plan of the works.✓ | (3) |
| 2.2 | 2.2.1 | Open traverse is used when surveying along a river etc.✓ it starts from a known point and ends at another known point.✓ | (2) |
| | 2.1.2 | Closed traverse is used in the survey of boundary lines.✓ It starts from a known point and ends up at the same point.✓ | (2) |

[16]

QUESTION 3

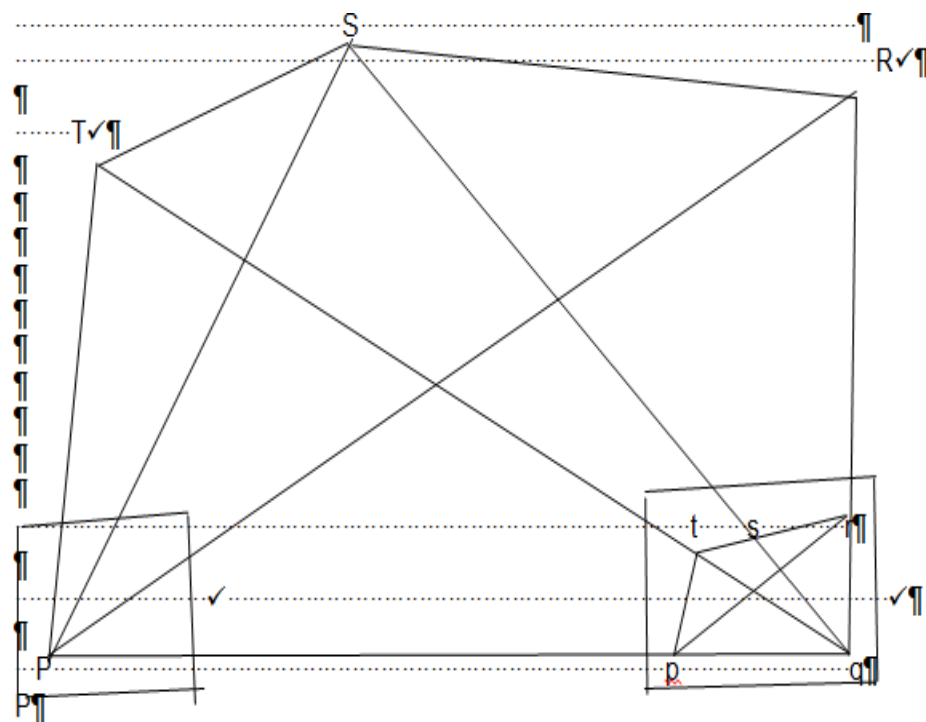
3.1 3.3.1



RADIATION

(4)

3.3.2



Triangulation

(4)

- 3.2
- Production of maps and plans of small areas.
 - For the preparation of reconnaissance and exploratory survey maps and plans.
 - Filling in details between control points established more accurate by theodolite traverse or triangulations, as plane table is faster than the chain survey method.
 - When existing maps and plans are reviewed.
 - For the location of contours.

(5)
[13]

QUESTION 4

- 4.1
- RF = 1:1200
- GU = 660 m (convert to millimetres)
= 660 × 1 000 = 660 000 mm✓
- MU = RF × GU✓
= $\frac{1}{1200} \times 660000$ ✓
- MU = $\frac{660000}{1200}$ ✓
= 550 mm or 0,55 m✓

(4)

4.2 Mu = 83 mm (convert to meters)

$$MU = \frac{83}{1000} = 0,083 \checkmark$$

$$RF = 1:5000$$

$$MU = RF \times GU \checkmark$$

$$= 0,083 \times 5\,000 \checkmark$$

$$= 415 \text{ m or } 415\,000 \text{ mm} \checkmark$$

(4)

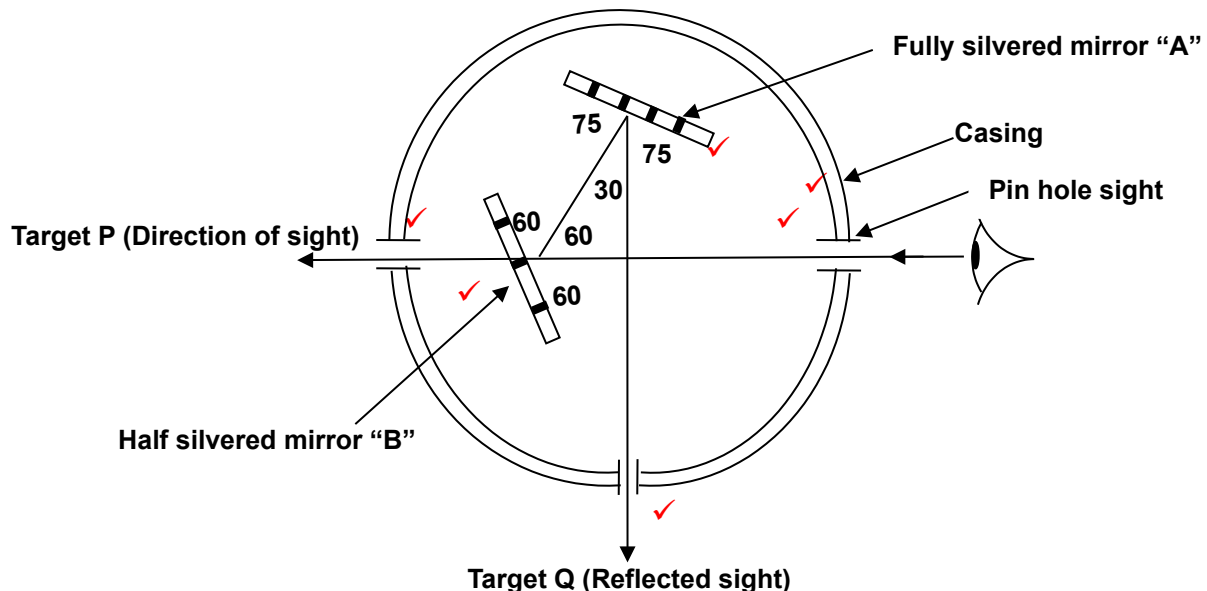
- 4.3
- Scale
 - Speed and cost
 - Skill and experience
 - Control (frame work) – (fixed points)

(4)

[12]

QUESTION 5

5.1



The observer holds the instrument over the selected point and sights the target P ✓ through the half silvered mirror B. ✓ An assistant holding the ranging pole is directed at Q until the pole is seen to coincide exactly with target P in the upper silvered half B, ✓ whereupon a right angle will have been formed. ✓

(10)

- 5.2 A magnetic needle consists of a piece of magnetized cast steel supported at its centre, ✓ which aligns itself in a position determined by the earth's magnetic field. ✓

(2)

- 5.3
- It should be sensitive.
 - The magnetic axis should coincide with the geometrical axis.
 - The ends should lie in the same horizontal and vertical planes as the pivot point.
 - For stability the centre of gravity should be as far below the pivot point as possible.
 - The housing box should be non-magnetic.
- (5)
- 5.4
- Slide
 - Bubble tube
 - Graduated rule
 - Vane with 5 peep-holes
- (4)
[21]

QUESTION 6

- 6.1
- Ct = $L \times e (t_m - t_s)$
 $= 2056,40 \times 0,0000113 (38 - 20) \checkmark$
 $= 0,418 \checkmark$
- CD = $2\ 056,40 + 0,418 \checkmark$
 $= 2\ 056,818 \checkmark$
- HD = $SD \times \cos 15,9^\circ$
 $= 2056,818 \times \cos 15,9 \checkmark$
 $= 1978,127\text{ m} \checkmark$ (6)
- 6.2
- Ct = $L \times e (t_m - t_s)$
 $= 456,51 \times 0,0000112 (14 - 22) \checkmark$
 $= - 0,041 \checkmark$
- CD = $456,51 - 0,041 \checkmark$
 $= 456,469\text{ m} \checkmark$
- HD = $SD \times \cos 7^\circ 49' 10''$
 $= 456,469 \times \cos 7,819 \checkmark$
 $= 452,225\text{ m} \checkmark$ (6)
[12]

QUESTION 7

- 7.1 Geological survey is an investigation of the subsurface of the ground✓ to create a geological map or model.✓ (2)
- 7.2 Hydrographic survey is the gathering of information about navigable waters✓ for the purpose of safe navigation of vessels. ✓ (2)
- 7.3 Topographic survey is a survey that measures the elevation of points on a particular piece of land✓ and present them as contour lines on a plot.✓ It is done to locate features such as hills, rivers, valleys, lakes etc.✓ (3)
- 7.4 Alidade is a sight rule with sighting vanes at both ends✓ it is used for sighting the direction of the distant target,✓ or fitted with a telescope.✓ The edge of the alidade acts as a straight edge, and is used to rule lines,✓ parallel to the observed sight direction, on the paper.✓ (5)
- 7.5 Plumbing fork is a bent steel arm used to position the station point on the ground onto the drawing paper on the plane table.✓ The upper arm on the drawing paper is set in such a way that it points to the position of the ground,✓ and the plumb bob hangs on the lower arm,✓ vertical above the station point which corresponds with the position of the upper arm.✓ (4)

[16]**TOTAL: 100**